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THE PREHISTORY AND HUMAN ECOLOGY OF GARDEN AND COAL VALLEYS: A CONTRIBUTION TO THE PREHISTORY OF SOUTHEASTERN NEVADA

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Department of Anthropology
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Table of Contents

Preface i
List of Figures ii
List of Tables iv

Chapter I - Introduction

Introduction 1
Theoretical and Empirical Goals of Research 3

Chapter II - Natural Setting

Geology and Geomorphology 7
Quinn Canyon and Grant Ranges 7
Worthington Mountains 8
Garden Valley 9
Golden Gate Range 10
Coal Valley and Coal Valley Dry Lake 10
Seaman Range 10
Modern Climate 10
Vegetation and Wildlife 11
Basin Floor/Playa Zone 12
Upper Bajada Zone 12
Lower Slope Zone 13
Summit/Crest Zone 14
Fauna 14
Holocene Environmental Change 15
Recent Ecological Changes in the Area 17
Summary 18

Chapter III - Ethnographic, Archaeological and Historical Overview

Introduction 21
The Ethnographic Record 21
Archaeology 23
History 38

Chapter IV - Civa Shelter II

Introduction 41
Excavation Strategy 41
The Deposits - General 45
Stratigraphic Unit Description 45
Firehearths 49

Chapter IV - Civa Shelter II (continued)

Radiocarbon Dates 51
Ceramics/Ceramic Artifacts 51
Projectile Points/Projectile Point Fragments 54
Bifaces/Biface Fragments 62
Artifacts 68
Drills/Perforators 69
Scrapers 71
Choppers 71
Retouched Flakes 72
Cores 73
Raw Material 74
Edge Damaged/Utilized Flakes 74
Lithic Debitage 75
Manos 76
Metates 77
Pestles 79
Battered Stones 79
Ochre/Pigment Stones 80
Tabular Fragments 80
Bone Awls 80
Bone Flaking Tools 81
Bone Beads 81
Incised Bone 82
Worked/Utilized Bone 82
Bone Pendant 82
Tubular Bones or Bone Beads 83
Gaming Counters 84
Shell Artifacts 84
Perishables 85
Historical Artifacts 85
Human Skeletal Material 85
Faunal Remains 85
Summary/Interpretations 86

Chapter V - Coal Valley Dry Lake Sites

Introduction 101
Collection Strategy 102
Pottery/Ceramic Artifacts 103
Projectile Points/Projectile Point Fragments/Preforms 104
Bifaces 113
Scrapers 119
Composite Tools 120

Chapter V - Coal Valley Dry Lake Sites (continued)

Miscellaneous Chipped Stone Artifacts	121
Ground Stone	121
Metates	121
Manos	122
Atlatl Weight	122
Edge Damaged/Utilized Flakes	122
Cores	123
Lithic Debitage	123
Radiocarbon Dates	124
Summary/Interpretations	124

Chapter VI - Slivovitz Shelter

Introduction	137
Excavation Strategy	137
The Deposits - General	138
Stratigraphic Unit Descriptions	140
Firehearths	140
Ceramics/Ceramic Artifacts	143
Projectile Points/Projectile Point Fragments	145
Bifaces/Biface Fragments	152
Drills/Perforators	154
Scrapers	155
Choppers	155
Retouched Flakes	157
Edge Damaged/Utilized Flakes	157
Exhausted Cores	157
Raw Material	157
Lithic Debitage	158
Ochre	159
Metates/Fragments	159
Manos	160
Battered Stone	160
Pestles	160
Grinding/Pigment Slabs	161
Bone Awls	162
Ochre Stained Bones	163
Tubular Bones or Bone Beads	164
Bone Beads	164
Bone Flaker	164
Worked/Utilized Bone	164
Gaming Counter	165
Shell Beads	165
Faunal Analysis	165
Summary/Interpretations	165

Chapter VI - Avocado Shelter

Introduction 175
Excavation Strategy 175
The Deposits 175
Ceramics 176
Projectile Points 177
Bifaces 177
Miscellaneous Chipped Stone Artifacts 179
Retouched Flakes 179
Lithic Debitage 179
Miscellaneous Ground Stone Artifacts 170
Bone Awls 180
Faunal Analysis 180
Summary/Conclusions 181

Chapter VIII - Site Survey - Garden and Coal Valleys

Introduction 185
Methodology 185
Archaeological Site Types 186
Procedure 187
Results 188
Interpretations/Conclusions 193

Chapter IX - Summary/Interpretations

..... 197

References Cited 201

Appendix I

Sediment Analysis of Civa II and Slivovitz Rockshelters, by J. Sandor 223

Appendix II

An Analysis of the Fauna From Civa Shelter II, Lincoln County, Nevada, by by L. D. Northey 233

Appendix III

Analysis of Two Faunal Assemblages: Slivovitz Rockshelter and Avocado Rockshelter, by L. S. Kobori 245

Preface

This monograph represents a slightly revised version of a doctoral dissertation submitted to the Graduate Division at the University of California, Berkeley in 1978.

The archaeological investigations in Garden and Coal Valleys were sponsored by the Archaeological Research Facility and the Department of Anthropology, University of California, Berkeley.

Numerous people contributed their support and special knowledge to the project and helped make it a success. To those who I have not mentioned below, I offer my apologies and sincere thanks.

I am indebted to the various individuals who served as field crew and laboratory assistants and made the project possible by their capable labor. This project would not have been completed without their enthusiastic and whole hearted support. Ms. Pamels Endweig deserved special recongition for her excellent artifact illustrations which appear in the report.

Special notes of thanks are due to numerous professional colleagues, fellow graduate students, government personnel, the staff of the R.H. Lowie Museum of Anthropology and field camp visitors who were most helpful for their advice, assistance and loan of necessary field equipment. Michael and Barbara Heizer of Hiko, Nevada, deserve special recognition for their generous hospitality during the three seasons of field work.

To the members of my dissertation committee, Professors Robert F. Heizer, A. Roger Byrne and John A. Graham, I express my appreciation of their aid and guidance. I am especially indebted to Dr. Heizer for his encouragement, comments and ever helpful advice.

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Berkeley, 1979

List of Figures

1. Outline Map of Great Basin with Study Area Defined 4
2. Topographic Map of Study Area with Site Locations 5
3. Typical View of Area - Cherry Creek/Golden Gate Range 19
4. View from Civa Shelter I (26-Ny-264) of Coal Valley/Golden Gate Range . 19
5. Study/Reconnaissance Areas of Fowler, Madsen and Hattori (1973) 19
6. Archaeological Overview Site Location Map 37
7. Plan View of Civa Shelter II 42
8. Artist's View of Civa Shelter II Formation 42
9. View of Civa Shelter II Opening and Apron 43
10. View from Civa Shelter II of Garden Valley Area and Open Area in Front of the Shelter 43
11. View of Civa Shelter II Apron and Excavations, 1976 44
12a. Civa Shelter II - North Wall Profile, N8E0 47
12b. Civa Shelter II - East Wall Profile, N6E0 47
13a. Civa Shelter II - East Wall Profile 48
13b. Civa Shelter II - North Wall Profile, N8E2 48
14. Civa Shelter II - East Wall Profile, N10E0 50
15. View of Hearth in Unit N8E2, Civa Shelter II 44
16. Biface Types 65
17. Civa Shelter II - Desert Side Notched/Cottonwood Series Projectile Points 90
18. Civa Shelter II - Rose Spring Corner Notched Projectile Points/Cottonwood Series Points/Ceramic Artifacts 91
19. Civa Shelter II - Desert Side Notched/Elko Corner Notched/Elko Eared Projectile Points/Side Scraper 92
20. Civa Shelter II - Cottonwood/Rose Spring Contracting Stem/Rose Spring Corner Notched Projectile Points 93
21. Civa Shelter II - Rose Spring Corner Notched/Eastgate Expanding Stem/ Humboldt Basal Notch Projectile Points/Tabular Fragment 94
22. Civa Shelter II - Rose Spring Series/Drill Fragment/Type 3 Drill/ Retouched Flake/Type B Bone Bead 95
23. Civa Shelter II - Bifaces 96
24. Civa Shelter II - Bifaces/Drills-Perforators 97
25. Civa Shelter II - Bone/Shell/ Antler Artifacts 98
26. Civa Shelter II - Bone Artifacts 99
27. View of Discrete Lithic Scatter Mound on Former Lake Bed of Coal Valley Dry Lake 102
28. Coal Valley - Great Basin Transverse Points/ Humboldt/Pinto/Elko Series Projectile Points 128
29. Coal Valley - Eastgate/Desert Side Notched Projectile Points 129
30. Coal Valley - Elko/Rose Spring Series Projectile Points 130
31. Coal Valley - Desert Side Notched/Elk Preforms/Bifaces 131
32. Coal Valley - Bifaces 132
33. Coal Valley - Bifaces 133

34. Coal Valley - Preforms/Bifaces 134
35. Coal Valley - Miscellaneous Chipped Stone Artifacts 135
36. Coal Valley - Shoshone Ware Vessel Fragment/Drills/Perforators/Mano 136
37. Artist's View of Slivovitz Shelter 139
38. Plan View of Slivovitz Shelter 139
39. Slivovitz Shelter - North Wall Profils, N5E0 141
40. Slivovitz Shelter - East Wall Profile, N5E0 141
41. Slivovitz Shelter - North Wall Profile, N5W2 142
42. Slivovitz Shelter - Desert Side Notched/Cottonwood Triangular/Eastgate Series/Rose Spring Series/Elko Series Projectile Points 169
43. Slivovitz Shelter - Ceramics/Grinding Slab/Pestle/Choppers/Mano 170
44. Slivovitz Shelter - Bifaces/Humboldt Projectile Point/Scraper/Rose Spring Contracting Stem Porjectile Point/Drill/Perforater 171
45. Slivovitz Shelter - Bone/Shell Artifacts/Drill-Perforators 172
46. Slivovitz Shelter - Bone Awls 173
47. Plan View of Avocado Shelter 176
48. Avocado Shelter - Projectile Points/Bifaces 183
49. Avocado Shelter - Bifaces/Bone Artifacts 184
50. Summary Site Survey Data Coding Key 189

List of Tables

1. Precipitation in Relation to Altitude 10
2. Vegetation Zones Present in the Study Area 12
3. (a,b,c) *Civa Shelter II - Projectile Point Data* *57-59*
4. Civa Shelter II - Selected Projectile Point Metric Attributed Ranges 60
5. Civa Shelter II - Projectile Point Fragments 62
6. Biface Type Criteria 64
7. Civa Shelter II - Typable Biface Data 70
8. Civa Shelter II - Light Duty Chopper Measurements 72
9. Civa Shelter II - Retouched Flake Proveniences 73
10. Civa Shelter II - Lithic Debitage 76
11. Civa Shelter II - Metate Proveniences 78
12. Civa Shelter II - Bone Artifact Proveniences 82
13. Coal Valley - Projectile Point Data 110
14. Coal Valley - Projectile Point Data 111
15. Coal Valley - Selected Projectile Point Metric Attribute Ranges 112
16. Coal Valley - Biface Type Data 116-117
17-20 Slivovitz Shelter - Projectile Point Data 148-151
21. Slivovitz Shelter - Projectile Point Metric Attribute 153
22. Slivovitz Shelter - Typable Biface Data 156
23. Slivovitz Shelter - Lithic Debitage 158
24. Slivovitz Shelter - Ground Stone Distribution 161
25. Avocado Shelter - Projectile Point Data 178
26. Avocado Shelter - Biface Data 178
27. (a-b) Summary Site Survey Data - Garden and Coal Valleys 190-191
28. Site Type Data 192
29. Site Location Data 192
30. Site Vegetation Types 193

Chapter I

Introduction

The Great Basin of western North America has become in the past several decades an area of increasingly important emphasis in regional anthropological research. The "phenomenal" growth in prehistoric, linguistic, ethnohistorical and anthropological studies is readily apparent in a comparison of Grosscup's (1957) bibliography on Nevada archaeology with the impressive compilation of Catherine Fowler (1970) for the entire Great Basin. The development and history of archaeological/anthropological research in the basin has been briefly reviewed by Jennings and Norbeck (1955), D. Fowler (1977), C. Fowler (1977), Hester (1973), Fitting (1973), Bennyhoff (1958), Baumhoff (1958), Steward (1940), Napton (1970), and Aikens (1976) among others.

R. F. Heizer and T. R. Hester have defined four paradigms which have marked the course of prehistoric research in the region (cf. Hester 1973; Heizer and Hester 1978). The first paradigm (as it was defined by Kuhn (1970) as a "problem solving model") is termed "artifact collecting and defining the variation of prehistoric evidence." Persisting between 1912 and 1938 its beginnings can be found in the work of L. L. Loud and M. R. Harrington at Lovelock Cave (Loud and Harrington 1929); M. R. Harrington's research on Puebloid materials in the southeastern basin and at Gypsum Cave in southern Nevada (Harrington 1926, 1938, 1933); the Campbells' work on regional variations in the southwestern basin (E. Campbell 1931; Campbell and Campbell 1935); L. S. Cressman's exploratory research in the northern basin (e.g. Cressman 1942); and Judd's (1917a, b, 1919) and Morss's (1931) research on the Fremont culture of the eastern Great Basin.

This "exploratory phase" paradigm cannot really be considered to have ended since many areas still exist (e.g. north central Nevada, southeastern Nevada) where exploratory work is still being conducted by professional archaeologists.

The second paradigm involved the "fitting of Great Basin prehistory into wider perspective." During this period (1929-1940) researchers attempted to relate and compare their materials to adjoining areas, primarily to the Southwestern cultures. Comparisons were made by Harrington using the Lovelock Cave perishable materials with Basketmaker sites (Loud and Harrington 1929: 119-123) and ceramic and architectural remains from sites in the Virgin-Muddy-Moapa River valley areas (Harrington 1926; 1928). Kroeber (1939: 50) however, cautioned on representing significant affinities as positive identifications and expressed doubts about Harrington's conclusions as additional materials became available. Steward was making similar comparisons in the eastern basin primarily utilizing ceramic typologies from the Southwest to attempt an ordering of cave deposits he had excavated in the Great Salt Lake region (Steward 1936; 1937a).

From the late 1940s to the present a third paradigm is concerned with the

development of an exact chronology. The advent of the radiocarbon dating method spurred this concern for chronological matters and provided a reasonably objective means of dating the cultural sequences. At present, as the number of excavated sites and radiocarbon dates increase, finer and finer correlations among sites and assemblages are made possible as well as contributing to the overall understanding of Great Basin prehistory.

The "ecological interpretation model" is the fourth paradigm defined by Heizer and Hester. This concept was of interest to the early ethnographers because of their awareness of the relationships between man and the environment. Steward's work (1938) can be considered as the first major work on the Great Basin using this concept. In the 1950s ecological concerns led to the formulation of the "Desert Culture" (later changed to the Desert Archaic; occasionally named the Desert Tradition (cf. Willey 1966) concept (Jennings 1953, 1973; Jennings and Norbeck 1955)). This interpretive model, dealing with a cultural system adapted to 'arid' land exploitation/utilization and defined by the presence of certain material culture items, has provided a useful concept in linking and arriving at some understanding of the prehistory and cultural record of the Desert West. However, at least one other significant adaptive system was present in the basin, the "Lacustrine Adaptation," a system keyed to the use of lacustrine resources (Heizer and Krieger 1956; Rozaire 1963; Napton 1969, 1970; Shutler 1968; Heizer and Napton 1970; Jennings and Norbeck 1955; Barrett 1910).

At present, emphasis is on ecological studies dealing with the correlation of environmental and archeological data to give an integrated picture of settlement patterns, subsistence activities and cultural adaptation to the resources available to the prehistoric inhabitants of the basin (cf. Gunn 1975; Bettinger 1977; Thomas 1971a, b, 1972a, b, 1973; Napton 1969, 1970; Swanson 1972; O'Connell 1971 among others).

The study presented in the following pages can be traced as operating directly under the first ("exploration") and third paradigms ("chronology") with some reference to the fourth ("ecological interpretation"). D. Fowler (1977) has noted that with some exceptions, most Great Basin prehistoric studies have been essentially within the historicalist paradigm framed by Leone (1973) and Leach (1973). The historicalist paradigm is a general culture history approach to archaeology based on the assumption that the principal purpose of anthropology (and archaeology) is to understand the spatial and temporal distributions of "traits" and agglomerations of traits: "complexes," "traditions," "cultures," etc. (Fowler 1977: 3-4). Folwer (1977) has noted that implicit in the culture history approach is a concern to determine the relations between culture and environment ("cultural ecology"); to develop, if possible, genetic models of prehistory, relating cultures to languages and populations; and the projection of ethnographic models onto archaeological data.

The study which follows falls within the theoretical framework of the historicalist paradigm, an approach which Aikens (1977) (and undoubtedly many others) in his brief comment on models in Great Basin prehistory, considers as essential and complementary to contributing to a comprehensive view of prehistoric cultural events and processes and deserving of attention in archaeological research.

Theoretical and Empirical Goals of Research

The research focus of this project was designed to provide a clearer and more integrated picture of the prehistory of a relatively unknown portion of southeastern Nevada. The research was centered around the excavation of three rockshelter sites, the collection from a large open site and an archaeological site reconnaissance of the study area. The prime research objectives were defined as:

1) the determination of the antiquity of human occupance and the formulation of a chronological sequence for the area utilizing previously defined projectile point and ceramic types;

2) the determination of variable occupational use/seasonal use of the excavated and surveyed sites where possible;

3) the social/political structure of the aboriginal inhabitants;

4) the man-land relationships existing within the boundaries of the study area - subsistence and settlement patterns;

5) post-glacial environmental change and its effect on the aboriginal inhabitants of southeastern Nevada;

6) culture relationships with other areas (especially the Fremont culture area to the east);

7) to determine if the transitional nature of the area in terms of climate and environment had any appreciable effect on man-land relationships.

The secondary objectives of the archaeological survey were to examine the distribution of sites and the range of artifacts and other material associated with them in order to further our knowledge of both the chronological sequence present and the total economic cycle. The excavations at the three rockshelter sites could only provide narrow aspects of the overall chronological, seasonal and economic patterns in the area and without a broader outline of the temporal span and human ecology, their importance in the general, regional and areal pattern could be fully evaluated. Thus, the primary task of the survey was seen as investigating differences in (a) activity patterns, (b) chronology within the boundaries of the study area and (c) comparing the data with both the stratified sites in order to provide a more integrated picture of the region as well as to place the area within the broader frame of Great Basin prehistory. The research objectives have been satisfactorily realized. The findings and conclusions are presented in the following chapters.

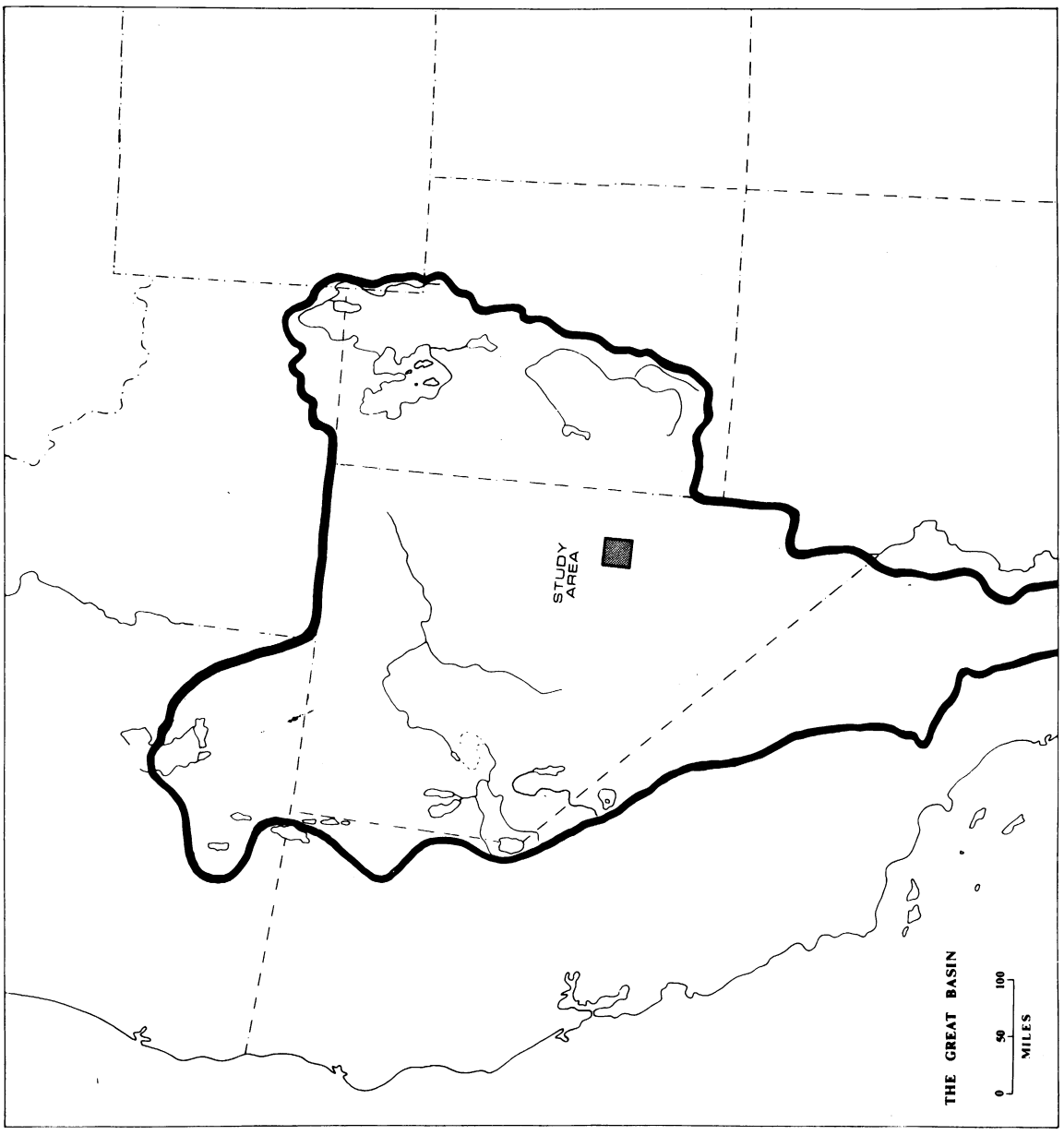


Figure 1: Outline Map of Great Basin With Study Area Defined.

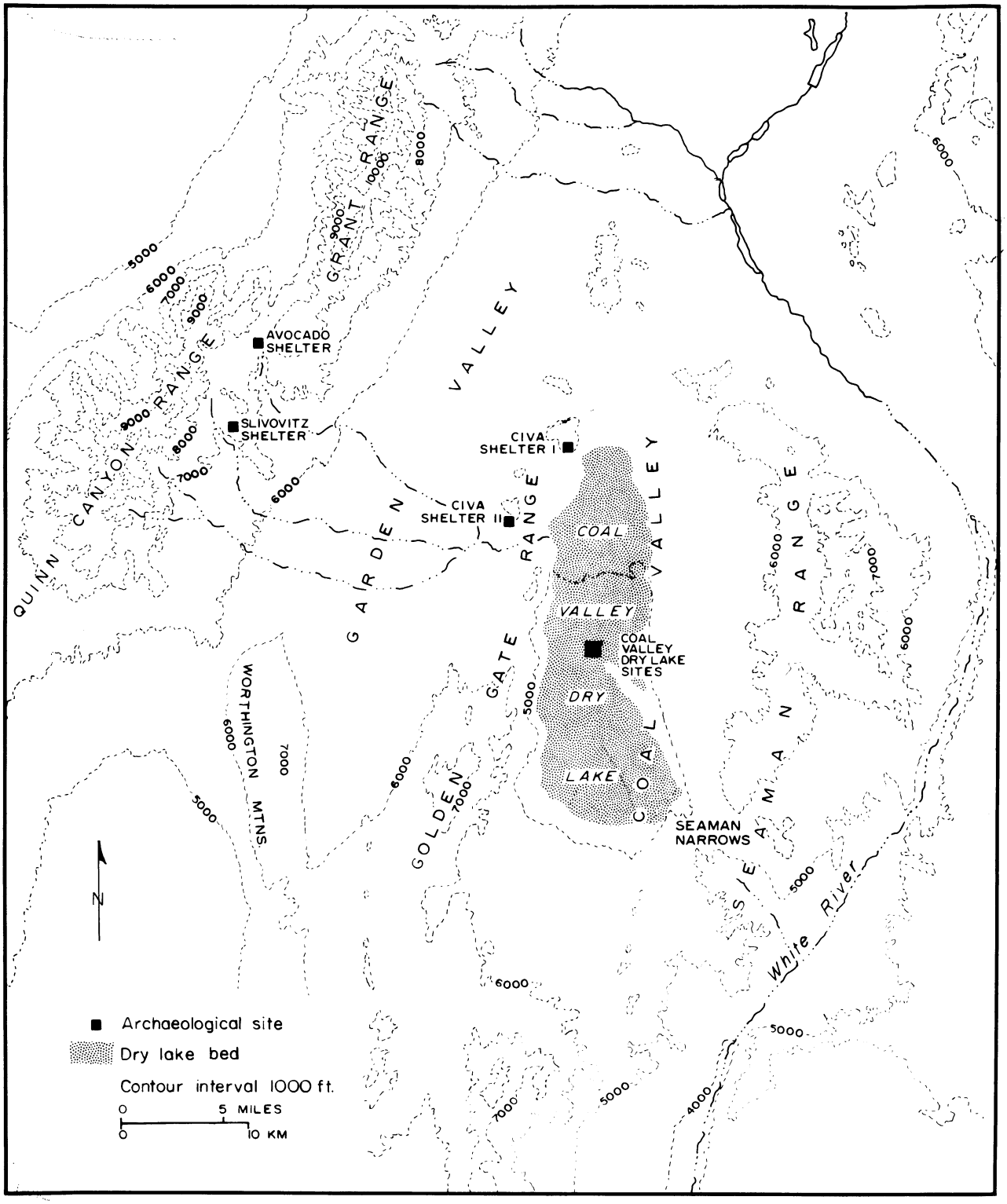


Figure 2: Topographic Map of Study Area.

Chapter II

Natural Setting

The study area is located on the eastern edge of the Great Basin in southeastern Nevada within western Lincoln and southeastern Nye Counties between 38°15' and 37°45' North latitude and 115°37' and 115°07' West latitude (Fig. 1 and 2). The area is within the boundaries of Garden and Coal Valleys.

Geology and Geomorphology

Physiographically the area is within the Great Basin section of the Basin and Range Province (Fenneman 1931) and is characterized by generally north-south trending mountain ranges of block fault or volcanic origin (Tschanz and Pampeyan 1970). Aspects of the geological history of the region have been described by Tschanz and Pampeyan (1970); Kleinhampl and Ziony (1967); Cornwall (1972); Carpenter (1915); Spurr (1903); and Hubbs and Miller (1948). The following descriptions of the regional and local geology/geomorphology draw largely on the general works by Tschanz and Pampeyan (1970), Carpenter (1915), Spurr (1903), and Hubbs and Miller (1948). It is unlikely that the general picture presented by these researchers will be substantially changed by future research although certain specifics may be modified with more intensive research.

Quinn Canyon and Grant Ranges (Fig. 2)

The Quinn Canyon and Grant Ranges form the western boundary of Garden Valley. The Quinn Canyon Range is closely connected, being only slightly offset to the west, with the Grant Range, with the two ranges separated only by a narrow, rock-cut valley through which Cherry Creek drains. The Quinn Canyon Range is broad and short with a north-south length of 25 miles (40 km) and an east-west dimension of 20 miles (32 km). Steep cliffs are present on the east, west and north sides of its northern half where considerable thrust faulting has occurred. The rugged and irregular topography in this portion has been mapped as Pogonip limestone of Orodovician Age while the southern foothills are composed of an eroded mass of Tertiary Age volcanic rocks. Small, steep walled valleys and ravines are present in both sections. The maximum elevation in this group is 10,229 feet (3118 m) near Cherry Creek Summit.

Only the southern portion of the Grant Range is within the study area. This range is a single, steep sided, main ridge, flat and broad on top with a north-south length of approximately 30 miles (48 km). It is cut deeply by a small steep-sided mountain valley which runs out into Garden Valley on the east and Railroad Valley on the west. Preliminary mapping of this range indicates the Pogonip Group (limestone and shaly limestone) of Ordovician Age exposed at the lower elevations with Cretaceous-Tertiary granitic rocks at the higher elevations. The highest elevation is Troy Peak in the central section of this range with a height of 11,298 feet above sea level (3444 km).

Worthington Mountains (Fig. 2).

The Worthington Mountains, a very small group sometimes called the Freiberg (or Freyberg) Range are high, steep-sided (30^{o}), north-south trending mountains bounding Garden Valley on the east and Sand Springs Valley on the west with an extensive field of volcanic rocks in the northern Timpahute Range present to the southeast. This range is a complex, thrust faulted series composed of limestone, sedimentary and granitic rocks. The youngest rocks, of Devonian Age, are at the south end with the northern end composed of Ordovician limestone of the Pogonip Group and highly faulted colomite and quartzite of Devonian Age.

The Freiberg Mining District, organized in 1865 by two prospectors from the Pahranagat Valley is located in the Worthingtons. The mineral deposits are veinlike deposits of gold, silver, led and zinc with scheelite deposits present in tactite (Tschanz and Pampeyan 1970). The total recorded production to date for the district is only $18,000 and at present the mines are inactive. The maximum elevation of the Worthingtons is 8850 feet (2697 km).

Garden Valley (Fig. 3).

Garden Valley is bordered on the west by the Quinn Canyon, Grant and Worthington Ranges and on the east by the Golden Gate Range. The valley, covering 490 square miles (1269 km^2), is approximately 19 miles (30.9 km) in length and ranges from 5 to 12 miles (8.0-19.3 km) in width. It has been filled with alluvial deposited debris from the bordering mountain ranges. The regional slope is to the east with the result that the lower elevations of the Golden Gate Range have been partly buried by this unconsolidated material. Cottonwood, Cherry, Sand and Bruno Creeks with headwaters in the Quinn Canyon and Grant Ranges have carved shallow channels across the valley which unite near the east side and drain through a narrow gap (Water Gap) in the central Golden Gate Range into Coal Valley (Fig. 4). The age of these channels is unknown but they are interestingly similar to the arroyo systems that have been widely recognized in the southwest and dated as being less than one hundred years old (cf. Martin 1963; Leopold 1951). Presumably their formation reflects regional changes in climate and geomorphic processes similar to the erosion and deposition cycles reported by Madsen (1972, 1973a) for Meadow Valley Wash and believed to have been caused by changes in precipitation seasonality. Further geological and geomorphological research may shed light on the processes present in the record for Garden Valley. Aside from this water supply, Garden Valley contains no other sources of surface water and this water only reaches the lowest part of the valley during exceptionally large floods or periods of runoff.

Golden Gate Range (Fig. 2, 3, and 4).

This range is a connected series of low, comparatively simple, westward tilted, north-south block faulted mountains bounded on the east by Coal Valley, on the west by Garden Valley and on the south by Murphy Gap. The range joins the northern

Seaman Range at the north end of Coal Valley and just slightly north of this point dies out in the White River Valley. It is north-south trending and has an extent of ca. 25 miles (40 km) with an average width of 3-4 miles (4.8-6.4 km). The mountains which comprise this range are detached from each other and are separated by narrow stretches of Pleistocene alluvial deposits at approximately the same elevation as the valleys on both sides of the range. Of particular note is the 'Water Gap', the major opening of four openings through which water drained from Garden Valley into Coal Valley Lake during the Pleistocene. The bedrock of this range consists mainly of Paleozoic strata: Guilmette Formation, Pilot Shale, Mississippian limestone, Chainman shale, Scotty Wash Quartzite and Pennsylvannia limestone and sandstone. Along the west side of the range, on progressively younger Paleozoic rocks, is an unconformable volcanic layer that includes a sequence of ignimbrite and basalt.

Coal Valley and Coal Valley Dry Lake (Fig. 4).

Coal Valley is bounded on the east by the Seaman Range which rises 2000-3000 feet (607-914 meters) above the valley floor and on the west by the Golden Gate Range which rises to only 1500-200 feet (457-607 meters) above the valley (Fig. 1). The southern boundary is formed by the northern slope of the North Pahranagat Range and the north boundary by the alluvial divide between the north ends of the Seaman and Golden Gate Ranges. The valley is approximately 30 miles (48 km) long and varies in width from 6 (9.6 km) to 15 (24 km) miles encompassing an area of about 455 square miles (1178 km^2). Topographically the most important features in the valley are the distinct wave-produced terraces and beaches of the now dry Coal Valley Lake. At its greatest the lake was about 14 miles (22.5 km) long, 6 miles (9.7 km) wide and covered approximately 100 square miles (259 km^2). Its maximum depth was ca. 75 feet (23 meters) and the length of its shoreline was about 40 miles (64.4 km). This lake had no outlet and was probably fed by the creeks in Garden Valley draining through the 'Water Gap'. At present, Seaman Springs is the only permanent water source in the valley except for some wells and reservoirs used by the holders of various grazing permits. The former lake bed is now represented by alkali playa areas and sand dunes in the central portion of the valley and is currently being deflated by wind action.

Seaman Range

The Seaman Range is bounded on the east by the White River, on the west by Coal Valley, on the south by Seaman Pass and on the north by Timber Mountain Pass. The southern portion of the Seaman Range is composed of Tertiary volcanic rocks and tuff and the northern portion is composed largely of Paleozoic limestone rocks. The faulting is extensive and complex. The principal feature of the volcanic portion of the range is the broad, dissected cone of an extinct volcano. Maximum elevation is 8650 feet (2636 meters) slightly to the south of Timber Mountain (8630 feet - 2630 meters).

Modern Climate

Climatically the area has a semi-arid continental climate with warm summers

and cool winters. Few climatic data are specifically available for the study area and data from the nearby Pahranagat and Penoyer Valleys have been used to fill this void. Precipitation occurs in the form of winter snow and spring rain (40% of annual total) and in summer a large percentage falls during showers and thunder-showers in July and August. The area is apparently a transition zone between summer and winter rainfall patterns as no one season is dominant in the precipitation pattern.

The average temperatures for stations in the area range from a daily maximum of 76° F (25° C) to a daily minimum of 39° F (4° C). Daytime summer highs can be in excess of 100° F (38° C) on the valley floors and winter lows can reach 21° F (-8° C) (Richardson 1968).

The low precipitation totals in the study area are largely the result of the rainshadow effect of the Sierra Nevadas to the west and intervening mountain ranges that effectively reduce the moisture content of inland moving Pacific Ocean storms during the fall, winter and spring. The Quinn Canyon and Grant Ranges also provide a local rainshadow effect. The average annual precipitation is approximately 8-10 inches (20-25 cm) annually on the valley floors and upper bajadas and varies with elevation with some of the higher mountain elevations receiving in excess of 25 inches (63 cm) annually (Table 1). Snowfall in the area is generally light, about 10 inches (25 cm) annually with the yearly total rarely more than 24 inches (61 cm). Based on the data presented by Richardson (1968) it appears that the mean monthly temperatures have not varied greatly during the time of record but annual precipitation values have fluctuated substantially. For instance, the highest annual precipitation reported has ranged from a high of 14.9 inches (37.8 cm) to a low of 1.2 inches (3.0 cm) over a ten year period indicating that rainfall varied substantially in amount and intensity on a yearly basis. Relative humidity in the area is generally low because of the low rainfall and generally warm temperatures. Evaporation is high during the warm summer months.

Data on wind velocity are non-existent for the area but generally the winds are light to moderate with the average velocity less than 20 miles per hour (32 kmph). Days with no breeze are common during the summer months. Strong winds occasionally accompany local thunderstorms in July and August or active frontal systems in fall, winter and spring. The winds are usually from the south or north due to the general relief of the surrounding mountain ranges (Richardson 1968).

Table 1

Precipitation Zone	Altitude Zone
less than 8" (20 cm)	below 6000' (1829 m)
8-12" (20-30 cm)	6000-7000' (1829-2134 m)
12-15" (30-38 cm)	7000-8000' (2134-2438 m)
15-20" (38-51 cm)	8000-9000' (2438-2743 m)
20+" (51+ cm)	9000+' (2743+ m)

Vegetation and Wildlife

A knowledge of the present resources and environment along with an understanding of past conditions is a necessity in all anthropological/archaeological studies dealing with the Great Basin due to the local variations in both culture and environment. This is especially so, in spite of the seeming uniformity of both culture and environment, with the present emphasis and interest in what has been called the 'systems approach' dealing with the correlation of environmental and archaeological data to give a picture of settlement patterns, subsistence activities and the cultural adaptation to the resources available to the prehistoric inhabitants of the basin (cf. Clarke 1968; Gunn 1975; Bettinger 1977; Thomas 1971a, b, 1973; among others). The following detailed discussion on the vegetation and wildlife is presented because it is necessary to have an understanding of the natural conditions with which the aboriginal inhabitants interacted and to indicate the variety of resources and conditions available to the prehistoric users of Garden and Coal Valleys.

Students of Great Basin vegetation and wildlife have described numerous "communities", "associations", "life zones", and "vegetation zones", the boundaries of which are not always easily distinguished (cf. Billings 1951; Cronquist, et.al. 1972; Hall 1946; among many others). Altitudinal differences which are primarily attributable to climate have most often been used to provide broad scale classifications, while edaphic units or microhabitats have been used to define local types.

The study area belongs environmentally and vegetationally to the Great Basin Desert (cf. Shantz 1925; Shreve 1942; Fautin 1946). Floristically the main portion of the area is included within the boundaries of the Tonopah Section of the Great Basin Division of the Intermountain Region as defined by Cronquist, et.al. (1972: Fig. 56) while a small portion of the northern area is included in the Calcareous Mountain Floristic Section.

In the study area no detailed work has yet been done but research in nearby areas provide a useful basis for comparison. The discussion of the zones and plant species/communities within them relies heavily upon previous research presented by Billings (1951); Beatley (1976); Branson, Miller and McQueen (1967); Conquist, et.al. (1972); and Shantz (1925) as well as on local studies of the soil and vegetation by members of the Bureau of Land Management (various personal communications, 1975-1977), Soil Conservation Service (Harlan Arnold, personal communication, 1977), and the U.S. Forest Service (Gene Smalley, personal communication, 1977). A complete catalogue of all specimens within the boundaries of the study is not presented as it is not the purpose of this paper to duplicate this data and the reader is referred especially to Beatley (1976); Cronquist, et.al. (1972); and Lewis (n.d.) for this specific information if it is of interest. However, all elements necessary to present a general picture of the region have been included along with a number of the species known to have been of some economic/subsistence importance to the aboriginal groups in the Great Basin as based upon ethnographic reports (cf. Chamberlain 1911; Stewart 1942; Steward 1938, 1941; Kelly 1964; Train, Henrichs and Archer 1941; Bye 1972).

Table 2

Zones Present in the Study Area

Basin Floor/Playa Zone - 5000-6000 feet (1524-1676 m)
Upper Bajada Zone - 5000-6000 feet (1524-1829 m)
Lower Slope Zone - 6000-10,000 feet (1829-3048 m)
Summit/Crest Zone - 8500-11,493 feet (2591-3503 m)

Basin Floor/Playa Zone - 5000-5500 feet (1529-1676 m)

This zone, restricted primarily to the closed drainage basins, is characterized by the dominance of Atriplex confertifolia (Shadscale) communities and roughly corresponds to the Shadscale Zone of Cronquist, et.al. (1972). The study area is confined to the middle elevational (4500-5500 feet) zone of these communities which can be described as being dominated by low, widely spaced more or less spiny, grayish, small-leaved shrubs which cover only about 10% of the ground area. Species composition appears to be under the major control of the geologic origin of the soil materials and the local or sporadic distributions of most species are due to local variations in edaphic variables. Quantitative data obtained by Beatley (1976 to the south of the study area indicates a shrub cover ranging from 5.5% - 25.6%, a maximum cover of herbaceous perennials of from 0.1% to 2.4% and a winter annual cover of 0.9% to 8.3%. She further notes that density varies with precipitation. Several distinct plant associations and species are linked directly to local soil conditions. Atriplex-Kochia americana commonly occurs on the heaviest textured soils in the area and on deep, loose sands the most predictable species is Atriplex canescens (Four Winged Saltbush). The edaphically controlled communities are the halophytic ones of which the most important is the Sarcobatus (greasewood) association. This association, dominated by Sarcobatus vermiculatus, usually occurs in the valley bottoms in saline clay soils around the margins of playas (especially Coal Valley Dry Lake) with a sparse herbaceous cover. The main dominant of this zone, Atriplex confertifolia, commonly occurs in mosaic with Ceratoides lanata, a valued forage plant. Since this zone covers large areas of the nearly level terrain of the basin floors it has been subjected to heavy grazing pressure by local ranchers. This has led to the introduction of an introduced annual, Halogeton glomeratus, which is now a serious problem to the local ranchers as it can be lethal to livestock when eaten in large amounts.

Upper Bajada Zone - 5000-6000 feet (1524-1829 m)

This zone, dominated by Artemisia tridentata, occurs on the deeper, permeable salt-free soils of the upper bajadas (alluvial fans) of the closed drainage basins usually forming a broad band of more or less uniform vegetation between the Basin Floor/Playa Zone and the Lower Zone. It is characterized by a fairly dense to open vegetation with relatively large (0.6 - 0.9 meters high) non-spiny shrubs with perennial and annual grasses and forbs present. Shrub cover from Beatley's (1976) studies averaged 32.6% of which

95% was due to Artemisia tridentata. Herbaceous perennials are represented by a large number of species but except for grasses are seldom present as more than occasional plants on any given area. Their maximum cover ranged from 3.8 - 6.6% (Beateley 1976) nearly all of which was due to the perennial grasses Stipa spp., Sitanion hystrix and Oryzopsis hymenoides. Beatley makes no mention of Bromus tectorum (cheet grass) an introduced winter annual which is dominant on the overgrazed portions of the study area (along with Halogeton), especially in this zone. Winter annuals ranged from 5.3% to 7.7% in cover. Artemisia nova tends to dominate or co-dominate with A. tridentata on the steeper, rocky slopes with shallow soils. This zone corresponds to the Sagebrush Zone described by Cronquist, et.al. (1972). Beatley (1976), Cronquist, et.al. (1972) and Lewis (n.d.) should be consulted for additional data on the zone and for a more extensive listing of species present.

Lower Slope Zone - 6000-10,000 feet (1829-3048 m)

This zone is characterized by pinyon pine/juniper stands in the lower elevations and by White fir (Abies concolor) in the upper reaches. Pinyon pine (Pinus monophylla) and juniper (Juniperus osteosperma) form a more or less open shrub woodland with scattered small trees of juniper first co-occurring with Artemisia then followed by pinyon pine within 200-300 feet (61-91 m) increase in elevation in the lower portions of the zone (6000-9000 feet; 1829-2743 m). Pinyon pine usually continues upslope at the interface with the White fir for several hundred feet after the juniper has disappeared.

Above the tolerance limits of pinyon pine and below the tolerance limits of limber pine (Pinus flexis) and bristlecone pine (Pinus longaeva), White fir (Abies concolor) is the dominant with an understory composition of scattered grasses and sage interspersed with mountain mahogany (Cercocarpus ledifolius).

Beatley (1976) points out that pure stands of juniper or pinyon pine can occur within the lower elevations of this zone without either of the Artemisia species (A. tridentata, A. arbuscula) present in the shrub layer. Quantitative studies conducted by Beatley (1976) to the southwest of the study area indicate that total tree and shrub cover can vary from 35% (on outcropping bedrock) to 44% with maximum herbaceous perennial cover varying from 7.0 - 31.0% with 69.0 - 99.0% of the cover due to perennial grasses, especially species of Stipa. Winter annuals are usually only represented near the lower limits of this zone with a cover of 16% reflecting the large size of plants in areas of high rainfall. Climatic differences, lower temperatures and higher precipitation exert some influence on the physiognomy and species composition in the zone. From her work in south central Nevada (Beatley 1976) notes that half of the plant species of this region are known to occur somewhere in this zone due to the diversity of geologic substratas and erosional and depositional features and it is highly likely that future botanical studies in this portion of Nevada will confirm this. Two micro-habitats are known to be present in the Lower Slope Zone. These can best be described as Valley Bottom-Perennial Stream (in the vicinity of Upper Cherry Creek) and Spring/Seepage areas usually located along the upper reaches of the canyons in the vicinity of the 'headwaters' of many of the ephemeral streams.

This zone roughly corresponds to the Pinyon-Juniper Zone and Upper Sagebrush-Grass Zone described by Cronquist, et.al. (1972). Beatley (1976), Lewis (n.d.), and Cronquist, et.al. (1972) should be consulted for an extensive listing of species common to the zone.

Summit/Crest Zone - 8500-11,493 feet (2591-3503 m)

This zone is limited to the high areas of the Quinn Canyon and Grant Ranges. This open subalpine forest is primarily bristlecone pine (Pinus longaeva) and limber pine (Pinus flexis) with some sagebrush, various grasses and forbs. The trees average 30-40 feet (9.1-12.2 m) in height at the lower limits of the zone and form the characteristic shrub-like krummholz at timberline (cf. Cronquist, et.al. (1972: 135). The zone roughly corresponds to Cronquist, et.al. (1972) Limber Pine-Bristle Cone Pine Zone and Basin Range Alpine Tundra Zone designations and they should be consulted for additional data and observations.

Fauna

In terms of mammalian fauna the study area lies within the boundaries of the Upper Sonoran, Transition, Canadian and Hudsonian Life Zones as described by Merriam (1898: 36). These life zones, essentially based on temperature gradients, are described by Hall (1946) in his monumental work on the mammals of Nevada as being clearly discernible and of great utility in studying the distribution of organisms because of zone distinctness. However, he does note, and implicitly caution, that the zone concept is less useful in studying the biota of the high country because of some upward extensions of Upper Sonoran fauna into these upper zones.

Life Zone Equivalencies

Basin Floor/Playa Zone	
Upper Bajada Zone	Upper Sonoran
Lower Slope Zone (lower elevations)	
Lower Slope Zone (higher elevations)	Transition
	Canadian
Summit/Crest Zone	Hudsonian

Hall (1946: 33-37) lists several species of small mammals indicative of these various zones (but not necessarily present over the total area). The reader is referred to Hall (1946) and BLM (1969a) for a complete list of mammals occurring in Nevada according to Life Zone.

The number of species occurring in the Upper Sonoran Life Zone is 83 (the largest number of all zones), Transition 68, Canadian 54, and Hudsonian 37. In terms of primary economic or subsistence utilized species (cf. Steward 1938; Kelly 1964; Stewart 1942), mammals (especially Rodentia and Lagamorpha) and large herbivores

(black-tailed deer (Odocoileus hemonius), antelope (Antilocapra americana), mountain sheep (Ovis canadensis) are found seasonally in all but the highest zone and are primarily located in the Upper Sonoran and Transition Life Zones.

Van Denburgh (1922), Stebbins (1966) and BLM (1971) describe the species of reptiles common to the area (mostly diurnal lizards and nocturnal snakes) and Hubbs and Miller (1948), La Rivers (1962) and BLM (1973) should be consulted for a discussion of the fish resources present in the region. Lindsdale (1936) and BLM (1969b) discuss and list the avifauna of the area which at the time of our fieldwork was limited to sightings of several hawk species.

Holocene Environmental Change

During the past thirty years there has been a continuing debate among students of Great Basin prehistory as to the significance to human settlement of post-glacial climatic change (Antevs 1948, 1955; Aschmann 1958; Baumhoff and Heizer 1965; Bryan and Gruhn 1964; Jennings 1957; Martin 1963; Swanson 1966; Fowler 1972, 1977; Elston (ed.) 1976; among others). One basic unresolved issue is the validity of Antevs's three part model of climatic change and its cultural effects. Various paleoecological studies have been undertaken throughout the Basin with either indirect or direct emphasis on determining the chronological boundaries of the climatic subdivisions proposed by Antevs; the postulated effects of climatic change, both cultural and ecological; regional and local variations in chronology and effect and so on. Mehringer (1977) has admirably summarized these studies (based on both geological and biological evidence) and has proposed a regional synthesis although he cautions against the acceptance of paleoclimatic models which claim relevance for the Great Basin as a whole.

Fowler (1972) has discussed the climatic chronology and Baumhoff and Heizer (1965) have reviewed its perceived effect on man.

Southeastern Nevada

The data available for southeastern Nevada (and the study area in particular) are extremely limited and studies dealing with Holocene climatic changes and effects are few in number.

To the west in the Toquima Mountains in the vicinity of the Big Smoky and Monitor Valleys, Kautz and Thomas (1972) have reported on the palynological investigations of two cave middens from Toquima Cave and Gatecliff Shelter. The results obtained are rather inconclusive but Thomas and Kautz suggest the possibility of a gradual replacement of a relatively dessicated woodland-savannah by a more mesic pinyon-juniper woodland about 3400 B. P. This shift corresponds quite closely to the conventional Holocene climatic sequence proposed by Antevs (1948, 1955) of a shift from a warm dry Altithermal climate to a cooler, moister Medithermal.

To the south, Spaulding's studies in the Sheep Range of Clark County dealing with the late Quaternary vegetation changes have involved both palynology (Spaulding 1974) and fossil wood rat midden analysis (Spaulding 1977). While most of Spaulding's data (1977) is tentative and covers the period before 10,000 B. P., his analysis of the Canyon Two midden dating between 330 and 1900 B. P. (1977: 8) indicates a Holocene climatic oscillation from xeric to mesic conditions based on the macrofossil record. A pollen spectrum obtained from a bighorn sheep dung deposit slightly north of the Canyon Two midden (Spaulding 1974) shows a slight but consistent increase in arboreal pollen (AP) at ca. 3600 B. P. This is consistent with the rise noted in AP at O'Malley Shelter (Madsen 1972, 1973a) 85 km to the east at around 3700 B. P. This appears to represent a plant association more mesic than the present vegetation.

The Tule Springs Site in the Las Vegas Valley to the south of the study area, reflects a trend towards warmer and drier conditions as indicated in the pollen spectrum change from juniper-sagebrush to sagebrush-shadscale starting around 12,000 B. P. and culminating in a vegetation similar to the present lower elevation Mohave Desert by 7000 B. P. This drying phase is marked by several short term reversals at about 10,500 - 10,000 B. P. and 8500 - 8000 B. P. (Mehringer 1967). The pollen record for Tule Springs is incomplete after 7000 B. P. although Mehringer (1967) is of the opinion that no major changes have occurred after this date.

Harper and Alder's (1970, 1972) recent studies of macrofossil plant remains from both Danger and Hogup Caves in northwestern Utah provide some evidence for vegetational history and climatic change in the eastern Great Basin. Based on their studies they recognize a dry period lasting from ca. 10,130 to 9750 B. P. followed by more moist conditions and then another general dry period from 8000 - 3000 B. P. Two moist periods, a brief one at ca. 6000 B. P. and a longer one at 1500 - 600 B. P. interrupt the 'dry' sequence. Harper and Alder conclude that the present climate is more arid at present than at any time during the past 10,000 years.

Madsen's (1972, 1973a, b) research to the southeast in the nearby Meadow Valley Wash area is the most relevant to the study area. The 7000 year pollen record from O'Malley Shelter (Fowler, Madsen and Hattori 1973) is interpreted by Madsen (1972 1973a: Fig. B2 and B4) as indicative of a juniper-sagebrush dominated community about 5500 B. P. changing to a more open savanna-like, grass-sagebrush community with some juniper and oak at around 3900 B. P. Sagebrush-juniper is dominant at 3000 B. P. with a gradual change to vegetation similar to the present juniper-pinyon woodland by 900 B. P. There is no record of significant changes from 900 B. P. to the present.

Plant macrofossils from 2 fossil woodrat (Neotoma sp.) middens partly substantiate the pollen record. One, dated around 300 B. P. (Madsen 1973a: 141), is essentially modern and dominated by juniper while in the other, dating from about 4400 B. P. (Madsen 1973a: 141) juniper is rare.

From Madsen's research it is apparent that only minor changes in the vegetation

patterns have occurred in the Meadow Valley area and by extension in the Garden and Coal Valley region.

Examination of the alluvial sequence in Meadow Valley Wash has revealed 5 cycles of erosion and deposition occurring in less than 2400 years. Madsen (1973b) believes that these were caused by changes in precipitation seasonality with erosion being caused by the dominance of summer rainfall and deposition by a shift in dominance to winter rainfall.

Additional research on Holocene climatic change and its ecological/cultural consequences is currently ongoing in all regions of western North America. The point to be made in discussing Holocene environmental change is that small changes in climate can have major environmental consequences as the recent history of the post-pluvial lakes in the Great Basin indicates. For the study area, it is highly likely that the small changes in climate, as seen in the palynological and macrofossil records, had a major effect on environment and hence subsistence. More research is needed, however, to determine the significance of postglacial climatic change, both for the study area in specific and the Great Basin in general.

Recent Ecological Changes in the Area

Various areas within the region have undergone substantial ecological changes since post-contact times, primarily due to the introduction of livestock. These significant modifications have primarily occurred on the Basin Floor/Playa and Upper Bajada Zones where shrubs and introduced annuals (largely sage and cheet grass) have expanded at the expense of the native bunchgrasses (cf. Beatley 1976; Young, Evand and Major 1972). Wheeler (1875) comments extensively on the amount and quality of bunchgrass available in the surrounding valleys and Carpenter (1915) notes large amounts of bunchgrass present in southern Coal Valley. Today, in much of these areas, bunchgrasses are a very insignificant percentage of the total cover with sage (Artemisia spp.) and cheet grass (Bromus spp.) the present dominants. As Beatley (1976) rightly points out, Bromus spp. has become so integrated into various communities at so many sites and over so large an area, that, were its history of introduction not known, it would be inferred to be one of the many winter annual species. Another common introduced winter annual, commonly occurring on disturbed Basin Floor/Playa Zone soils in closed drainage basins, is Halogeton glomeratus. Introduced from Central Asia the herbage Halogeton provides a strong dose of oxalic acid which when consumed in large amounts, becomes lethal to grazing livestock. No successful method of control has yet been found (cf. Cronquist, et.al. 1972).

While the major cause of change has been linked to overgrazing and subsequent invasion by introduced annuals, a possibly important factor has been the suspension of the aboriginal practice of periodic firing of the grasslands and increased control of naturally caused fires. Aboriginal burning is widely known to have been practiced in California (cf. Lewis 1973), western North America (cf. Stewart 1963) and in various

parts of the Great Basin (Steward 1941: 281, 1943: 303; Stewart 1941: 376; Kelly 1932: 82) for the purpose of encouraging the growth of seed-bearing grasses or in game drives. Native faunal populations have not been exempt from modification. Antelope are almost extinct within the study area boundaries primarily due to competition with sheep (domestic) and to a lesser extent with cattle. The faunal remains from South Fork Rockshelter to the northwest indicate an abundance of elk (cf. Heizer, Baumhoff and Clewlow 1968) but the presence of this species is not reported for historic times. Deer have increased at the expense of antelope as the increases of shrubs and the decline of perennial grasses has tended to favor them. A small number of Mountain sheep (Ovis canadensis) are currently on the Grant Range although Hall (1946) notes that their range was probably more extensive in the past.

In summary, the present vegetation and faunal patterns have changed greatly due in a large part to Anglo-American impact on the area.

Summary

The study area and its immediate environs, while geologically complex and floristically diverse, has a relatively simple and reasonably clearly defined vegetation pattern. The Basin Floor/Playa Zone, made up of Garden and Coal Valleys, is occupied by Atriplex confertifolia with some herbaceous cover. The Upper Bajada Zone (a zone of coalescing alluvial fans) begins at about 5000 feet (1524 m) elevation and is dominated by Artemisia tridentata and various grasses. This zone forms a narrow altitudinal band between the Basin Floor/Playa Zone on the valley bottoms and the Lower Slope Zone dominated by pinyon-juniper in its lower elevations. The Lower Slope Zone is found between 6000 - 10,000 feet (1829-3048 m) elevation on the slopes of the various mountain ranges present and is dominated by an open shrub woodland vegetation of Pinus monophylla and Juniperus osteosperma with some herbaceous cover in its lower reaches while in the higher elevations the overstory composition is primarily White fir (Abies concolor) with an understory composition consisting mostly of sage (Artemisia Spp.) and grass with mountain mahogany (Cercocarpus ledifolius) interspersed throughout. The Summit/Crest Zone is located in high areas ranging from 8500 - 11,493 feet (2591-3503 m). Tree species are primarily Bristlecone pine (Pinus longaeva) and limber pine (Pinus flexis). Some Artemisia Spp., various grasses and forbs are present in the lower regions of the zone. Substantial variation exists among these zones in terms of the variety, amount and seasonal distribution of subsistence resources that could be utilized aboriginally.

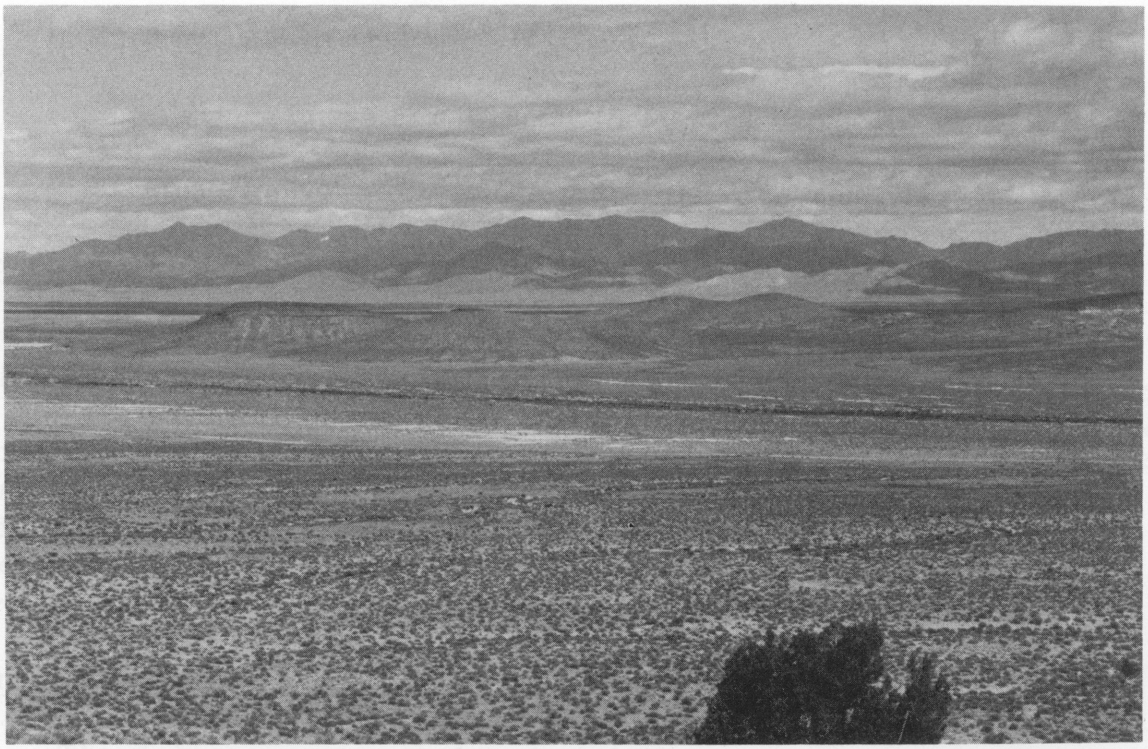


Figure 3: Typical view of area showing Garden Valley and Cherry Creek in the foreground and the Golden Gate Range in the background. Basin Floor/Playa Zone and Upper Bajada Zone Vegetation.

Figure 4: Typical view of area from Civa I (26-Ny-264). Golden Gate Range and Water Gap in upper right. Coal Valley and Dry Lake to the upper left. Basin Floor/Playa Zone and Upper Bajada Zone vegetation.

Chapter III

Ethnographic, Archaeological and Historical Overview

Introduction

The following brief summaries are included to provide the ethnographic, archaeological and historical background for the study area. Ethnographic data from the existing literature are used to identify the aboriginal territorial boundaries of the groups occupying the region and to provide an ethnographic context for archaeological interpretation. The data and the references presented below, while not extensive, are provided primarily for background information and to form a framework in which to place the archaeological evidence recovered from the excavations and site survey in the study area.

The Ethnographic Record

The study area appears to have been held by the Shoshone and Southern Paiute tribal groups (Kelly 1934: Map 1; Steward 1937, 1938; and Stewart 1966). Steward (1937, 1938), Stewart (1966) and Euler (1966a) are in essential agreement with Kelly's (1934) determination of the Southern Paiute boundaries and for our purposes, the boundaries indicated by Kelly will be accepted as valid and accurate. Very little is known ethnographically or ethnohistorically about the historic Southern Paiute inhabitants of the study area. Within the area defined by Kelly (1934), the Southern Paiute were divided into fifteen subgroups, bands, or tribes which are defined as "dialectic units with political concommitants." Steward (1938: 181) questions whether all of these groups fulfilled the requirements of 'bands' and suggests that it is probable that the aboriginal number of politically independent groups were nearer to Powell and Ingalls's (1874) list of 131 and that this estimate was probably short of the actual number. Of these groups, only one is known to have occupied or used a portion of Coal Valley and quite possibly Garden Valley (cf. Steward 1937: 627 and Fig. 1). The boundaries of this group, listed by Hodge (1906: II, 202) as the Paraniguts ("people of the marshy spring"), recorded by Powell and Ingalls (1874) as the "Paraniguts of Paranigut Valley," by Kelly (1934) as the Paranigat and by Fowler and Fowler (1971) as the Pahranaguts of Paranigut Valley (possibly a modernized version of Powell and Ingalls's list) are located by Kelly (1934: 554) as follows:

> "On the east they are bounded by Pahroc range, on the west by Desert Valley. The northern boundary is best described as passing between Irish Mountain and Golden Gate Range, thence northeast to Pahroc Range. The southern boundary crossed "Delmar Mountain" south of Coyote Spring to a point just south of the dry lake in Desert Valley. The Shoshone, speaking an unintelligible language, surround the Paranigat on the north and west; with them relations were cordial."

Powell and Ingalls's (1874) list of tribes as presented in Fowler and Fowler (1971: 104) mentions a 'Pah-ran-a-guts tribe' in the 'Paranigut Valley' with a population of 65 men, 58 women and 48 children under the control of An-ti-av, chief in 1873. F. H. Head (BIA 1868: 173-180), Superintendant Indian Affairs, Utah Superintendancy, notes some details on the Pah ranagat [sic] and lists a population of 700 in 1867 but otherwise gives little detailed information. There are no published ethnographic data on this band except for a brief account of shamanistic practices by a Pahranagat Valley shaman (Kelly 1939) although Sale (BIA 1865: 152-157), Acting Special Agent for the Utah Superintendancy, does describe in some detail the Pahranagat Valley and the silver mine near the present site of Hiko. Otherwise, he offers only very general information on the Pai-utes within the southern boundaries of the Utah Territory.

Elsewhere, Kelly (1964) has detailed the ethnography of the Southern Paiute while Euler (1966b) has compiled a volume on the ethnohistory. Recently Ruppert (1976) has published an ethnographic summary of the Southern Paiute in the Lake Mead recreation area.

The Southern Paiute generally followed a hunting/gathering lifeway - a broad spectrum economy which made maximum use of a limited territorial range of micro-environments. Kelly (1964), Stewart (1942) and Ruppert (1976) present a general view of Southern Paiute subsistence. Limited farming was practiced by some groups, primarily in the vicinity of the Muddy, Virgin and Santa Clara Rivers (cf. Fowler and Fowler 1971: 112; Winter 1976; Euler 1966b: 111-112; Kelly 1964: 39-41). The archaeological evidence presented in Fowler, Madsen and Hattori (1973) for the Pahranagat Valley and regions adjacent to the study area (Fig. 5) indicates that the valley was a center for Southern Paiute peoples who utilized the springs in the area for the irrigation of some crops. Fowler, et.al. (1973:7) quote a letter from James M. Day to Governor Henry G. Blasdel of Nevada dated August 25, 1865 from the Carson City Appeal concerning the *Paiutes (Southern) use of the valley. The letter describes the "Parranagut Mining District" (cf. Hulse 1971) and adds:*

> "The Indians in the vicinity of these mines are a band of the Piute tribe, about four hundred strong, and know but little of the White man. But a few of them had ever seen a 'pale face' before they saw our party. They are disposed to be friendly and are industrious.
>
> "To a limited extent and in a rude manner they cultivate the soil; raise wheat, corn, pumpkins, irrigate the soil by conveying water through ditches constructed by them the distance of a half mile in some instances with no other tools than sharpened sticks to work with."

Fowler, et.al. (1973:7) suggests that the wheat may have been derived from that planted by a Mormon exploring party in 1858 in Meadow Valley (Fig. 5).

While the study area was apparently shared by both the Southern Paiute and Shoshone (Kelly 1934: Map 1; Stewart 1966; Steward 1937, 1938), ethnographic data on the Shoshone groups of the area is limited. Steward (1938) has some recorded information for the Shoshone of Railroad Valley (pp. 117-121) to the west; the groups to the north in the Ely area (pp. 121-123); for the Spring, Snake and Antelope Valley Shoshone to the northeast and east (pp. 123-131); and Cave Valley to the east (p. 131) but has no references for any of the Garden/Coal Valley area except for a map notation "Shoshoni and Southern Paiute" (1938: Fig. 8).

Apparently the Railroad Valley Shoshone utilized the Quinn Canyon Range (Shoshoni name - Biadoya) for pinyon nut gathering in the fall (Steward 1938: 117-118) although Steward also notes that the Tybo Creek band in the Kawich Mountains (1938: 111) also knew of the Quinn Canyon Mountains but did not journey to them for pinyon nut gathering.

Population density in the Railroad Valley area has been estimated at approximately 1 person per 9 square miles (Steward 1938: 117).

In general the Shoshone groups ringing the study area followed a hunting/gathering economy similar to the Southern Paiute, based on the gathering of various plant resources (especially seed and pinyon nuts) and the hunting of various small to large mammals (especially rabbits, deer and bighorn sheep). No horticulture was practiced by the eastern Shoshone groups although Steward (1938: 119) notes the practice of sowing wild seeds for future harvest.

The hunting/gathering lifeway of the Shoshone has been described and discussed by Steward (1938, 1955, 1970), summarized in numerous doctoral dissertations on the Great Basin (cf. Thomas 1971a) and discussed in many papers (Thomas 1971b, 1972a, b, 1973a; Davis 1963; among many others). It will not be discussed in this report although references to the "Shoshone Lifeway" will refer to the general patterns discussed in previously cited works.

The Archaeological Record

Archaeological research in the eastern Nevada portion of the eastern Great Basin in the vicinity of the study area has been limited (cf. Hester 1973 for a brief review of the area). The following pages will review and summarize the archaeological research dealing with several of the major sites and surveys in the immediate and surrounding region that are of value in understanding and comparing the data from Garden and Coal Valleys.

Dr. Don D. Fowler of the Desert Research Institute (University of Nevada, Reno) has directed several research programs of excavation and archaeological survey in eastern Nevada during the past 10 years (Fowler 1968a, b; Fowler, Madsen and Hattori

1973). Eighty-six sites have been recorded in a survey to the northwest of the study area in Elko, Eureka and White Pine Counties. Of these, five have Shoshone ceramics present and Puebloid pottery was collected from two sites. Projectile points noted during the survey include Desert Side Notched, Rose Spring, and Eastgate Series, Cottonwood Triangular, Elko Series and Humboldt Concave Base points (Fowler 1968a). The major site excavated by Fowler (1968b) during his research was Newark Cave in White Pine County (Fig. 6). The site yielded a stratigraphic sequence of Desert Side Notched, Eastgate, Rose Spring, Cottonwood, Elko and Humboldt Series projectile points dating between A.D. 1100 and 3000 B.C. Shoshone ceramics were common in the upper deposits and one Snake Valley Black-on-Gray sherd was recovered from 0-20 cm implying contact to the east with the Fremont Culture. Faunal remains indicated a major reliance on small mammals, especially lagomorphs (Sylvilagus spp., Lepus spp.) and Marmots (M. flaviventris). Large mammals noted included antelope, deer and tentatively Bison bison. Mountain sheep (Ovis canadensis) was represented by only a few bones.

In summary Fowler (1968b) indicates that the inhabitants of Newark Cave followed a lifeway comparable to that of the Desert Archaic, hunting rabbits, marmots and some artiodactyls while gathering various seeds and pinyon nuts. The intermittent or seasonal occupation has been radiocarbon dated as falling between ca. 3000 B.C. and A.D. 1100.

In 1973, Fowler, Madsen and Hattori, as part of their continuing interest in southeastern Nevada published the "Prehistory of Southeastern Nevada" based on the excavation of three major archaeological sites, O'Malley Shelter, Conaway Shelter and the Scott Site, all located between 50-70 miles (80-112 km) east of the study area. In addition, they conducted a general archaeological survey and a series of test excavations in the Lower White River Valley; Pahranagat Valley and Pahroc Range area; Delmar Valley and Mountains; Dry Lake Valley; Upper Meadow Valley Drainage; Middle Meadow Valley; Clover Creek; Cedar Ridge; Rainbow Canyon area; upper and lower Beaver Dam Wash area; and the Fairview Range and Mule Shoe Valley (Fig. 5).

O'Malley Shelter, 16 miles (26 km) east of Caliente is a south facing solution formed cavity situated in mixed sagebrush-juniper vegetation. A pinyon-juniper woodland lies immediately north of the site. The deposits of the shelter consist of alternating layers of cultural debris and naturally deposited alluvium. Several sequential occupation units have been defined. Unit I is the oldest cultural unit and is characterized by Elko Series points. Unit II is the largest cultural unit and contained numerous artifacts, including Pinto and Humboldt series projectile points. Unit III is characterized by a large number of Gypsum projectile points. Unit IV has been labelled as "transitional" due to the presence of both Elko and Gypsum Series points. Unit V is described as Fremont-Anasazi and is characterized by Snake Valley and North Creek Gray ceramics as well as Rose Spring Series projectile points. Unit VI is noted by the appearance of Shoshonean pottery and Eastgate series points mixed with Fremont and Puebloid cultural materials. Unit VII is classified as historic. The suite of C-14 dates for the site (cf. Fowler, et.al. 1973: 15) suggests an occupation range of 5150 B.C. to A.D. 1060.

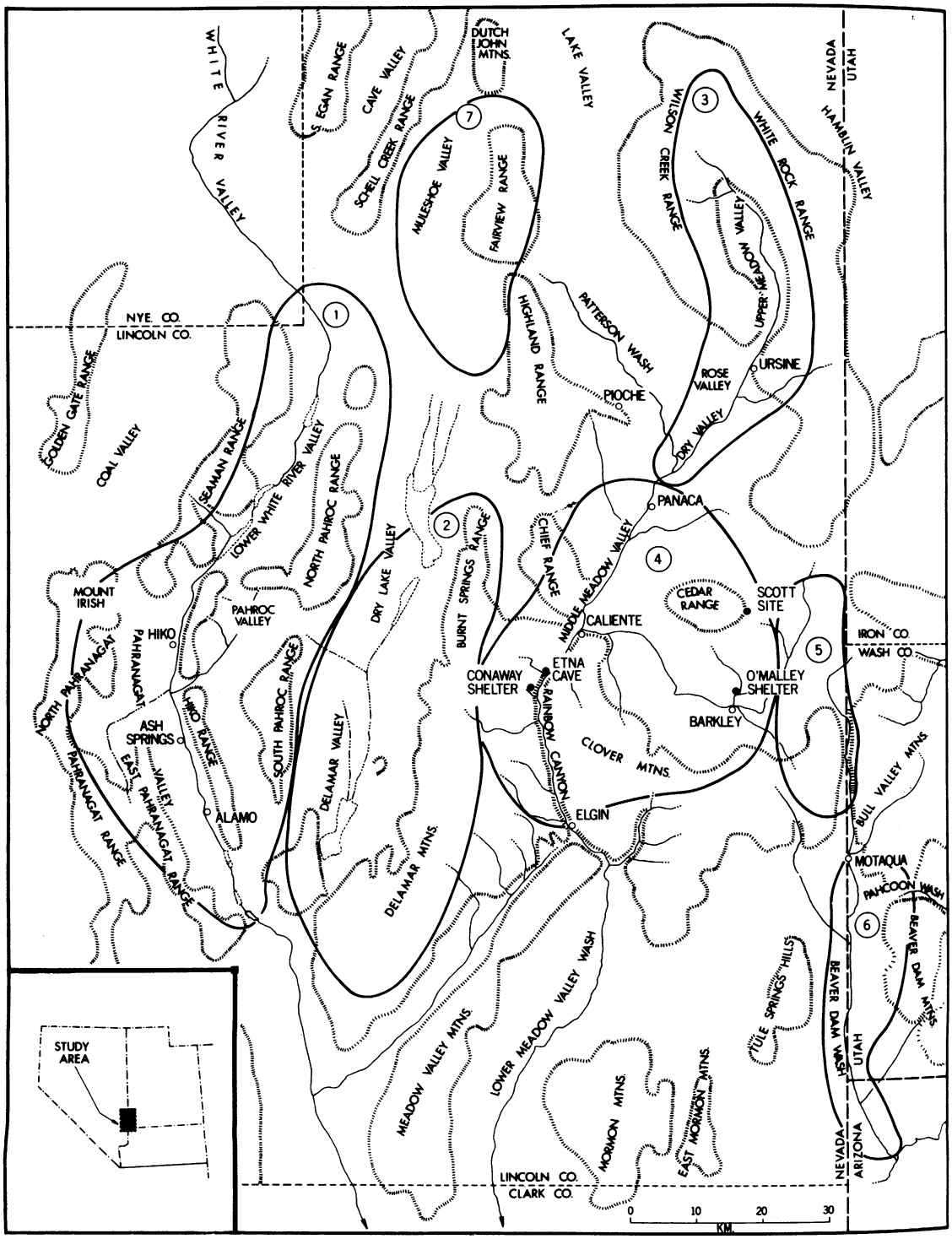


Figure 5: Study/Reconnaissance areas of Fowler, Madsen and Hattori (1973).

The O'Malley Shelter data indicate an intermittent occupation of over 7000 years. Desert Archaic material is present in Units I - IV existing from ca. 7200 B. P. to ca. 6000 B. P. for a first occupation and from 4600 B. P. to ca. 3000 B. P. for the second. An apparent hiatus is present between Units II and III accounting for the two different occupations. Radiocarbon samples from Units IV and V apparently indicate a second occupational hiatus of over 2000 years duration between the two layers. Fowler, et. al. (1973: 35) suggest that the gap between the Desert Archaic and Fremont occupation may possibly be around 1000 years (rather than 2000 years) similar to the hiatus at the nearby Conaway Shelter.

Unit V represents occupation by the Parowan Fremont at ca. A. D. 1000 and the presence of Virgin Branch ceramics suggests either tradeware or actual occupation of the site by groups from the south. A time range of A. D. 950 - A. D. 1200-1300 is postulated for this occupation.

Unit VI is characterized by both Fremont and Shoshonean components suggesting either separate or concurrent use. Fowler, et. al. (1973) suggest that these data supports the thesis of a Shoshonean entry into the area around A. D. 1000.

Continued utilization of the site by Shoshonean groups is noted in Unit VII. No radiocarbon dates are available for Units VI and VII but it is suggested (Fowler, et. al. 1977: 55-56) that deposition in Unit VI dates from ca. A. D. 1100 with the Fremont component ending at ca. A. D. 1300 while Unit VII deposition ends at ca. A. D. 1965. Much of the material in the disturbed Unit VII is attributed to historic Anglo use.

Subsistence at O'Malley Shelter was based on the gathering and hunting of locally available plant and animal foods. The brief faunal analysis presented (Fowler, et. al. 1973: 49-51) suggests a dependence on large herbivores (deer, bighorn sheep) and small mammals, primarily lagomorphs. The major activity at the site for all occupations was the production of chipped stone artifacts primarily from locally available obsidian (53%) and chalcedony (31%) nodules. The Conaway Shelter located 5 miles (8 km) south of Caliente in Echo Canyon and southwest of Etna Cave (Wheeler 1942) had slightly under 6 meters of deposit present with seven distinct cultural levels interleaved between seven sterile alluvial strata. Strata VII, the earliest occupation level, and VI both have Elko Series projectile points present and are followed by a Western Fremont and Puebloid occupation (Stratum V) with Rose Spring, Cottonwood and Elko Series points present. Stratum IV is characterized by a mixed Fremont, Puebloid and Shoshonean occupation with Snake Valley Gray Ware, Puebloid ceramics and Shoshonean tradition pottery present in association with Rose Spring and Cottonwood and Elko Series points present. Strata II and III are mixed Shoshonean and Fremont occupations, based on the ceramics and projectile points (Rose Spring and Desert Side Notched points). Stratum I yields a large number of Shoshonean ceramics and an Eastgate Series projectile point.

Three intermittent occupations occurring between ca. 1000 B. C. to historic times are represented at the Conaway Site. The first occupation was by a Desert Archaic

group around A.D. 1 or earlier. The second occupation by Puebloan peoples around A.D. 1000 occurred after an occupation hiatus of ca. 900-1000 years. This was followed by a Parowan Fremont occupation which was in turn coeval in part with a Shoshonean occupation continuing into the historic period.

Subsistence at the site was based on the gathering and hunting of locally available plants and animal foods. The list of identifiable bones from the shelter (Fowler, et.al. 1973: Table 24) indicates an apparent reliance on bighorn sheep, mule deer, jackrabbit and cottontail rabbits. The chipped stone industry, as at O'Malley Shelter, shows a preference for the use of obsidian (60.5%) over chalcedony (78.5%).

Six miles (10 km) from the O'Malley Shelter and 13 miles (21 km) southeast of Panaca is the Scott Site. At an elevation of 7014 feet (2138 km), the site is located in the immediate vicinity of a fossil spring. The midden deposit varied from 25-119 cm in depth with no apparent stratigraphy present. Fremont and Puebloan ceramics were found throughout the fill with Shoshonean Ware sherds occurring only in the upper 20 cm of the deposit. Elko and Rose Spring Series projectile points were recovered from all levels of the midden deposit. A small assemblage of chipped stone and bone artifacts were also recovered. The Scott Site has been interpreted as as open camp site around a spring probably used as a temporary hunting camp. The faunal remains present indicate that bighorn sheep, mule deer and rabbits were hunted. Fowler, et.al. (1973: 70) suggest that the site may have been utilized as a pinyon gathering site although they note that very few grinding implements were recovered and that pinyon pines are few and widely scattered in the area at present.

Primary occupation was by Western Fremont (Parowan subarea) groups with concurrent or subsequent occupation by Shoshonean groups. The single radiocarbon determination of 970 $\pm$ 120 years is in general agreement with other dates from the area.

The archaeological survey of the previously mentioned areas (Fig. 5) conducted by Fowler and his associated between 1967 and 1970 recorded a total of 151 sites for the surveyed area. Of these, six were tested and the previously described sites, O'Malley Shelter, Conaway Shelter and the Scott Site extensively excavated. Fowler, et.al. (1973: Table A1) have classified the recorded sites as follows:

1. Petrograph Sites - 28 recorded. Petroglyph and pictograph panels. Some found single, others on the wall of occupied shelters or adjacent to camp or lithic sites.

2. Rockshelters - 32 recorded. Occupation sites in rockshelters yielding evidences of continued or sporadic aboriginal occupation.

3. Open Camp/Gathering Sites - 46 recorded. Sites with pottery and/or ground stone artifacts mixed with lithic

debris. Usually located on ridges of knolls adjacent to springs or streams within pinyon-juniper areas, but found within creosote and black brush areas in the Pahranagat Valley.

4. Chipping Stations - 37 recorded. Sites with concentrations of lithic debris, but lacking pottery or ground stone. Usually located on ridges or knolls overlooking springs, water course or game trails.

5. Hunting Blinds - 5 recorded. Low, dry laid rock walls, usually circular or semi-circular, located at heads of canyons or other areas commanding game trails or springs.

6. Architectural Sites - 5 recorded. Confined to lower Beaver Dam Wash area. Surface evidences of unit pueblo or pit house construction. Collected artifacts indicate cultural affiliation with the Virgin Branch Anasazi culture.

7. Historic Sites - 10 recorded. Includes graves, cabin foundations and mill ruins.

8. Miscellaneous - 1 site. So-called "Indian Playground."

Tables A2-A12 in the report (Fowler, et.al. 1973: 101-118) present the site descriptions, locations and other data for the surveyed sites. Six of the surveyed sites were tested for cultural remains and the results are summarized below.

Site 26LN112 is a rockshelter at an elevation of 4400 feet (1342 m) in an unnamed canyon which enters Rainbow Canyon near Elgin. Two petroglyph panels and three pictograph panels are present on the back wall of the shelter (Fowler, et.al. 1973: Fig. A2, c-f). Three strata were noted during the excavations with only Stratum I yielding any culturally and temporally diagnostic artifacts. Ceramics from this level included Shoshone Ware, Fremont ceramics (Snake Valley Gray) and Puebloid pottery (Shinarum Brown) along with a Rose Spring Corner Notched point. Stratum II had only obsidian and chalcedony debitage present. The site data are interpreted as the result of a brief pre-ceramic or possibly non-ceramic occupation followed by a later brief occupation by Puebloan and Shoshonean groups.

Site 26LN204 is a shallow rockshelter on the east side of the Pahranagat Valley at an elevation of 4052 feet (1235 km) slightly north of Hiko Lake. Badly vandalized, the site yielded Shoshonean and Puebloan ceramics (Shinarump Brown, Snake Valley Gray, Snake Valley Black-on-Gray) and an Elko Corner Notched point as well as several other chipped stone artifacts. Recovered faunal remains include bighorn sheep, mule deer, jackrabbit, cottontail, badger and domestic cow. The site was apparently occupied during Puebloan and Shoshonean periods.

Site 26LN241 is another small rockshelter at an elevation of 6700 feet (2042 m) on the east flank of Mount Irish on the west side of the Pahranagat Valley. Two strata were observed with the upper 10 cm of the deposit yielding Shoshonean Ware ceramics and a Rose Spring Corner Notched point. Two Elko Eared and one Elko Corner Notched points were recovered from the lower 15 cm of Stratum I. Faunal remains include bighorn sheep, bobcat, cottontail and mule deer. Historic Anglo refuse was present on the surface. The presence of Shoshonean ceramics and a Rose Spring point indicate minimal use of the site by Shoshonean peoples while the Elko Series points may indicate an earlier brief use by Desert Archaic peoples (Fowler, et.al. 1973: 123).

Site 26LN401 is a small cave in the immediate vicinity of the Conaway Site at an elevation of 4600 feet (1403 m). Four strata were recognized, two of which had cultural materials present. The uppermost stratum contained a Shoshone Ware sherd and several waste flakes. Stratum III, beneath a culturally sterile Stratum II, contained a Snake Valley Gray sherd and a worked bone object. Fowler, et.al. (1973: 124) suggest that these two occupations are probably related to the occupation of the Conaway Site down the canyon.

The badly vandalized Stine Canyon Shelter I (26LN402) is a small cave located near the confluence of Stine Canyon at an elevation of 4234 feet (1290 m). No stratigraphy was present in the 25-75 cm thick deposit due to previous vandalism. Fremont and Shoshonean artifacts and numerous organic remains were recovered. A small number of cultigen remains including Fremont dent corn, beans (Pahseolus vulgaris), pumpkin (Curcurbita pepo) and wild coyote melon fragment (Curcurbita palmeta or feotidissima) were recovered. The recovery of these specimens appears to strengthen the inference that horticulture was practiced in the Meadow Valley area during the Puebloan period as well as confirm an 1865 report that Southern Paiute were practicing horticulture in the area (Fowler, et.al. 1973: 133).

Stine Canyon Shelter II (26LN406), a large rockshelter, is on the south side of Stine Canyon and ca. 2 km upstream from the confluence of the canyon with Meadow Valley Wash. Over 160 red and yellow zoomorphic, anthropomorphic and geometric pictographs are present on the walls and ceiling of the site (cf. Fowler, et.al. 1973: figs. A11-A13). Seven strata, 3 containing cultural materials were noted in the test excavations. Stratum I had 2 Shoshonean sherds plus 12 flakes present; Stratum IV contained Snake Valley Grey pottery and waste flakes; and Stratum VI had 5 Elko Eared point fragments, a Gypsum Type A point, 2 gaming pieces, a scraper, core, flake tool and 136 pieces of lithic debitage present. The occupation apparently represents intermittent use by Desert Archaic, Puebloan and Shoshonean groups.

Summary

A tentative reconstruction of the area has been offered by Fowler, et.al. (1973), based on a series of excavations and an archaeological reconnaissance. The study area was initially occupied by Desert Archaic peoples around 7000 B.P. Occupying O'Malley

Shelter and other open sites in the area, they utilized local plant and animal foods. Faunal remains indicate the hunting of bison, bighorn sheep, mule deer, birds, rabbits, ground squirrel and other rodents. Large amounts of lithic debitage at O'Malley Shelter indicate the manufacture of chipped stone tools utilizing locally available obsidian and chalcedony nodules. This occupation by Desert Archaic peoples continued intermittently until ca. A.D. 1 with several periods of 'abandonment' for the area postulated as occurring between ca. 6500 B.P. - 4600 B.P., 3000/2000 B.P. - ca. A.D. 1 and ca. A.D. 1 until ca. A.D. 1000.

The area was then re-occupied ca. A.D. 1000 by Puebloan peoples probably from the Parowan Fremont subarea to the east but possibly also by groups from the Virgin Branch Anasazi region to the south. The artifacts from the Fremont occupation indicate a lifeway based on horticulture as well as on hunting and gathering. During this period there appears to be a reliance on small game rather than on the hunting of large mammals. Site survey results suggest some reliance on the gathering of pinyon nuts as a large number of sites are located among the pinyons. No pueblos were noted and it is suggested that the occupation may have been seasonal or intermittent rather than permanent (Fowler, et.al. 1973: 72). Some trade was carried on as indicated by the presence of Virgin Branch ceramics from the south.

The Puebloan groups abandoned the area ca. A.D. 1000-1200 prior to which Sohsohnean peoples had entered the area. Ceramics and artifacts of both groups co-occur at O'Malley Shelter implying two distinct cultures and ceramic traditions. Alternate or coeval occupation of the area is postulated and it is suggested that the apparent paucity of Fremont ceramics in the Pahranagat Valley may indicate that Shoshonean groups were the principal occupants of this valley but may have ranged eastward into Meadow Valley to hunt and gather pinyon nuts as well as to trade with the Fremont peoples. Fowler, et.al. (1973: 135) suggest that the Delamar and Highland mountains mark the southwestern boundary of the Parowan Fremont range.

The Shoshonean groups followed a hunting/gathering lifeway and remained in the area until historic times after the disappearance of the Fremont people around A.D. 1200-1300. Some horticulture was practiced by the Southern Paiutes. From the survey and excavations, it is apparent that the area was marginal to both the Parowan Fremont and Virgin Branch peoples and may have served primarily as a hunting and gathering region rather than as an occupation locus.

In summary, based on Fowler, et.al.'s research, the archaeological record for the area indicates intermittent occupation by three cultural groups - the Desert Archaic, the Puebloan (Parowan Fremont and Virgin Branch Anasazi) and the Shoshoneans - between ca. 7000 B.P. and the historic period.

In the Caliente area near the Conaway Shelter site (cf. Fowler, Madsen and Hattori 1973), Wheeler (1942; also 1935, 1937a, b, 1938, 1939) has reported on the excavation of Etna Cave (Map 5). Fowler (1973) undertook a restudy of the available

materials from the site and reprinted the original site report. Wheeler interpreted the material found in the upper levels of the site as belonging to the Basket Maker-Pueblo phase established for the lower Virgin Valley to the south. Fowler (1973) notes that the uppermost Pueblo II level ceramics were probably a mixed collection of Parowan Fremont and Virgin Branch types. The Basket Maker III level ceramics have been classed as Snake Valley Gray assignable to the Parowan Fremont culture or North Creek Fugitive-Red from the Virgin Branch area (Fowler 1973: 3). Fowler (1973) assumes this Basket Maker III level to simply be the lower level of a Pueblo II and III occupation based in part on the ceramics and the presence of Fremont basketry.

The Basket Maker II occupation beneath the Basket Maker III deposition was made on the basis of projectile points (Wheeler 1942). Elko Series and Gypsum Series points are present in this level. From sites in the vicinity, Elko Series points have a time range of over 7000 years while Gypsum Series points have a span of between 2500 B.C. - A.D. 1000 (cf. Fowler, et.al. 1973: Tables 1 and 4). Once thought to be an Early Man site based on the apparent association of a Gypsum Cave point with 'Pleistocene' horse dung, restudy and C-14 determinations of the materials coupled with comparisons and dates from other sites indicate no 'great' antiquity for the site. Based on the present C-14 dates and projectile points/ceramics present, it appears that the site dates from ca. 4000 B.C. to ca. 800 B.P., a temporal span not inconsistent with other sites in the area (cf. Fowler, Madsen and Hattori 1973).

Aside from Fowler's extensive work in southeastern Nevada, work in the immediate and near vicinity of the study area has been extremely limited. Dr. Richard Brooks of the University of Nevada, Las Vegas, has been actively conducting fieldwork in the area for the past several years under contract for various public land managing agencies. Several site surveys and excavations (Brooks 1974, 1976, 1977) have been completed and reported on in preliminary form. The Mount Wilson Fire Rehabilitation Area Surface Survey (Brooks 1974) was an intensive surface reconnaissance of ca. 2500 acres in central eastern Lincoln County on the east side of the Wilson Creek Range (cf. Fig. 5). Vegetation in the area is pinyon/juniper, rabbit brush, various grasses with a riparian biota present in the vicinity of the springs. The average elevation of the survey area is 7000 feet (2134 m). Ninety sites were located with the heaviest site concentrations present on ridge top, ridge edges, alluvial slopes and adjacent to springs. Fifty-seven sites were classified as lithic scatters; 13 had lithic debitage and pottery present; nine had manos and metates; and nine had stone circles (architectural features) present.

The preliminary data analysis indicates an apparent association of Rose Spring Series, Cottonwood Triangular and Desert Site Notched projectile points. Elko Eared, Pinto and Humboldt Series along with Northern Side Notched points were noted at isolated sites. Shoshone Fremont and Puebloid ceramics were recovered from several sites and Brooks has assigned a temporal range of ca. A.D. 800 - Historic for them. A tentative chronology based on "current literature interpretations" of the projectile point typologies is offered in the report and is presented below.

Cottonwood Series	ca. A.D. 900 - Historic
Desert Side Notched	ca. A.D. 900 - Historic

Eastgate/Rose Spring Series	ca. A.D. 1 - Historic
Gypsum Series	ca. 2000 B.C. - ?
Elko Series	ca. 2000 B.C. - A.D. 1000
Pinto Series	ca. 3000 B.C. - 500 B.C.
Humboldt Series	ca. 4000 B.C. - A.D. 500

A tentative use/occupation range of 4000 B.C. - Historic has been assigned to the area.

A right-of-way archaeological survey commissioned by the Nevada State Highway Department in the White River drainage resulted in the locating of 15 sites along a 10 mile portion of SR-38 about 15.7 miles (25.3 km) north of Hiko (Brooks 1976). Eleven of the sites are small lithic scatters with no diagnostic projectile points present. The remaining sites are 3 small rockshelters, one with petroglyphs present, and a petroglyph site in association with a small lithic scatter. One rockshelter site (LN 618) associated with several petroglyph panels was excavated as part of the highway mitigation program and is summarized below.

The Mariah Site (26-Ln-618) is the only excavated rockshelter site in the immediate vicinity of the study area. Located in the southwest corner of Lincoln County approximately 7 miles north of Hiko along SR-38, the site was excavated by the Nevada Archaeological Survey, Southern Division under the direction of Richard Brooks in 1976 (Brooks 1977). Facing to the north and located in the sagebrush-grass zone, the site is associated with a petroglyph panel with elements consisting of parallel lines, geometric designs and mountain sheep. A series of test units were excavated and varied in depth from 1 meter to slightly under 3 meters. Seven strata were defined in the preliminary report for the midden deposit (cf. Brooks 1977: 25-28) and a varied assemblage of artifacts and cultural materials was recovered. Eleven diagnostic projectile points, Cottonwood Triangular, Desert Side Notched, Eastgate and Rose Spring Series, and Elko Series were recovered from the deposits. Fremont ceramics from the Parowan subarea (Snake Valley Black-on-Gray, Sevier Gray plus several undefined types) predominate (96.5%) while Virgin Branch ceramics comprise 3.5% of the total. No Shoshone Tradition ceramics were noted. The aboriginal occupation of the site was probably related to seasonal use for gathering and hunting. No faunal analysis is presented in the report but the recovered materials include burnt artiodactyl long bones. Brooks (1977: 46) has assigned a time range of A.D. 950 - A.D. 1200-1300 for the occupation of the site based on a radiocarbon date and the recovered temporally diagnostic artifacts.

Heizer and Hester (1973) have reported on a series of petroglyph sites in the Lower White River Valley to the north of the Mariah Site and to the east of the study area. Styles present include Great Basin Curvilinear, Rectilinear, Representational and Scratched. Puebloan influence is apparent at several of the sites. Aside from the site descriptions and figures presented in Fowler, Madsen and Hattori (1973) and Townley (1970), this is the only published study on rock art in the immediate area.

Within the boundaries of the study area, Busby (1977) has reported on the

excavation of a small rockshelter in the northern portion of the Golden Gate Range. Several test excavations recovered Rose Spring Corner Notched, Cottonwood Triangular and Desert Side Notched projectile points along with a small ground and chipped stone artifact assemblage. The site has been interpreted as a temporary campsite probably intermittently occupied by Shoshone/Southern Paiute groups sometime between A.D. 600/700 to Historic times.

York (1977), as part of the Bureau of Land Management's efforts to publicize the research potential of government 'in-house' cultural resource management reports/surveys, has published a series of short reports on the Sunnyside area on the northern boundary of the study area. Two lithic scatters were noted, one with Pueblo Black-on-White and Shoshone ceramics present and the other with an Elko Series projectile point. Both sites have been interpreted as seasonal camps. To the northwest York (1975) has reported on preliminary research in Long Valley, White Pine County (Fig. 6). Tadlock's (1966) initial report on the area reported surface collections that included crescents (Great Basin Transverse Points) associated with 'early' projectile point types (Clovis, Folsom, Scottsbluff, Angostura). York reported 55 sites primarily lithic scatters and test excavated 5 sites to check for subsurface cultural materials. Pinto style points (the most common), one Hell Gap point, a Type III "Butterfly" crescent, Shoshone ceramics, various stemmed projectile points and food grinding implements were among the artifacts recovered during the research on the valley floor. A surface reconnaissance of the surrounding mountain periphery recorded four quarry sites and one rockshelter yielding Elko Series, Desert Side Notched and Gypsum Cave points. York (1975) interprets the data to suggest that the Long Valley floor was mainly utilized during the Holocene (Anatherma Period) by aboriginal peoples exploiting an environment that was radically different from the present. The early forms of projectile points appear to suggest a temporal placement of between 9000 B.C. - 5000 B.C. (York 1975: 9) with later occupations present in the surrounding mountains. A final report on the research has not yet been published.

Recent work by Fowler (1976) in the Cave Lake area of the Schell Creek Range has led to the recording of 12 archaeological sites, preliminary lithic scatters. Artifacts collected during the survey and test excavations included Snake Valley Gray Ware, Shoshone Ware, Gypsum Series A, Rose Spring Corner Notched, Elko Eared, Elko Corner Notched and Desert Side Notched projectile points along with a small assemblage of ground and chipped stone artifacts. One pictograph site was also noted.

The archaeological evidence is interpreted by Fowler (1976) as being indicative of intermittent occupation by Desert Archaic, Parowan Fremont and Shoshonean groups between ca. 3000 B.P. to historic times concerned with exploiting local plant and animal foods. Seasonal occupation during the fall is suggested for the gathering of pinyon nuts.

Several site reports and archaeological surveys are available for the Baker area in White Pine County near the Utah border and to the northeast of the study area (Fig. 6).

The Smith Creek Canyon area has several sites present. Preliminary work by M.R. Harrington (1926) at a large cave (Wh-26) at the mouth of the canyon yielded Pueblo pottery. Black-on-Gray sherds, corn cobs, and a 'Pueblo' pitcher were noted in Indian Council Cave, also in Smith Creek Canyon (Harrington 1926).

Smith Creek Cave, tested by Harrington in 1934, yielded the remains of a Pleistocene horse from the base of the cave deposits. Harrington noted that the horse bones were split and he attributed the fractures to cultural activities. Wheeler's (1936) excavations yielded numerous horse bones and those of the extinct giant condor (Teratornis, cf. Howard 1952). Recent excavations by Bryan (1972) uncovered 3 occupations of the site. The earliest has been identified as an "undisturbed Lake Mohave Period living floor" with a small assemblage of stone and bone artifacts. Following the "Lake Mohave" occupation and separated by 2 meters of 'fossiliferous red silt' is an occupation characterized by the presence of a Rose Spring Corner Notched projectile point. The last occupation of the cave was by Puebloid peoples. Amy's Shelter, also in Smith Creek Canyon, has been excavated by Gruhn (1972). Originally noted by S.M. Wheeler (1936), the shelter contains a complex cultural sequence. Stream laid deposits near the base of the excavations contain occasional chert flakes and bone fragments. A Lake Mohave projectile point and two lanceolate points similar to the Humboldt Concave Base type along with lithic debitage were found in the "Brown IX" alluvial fan deposit as indicators of the earliest human occupation of the site. The overlying "Brown VIII" stragum yielded Humboldt Series points and a large square-based lanceolate projectile form. Units "Yellow VII, VI and Brown VI" are characterized by Gypsum Cave points. Large corner notched points were found in the overlying "Yellow V" unit and the following "Brown V" stratum yielded numerous large corner-notched points resembling the Elko Corner Notched point type along with scrapers, bifaces, choppers, hammerstones, several bone awls, a few manos and a milling stone (metate?). A large amount of cultural debris was also present. Succeeding levels or layers have corner notched or basal notched and barbed projectile points (Rose Spring-Eastgate Series??) present. Two Puebloid ceramic sherds occur in "Brown II." The upper 10 cm of the deposit is attributed to historic aboriginal occupation. Faunal remains are noted as being from mammals in the bighorn sheep/antelope/deer size range with the remains of small mammals and birds also present. Gruhy (1972) suggests a virtually continuous occupation of the site from 10,000 years to historic times.

Kachina Cave, located in the near vicinity of Amy's Shelter, has recently been re-excavated by Tuohy (1971). Originally excavated by Harrington (1932), the site's name derives from the Kachina-like pictographs on the rockshelter walls. Tuohy (1971) has discerned at least eleven clearly separate occupations, ending with the historic period. The first occupation of the shelter was probably more than two or three thousand years ago and is characterized by the presence of large corner notched projectile points similar to those found in the "Yellow V" unit at nearby Amy's Shelter (Gruhn 1972). Puebloid ceramics (Snake Valley Gray ware), corn cobs, bone beads and ornaments and projectile points typologically similar to Rose Spring Corner Notched and the Eastgate Series were found in the upper levels. Tuohy (1971) attributes the last occupation of the site to Shoshonean groups involved in the baking of yucca and the hunting of mountain sheep.

Snake Creek Canyon, also near Baker, was briefly surveyed by Shutler (1961). Two rockshelter sites, Wh-42 and Wh-43, yielded North Creek Gray ceramics as well as several other artifacts. Shutler (1961) classifies these sites as temporary campsites probably used during spring, summer and fall for hunting and gathering purposes. No temporal span has been assigned to the two shelters.

Rusco (1970) has a brief report on a petroglyph site in the Snake Range near Baker. Four styles, Great Basin Curvilinear, Rectilinear, Representational and Pit and Groove were present. She suggests a time range of 5000/3000 B.C. to A.D. 1500 for the site based on the styles present. Three other sites in White Pine County are also noted.

Taylor (1954) has reported on the Garrison Site slightly to the east of Baker, Nevada (Fig. 6). Classified as a "sedentary gardening community" growing maize and squash, the site yielded Snake Valley Gray, Corrugated, Black-on-Gray, Sevier Gray and Greal Salt Lake Gray and is located within the boundaries of the Parowan Fremont subarea (cf. Madsen 1977: Fig. 1). Two house types are present. One is the adobe Kanosh type with the second a large single roomed unit with jacal walls erected in a pit. Subsistence appears to have relied on a combination of agriculture and hunting/gathering. Faunal remains indicate a reliance on antelope and mountain sheep. Taylor (1954) suggests a date of A.D. 1000 based on the ceramics but the recent compilation by Madsen (1977) would appear to suggest a range of A.D. 400-1350 (?).

The Moapa Valley (Fig. 6) of southern Nevada has been a region of archaeological emphasis since the original survey by Harrington (1929). This area contains evidence of the Pueblo intrusion into southern Nevada around A.D. 500 with architecture and ceramics present similar to those of the Southwest. The movement of Pueblo peoples into the area may have been due in part to fluctuations in rainfall patterns in the Southwest (cf. Aschmann 1958; Kroeber 1939). While Harrington (1930) and others (cf. Osborne 1941; Colton 1945; Schroeder 1953; Shutler 1956; Shutler and Shutler 1962) have conducted excavations and reconnaissances in southern Nevada since the 1930s, Shutler's (1961) investigations and analysis of Harrington's data on the Puebloid remains at "Lost City" or Pueblo Grande de Nevada have resulted in the definition of a four phase "Virgin Branch" cultural sequence.

I.	Moapa Phase	? - A.D. 500	(Basketmaker II)
II.	Muddy River Phase	A.D. 500 - A.D. 700	(Basketmaker III)
III.	Lost City Phase	A.D. 700 - 1100	
IV.	Mesa House Phase	A.D. 1100 - 1150	(Pueblo II)

Each phase has been described in some detail (architecture, ceramics, artifacts, etc.) by Shutler (1961: 67-69) and will not be summarized here.

Based on his work both at Lost City and in the surrounding region, Shutler has postulated a time range of A.D. 500 to A.D. 1150 for the Pueblo intrusion into southern

Nevada suggests a range of A.D. 700-1100 for the Puebloid occupation in contradiction to Shutler (1961). The Southern Paiute entrance into southern Nevada is believed by Shutler (1961: 69) to have occurred between A.D. 700 and A. D. 1100 with occupation continuing into Historic times. "Diagnostic" artifacts associated with the Southern Paiute are brownware ceramics (primarily Southern Paiute Brownware - cf. Baldwin 1950) and Desert Side Notched and triangular projectile points.

Stuart Rockshelter to the south in the Meadow Valley Wash area north of Moapa (Fig. 6) has Pinto Series projectile points dated at ca. 2000 B.C. occurring in an "early hunters and gatherers" occupation at the base of the cultural deposits (Shutler, Shutler and Griffith 1960). Basketmaker II and III occupations are present from A.D. 300 to A.D. 700 (estimated) (Shutler, et.al. 1960: 14). Pueblo occupation is present from A.D. 700-1150 with a mixed Southern Paiute/Pueblo occupation occurring in the top 12 inches of the deposit. Shutler, et.al. (1960: 14-15) have classified the site as a hunting gathering campsite.

The Nevada Test Site and Nuclear Rocket Development Station comprising much of southern Nye County to the southwest of the study area (Fig. 6) has been the focus of several archaeological investigations (Worman 1966, 1967, 1969; Townley 1968; Tuohy 1965). Seventeen sites ranging open lithic scatters, rockshelters/small caves and petroglyph sites along with fifteen isolated finds are described by Worman (1969) in his monograph. Surface collections and materials recovered from several test excavations include a wide range of cultural materials (scrapers, bifaces, drills, trade beads, etc.); temporally diagnostic projectile points and ceramics (Southern Paiute Brownware, Lino Gray, Logandale Gray, Boulder Gray, Moapa Black-on-Gray, North Creek Black-on-Gray, and Corrugated, Tsegi Orange Ware); and chert and obsidian lithic debitage.

One large open site, the McKinnis Site on the east slope of Timber Mountain (cf. Worman 1969; Townley 1968), yielded surface finds of a Clovis point fragment, Pinto-Gypsum materials, Southern Paiute Brownware and Puebloan ceramics (North Creek Corrugated, Moapa Black-on-Gray) along with a small assemblage of chipped stone artifacts. Selected test excavations revealed no buried materials beneath the desert pavement surface of the site. A significant find was the recovery of two crescents (Great Basin Transverse Points) (Worman 1969: Plates 48-a, 50-k).

Tuohy's (1965) work at Pahute Mesa on the test site resulted in the excavation of two small rockshelters which yielded respectively a human burial in association with trade beads common after 1800 and a cache of wood arrows and digging sticks. Three open campsites and two chipping stations represent the other sites. Shoshone and Puebloan ceramics (Southern Paiute Brownware, North Creek Black-on-Gray and Washington Corrugated) were recovered at 3 sites. Diagnostic projectile point types appear to include Desert Side Notched, Cottonwood Triangular, Silver Lake and Elko Series (?) (Tuohy 1965: Fig. 1). A small collection of chipped stone artifacts, ground stone artifacts, a bone ornament, unmodified faunal remains and lithic debitage was also collected (Tuohy 1965: Table 1). Tuohy (1965) attributes the materials from the excavated sites to the Southern Paiute.

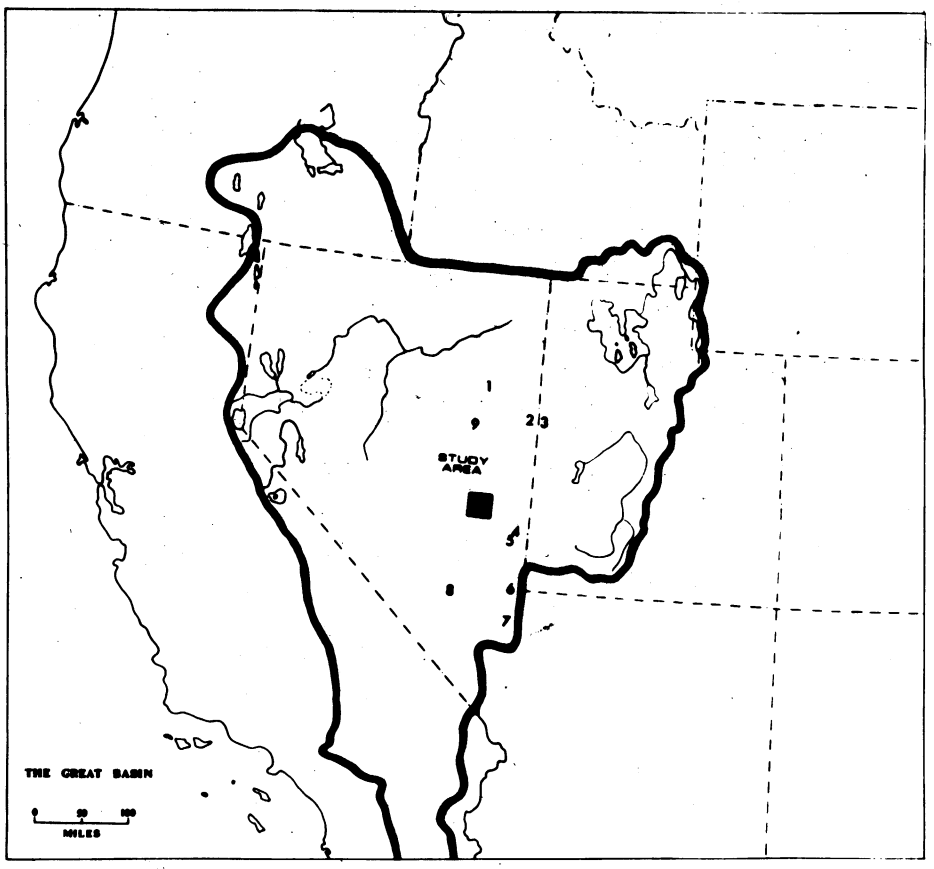


Figure 6

1. Newark Cave.
2. Baker Area/Smith Creek Canyon (including the sites of Smith Creek Cave, Amy's Shelter, Kachina Cave).
3. Garrison Site.
4. Caliente Area (including the sites of Conaway Shelter, O'Malley Shelter and the Scott Site).
5. Etna Cave.
6. Stuart Rockshelter.
7. "Lost City" and Moapa River Area.
8. Nevada Test Site.
9. Long Valley.

At present the archaeology of the Nevada Test Site is poorly known. The cultural manifestations reported to date indicate intermittent occupation and utilization by Desert Archaic, Puebloan and Southern Paiute (Shoshonean) groups from ca. 9000/ 8000 B.C. to the Historic. It is hoped that a systematic survey of the Nevada Test Site will be undertaken and published in the near future.

Additional site surveys and excavations near the study area have been carried out by Rudy in western Utah (Rudy 1953, 1954; Rudy and Sitrlund 1950); Ambler (1966), Marwitt (1968, 1970) and Berry (1972) in the Parowan Fremont subarea; and various archaeologists of the Bureau of Land Management as part of their cultural resource management duties. Jennings's (1978) monograph provides a summary of recent archaeological work and an overview of eastern Great Basin prehistory, especially Utah archaeology.

The above archaeological summary will be utilized to provide a framework for the archaeological interpretation of the data from the study area.

History

Historically this remote area was first opened to use by Anglo-Americans by miners from the nearby Pahranagat Valley who formed the Freyberg and Worthington Mining Districts in 1865 and 1869 in the Worthington Mountains bordering on Garden Valley (Angel 1881: 485). Angel (1881: 485) reported that two Indians led the miners to the outcropping ore veins. Hulse (1971) has covered the mining history of the surrounding districts but neglects the present study area.

Lieutenant George M. Wheeler, in his reconnaissance survey of southern and southeastern Nevada (Wheeler 1875) passed through the area to the southwest of the study area in the vicinity of Sand Springs Valley and Quinn Canyon in 1869, but after this date there is very little mention of the region except for some scattered studies and references in the geological literature (cf. Carpenter 1915; Spurr 1903).

Carpenter (1915) mentions a locality named Oneota as being present in the vicinity of the Water Gap, central Golden Gate Range in 1915, but no traces of this "site" are extant today. The lower portion of Cherry Creek in Garden Valley has the remnants of a substantial concrete/rock dam present. This dam was apparently built as part of a land promotion scheme devised by a con man about 1908. The term 'Garden Valley' was a sales item in the land fraud which failed after a brief time. The dam later washed out because of lack of an emergency spillway (Harlan Arnold, personal communication, 1977).

A former U.S. Post Office and settlement dating from the 1870s and now named Adaven (Nevada spelled backwards) is now within the boundaries of the Humboldt National Forest (Map 2). Information on this former hamlet is extermely limited (cf. Chatham 1956: 36; and Averett 1962), and the ranch now occupying its location serves as a cooperative weather station for the Bureau of Commerce.

At present the study area is almost uninhabited with Garden Valley having only one full time occupied ranch present and the Upper Cherry Creek region in the Quinn Canyon Range having a small number of ranches used by several permanent ranchers and a few transient 'weekenders' from Las Vegas. The nearest permanent villages are Hiko and Ash Springs about 60 miles (96 km) distant to the southeast.

The land in the area is primarily public domain and is leased for the grazing of some sheep and cattle by the Bureau of Land Management (BLM) to both resident and non-resident livestock owners. No further development of the area is planned for the future because of the lack of adequate surface water.

Chapter IV

Civa Shelter II

Civa Shelter II, located approximately 40 miles northwest of the village of Hiko, was first noted by Dr. R. F. Heizer, Department of Anthropology, University of California, Berkeley, and Mr. Michael Heizer, CIVA Corporation, Hiko, Nevada, in the early spring of 1976 during an informal archaeological survey of the Garden Valley area.

The site is a medium sized rockshelter/cave formed primarily by the mechanical weathering of a Tertiary Age spheroidal weathering ignimbrite (Txchanz and Pampayen 1970) in the west central portion of the Golden Gate Range, Lincoln County, Nevada (T2N, R59E, Section 7). The shelter is on land administered by the Ely District of the Bureau of Land Management and is designated as Ln-1590 in the files of the Nevada State Museum. Facing to the west, the site is at an elevation of ca. 5800 feet (1768 m) and overlooks Garden Valley with the Worthington Mountains to the southwest; the Quinn Canyon Range to the west; and the southern portion of the Golden Gate Range to the east.

Civa Shelter II is roughly rectangular in outline, measuring 5.0 m across the entrance and 5.0-7.0 m deep with the two inner chambers not surveyed due to the height of the interior deposits and the chamber's use as a snake denning locale. The floor is reasonably level at the entrance with the height of the deposit steadily rising towards the openings to the two inner chambers. The height of the shelter roof ranges from a minimum of 40 cm near the inner chamber mouths to a maximum of 1.0 m at the main entrance. When excavated to bedrock, the central portion of the shelter has a height of ca. 1.5-1.75 m from floor to ceiling. A moderate sized apron is directly in front of the entrance and a relatively gentle slope leads from the apron's edge downward to a wide open area bounded by several ephemeral stream channels (Fig. 7-11).

At an elevation fo 5800 feet (1768 m), the site falls within the elevational boundaries of the Upper Bajada Zone as discussed previously in the Natural Setting section (cf. Chapter II). Artemisia tridentata (sage), Chrysothamnus nauscesous (rabbit-brush), various grasses (Poa sp., Orysopsis hymenoides, Elymus sp. and Bromus spp.) and Ephedra nevadensis (Mormon tea) all occur either at the site or in its immediate vicinity.

Jackrabbit (Lepus californicus) and cottontail (Sylvilagus sp.), along with several lizard species, were the only faunal species noted at the site, although a packrat (Neotoma cinerea) was present occasionally in the cave.

Excavation Strategy

The excavation was organized according to a north-south grid, oriented on magnetic north and based on a datum stake set on the apron in front of the shelter mouth

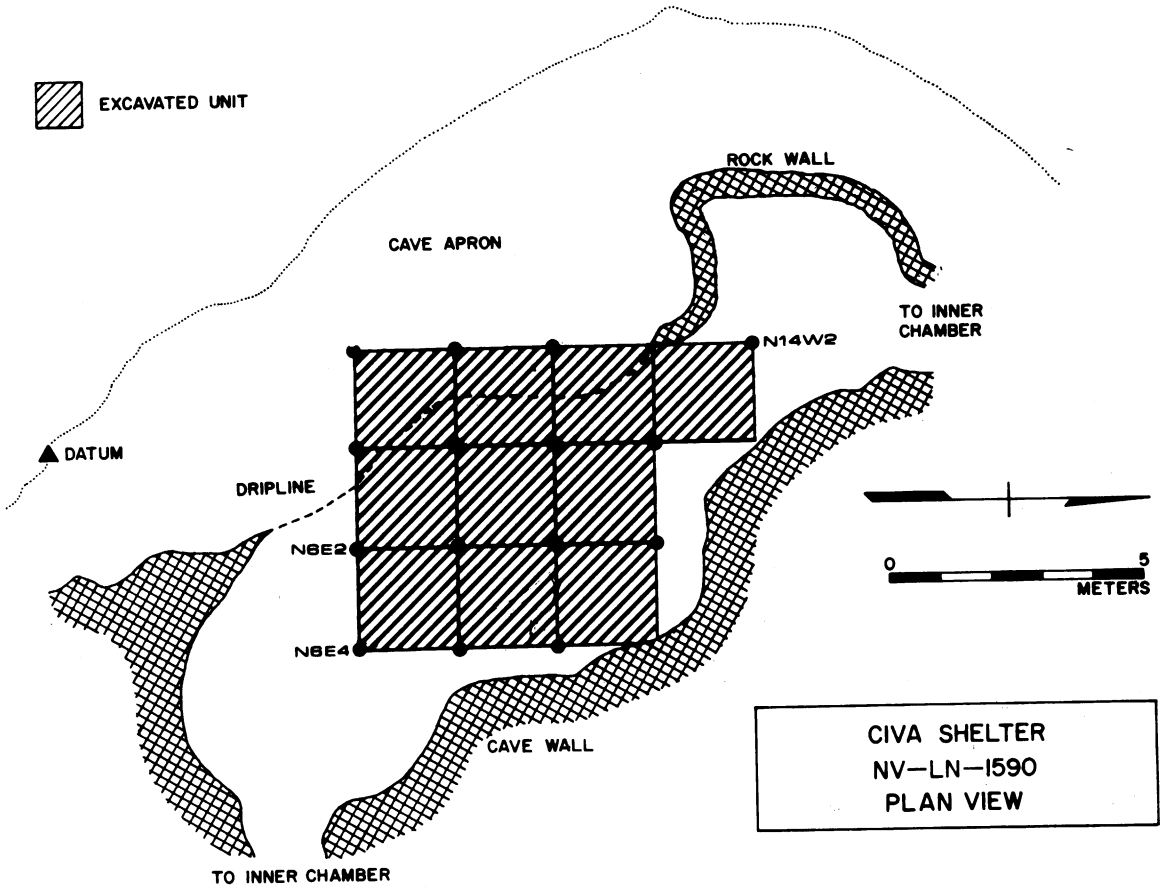


Figure 7: Plan View of Civa Shelter II.

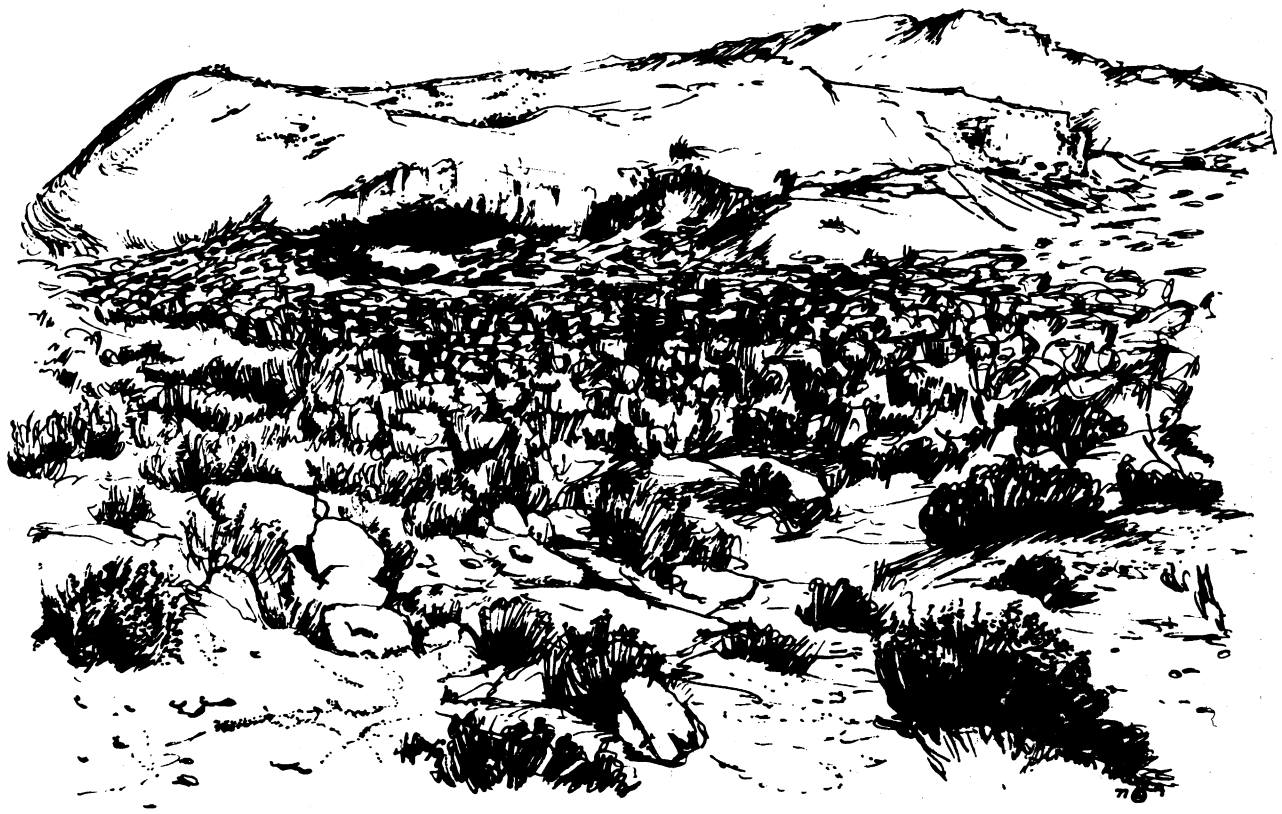


Figure 8: Artist's View of Civa Shelter II Formation.

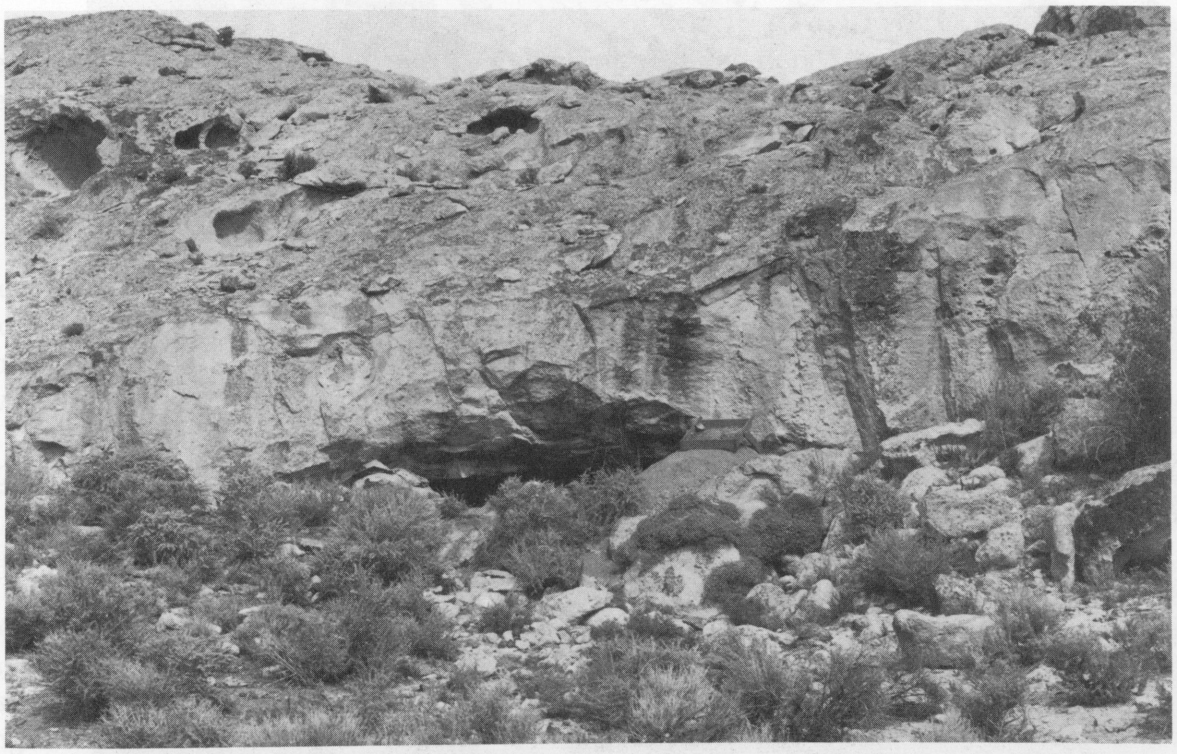


Figure 9: View of Civa Shelter II Opening and Apron.

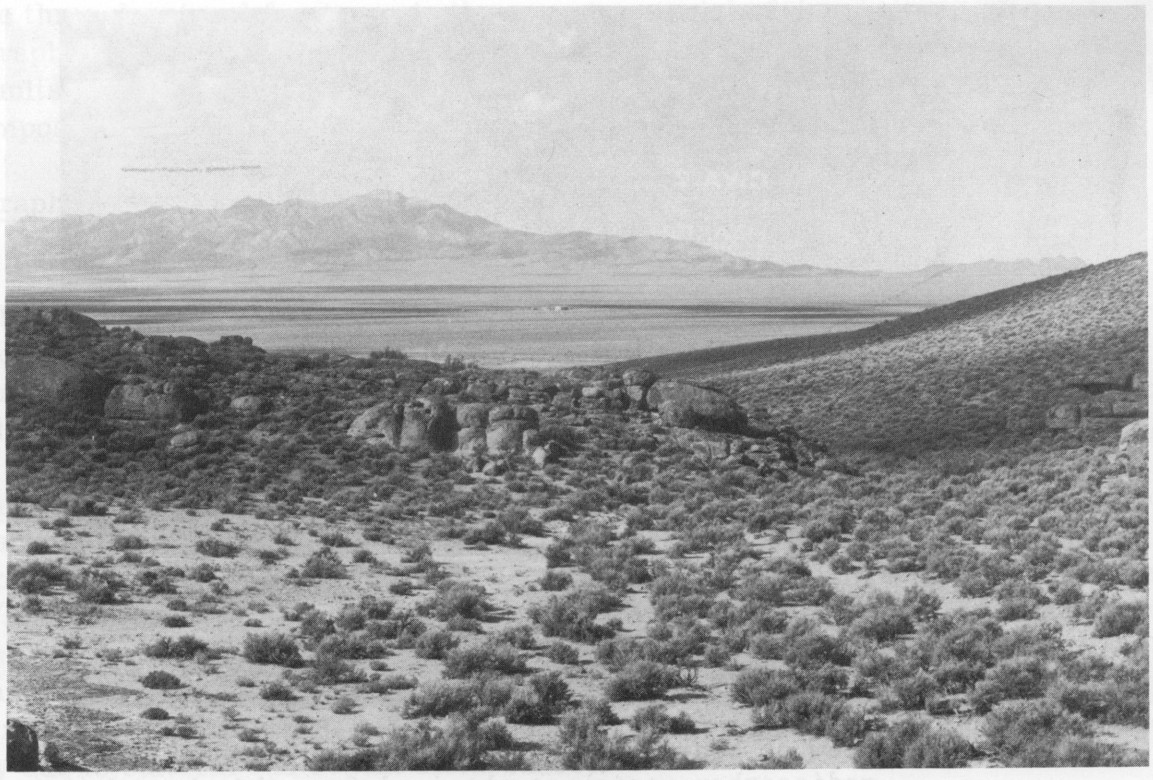


Figure 10: View from Civa Shelter II of Garden Valley Area and Open Area in Front of the Shelter.

Figure 11: View of Civa Shelter II Apron and Excavations, 1976.

Figure 15: View of hearth in unit N8E2. A date of 865± 80 radiocarbon years was obtained from this hearth.

(Fig. 7). Actual excavation within the grid units was in 10 cm arbitrary levels because of the unstratified nature and natural disturbance of the deposits. The excavated fill was passed through on-quarter inch mesh and standard excavation records were kept. One unit, N6W2, was totally screened using 1/8" mesh to check on differential recovery of lithic debitage and faunal remains.

The units chosen for excavation were selected because of their position in the central, easily accesible portions of the shelter -- that is, the most suitable areas of aboriginal occupation and use of the site. All units were completely excavated to bedrock. It is estimated that over 26 m^3 of fill was removed and that 60% of the site was excavated (irrespective of the unsurveyed inner chambers).

The Deposits - General

The site's deposits consisted of elemental accumulation (windblown dust, rock fall), organic remains (ash and charcoal, cow, coyote and rodent feces, dry grass and other vegetal material) mixed with varying quantities of faunal remains, lithic debitage and artifacts. Evidence of small rodent nests and burrows was found throughout the deposits. Several extensive hearth areas (mainly ash and some charcoal), the remains of single and multiple fires, were encountered in several of the units (see Hearths for a description). These were associated with many of the recovered artifacts. The deposits were excavated from the surface down to a maximum depth of 80 cm (average) before encountering the bedrock floor of the site. The deposits, while dry in the upper 20 cm, were damp and became progressively wetter with increasing depth, probably due to water seepage through natural fractures in the parent material of the shelter. No clear natural stratigraphy was discernible in the deposits during excavation, but from the wall profiles of the units, several stratigraphic layers were noted, based primarily on their color and composition. The stratigraphy of the various units is discussed below.

Stratigraphic Unit Description (Fig. 12-14)

Soil samples from each stratigraphic layer from each unit were submitted to the Soils Laboratory, Department of Soils and Plant Nutrition, University of California, Berkeley, for standard soils tests. The technical data, courtesy of Mr. Jon Sandor, Department of Soils and Plant Nutrition, are incorporated into the following descriptions. Appendix I should be consulted for the complete soils data.

Stratum A: Light brownish clay loam (Munsell 10YR6/2 - dry, 10YR3/2 - moist) with small angular fragments of decomposing roof fall present throughout the deposit. A small percentage of burned and unburned mammal bones, root/wood fibers and charcoal flecks/fragments along with some compacted ash are also present. The surface of this stratum, the modern floor of the shelter, is covered with vegetal material, faunal remains, angular rock fall from the roof and rodent feces in moderate quantities. The boundary between Strata A/B/B-1/B-2 generally ranges from smooth to wavy/irregular (mainly due to cultural and rodent disturbance).

Stratum B: Ashy clay loam/loam soil, light brownish grey to very dark grayish brown in color (10YR6/2, 19YR4.5/2 - dry, 10YR3/2, 10YR2/2 - moist) with small amounts of bone fragments, root fibers and charcoal flecks/fragments present along with angular decomposing rock fragments from roof fall. A small amount of lithic debitage is also present. This soil forms a smooth, abrupt boundary with the overlying and underlying units. Numerous fire hearth areas were probably present in this stratum at one time due to the ashy nature of the deposit but were not distinguishable during the excavations due to mixing, disturbance, etc. of the deposit.

Stratum B-1: A gray (10YR5/1 - dry, 10YR4/2 - moist) hard consistence clay with decomposed granular roof fall mixed with ash and charcoal flecks/fragments. Some angular roof fall fragments and small bones are present. The soil consistence is probably due to wetting of the sediment at some time, possibly due either to seepage or drainage into the site. This layer, present only in N8E0 near the entrance, forms a smooth to wavy abrupt boundary between Strata A and B. The analysis notes that this clay (cf. Appendix I) is very similar to the clay in N6E0 (Fig. 12) and may be a store/cache of clay used in pottery manufacture. Hence, this stratum may be culturally introduced rather than natural to the site.

Stratum B-2: Ashy, light gray (10YR6/1 - dry, 10YR4/2 - moist) loam stained with charcoal flecks/fragments containing a moderate amount of decomposing small angular rock fragments. Small percentage of root fibers and burned and unburned faunal remains present. Boundaries between overlying units are smooth and abrupt. This stratum is interrupted with a charcoal band (hearth) in units N6E0, N8E0, N8E2, and N10E0.

Stratum C: Light gray to gray (10YR6/1 - dry, 10YR3.5/1 - moist) heavy loam with a small amount of decomposing angular roof fall rock fragments. Bone fragments, charcoal flecks, compacted ash and plant fibers comprise a minor percentage of the sediment. A smooth to wavy abrupt boundary is present between the over and underlying strata.

Strata D and D-1: These are gray (10YR5/1 - dry, 10YR2/1 - moist) sediments with varying 'textures.' D is a fine silty ashy sediment, while the similar D-1 is a light loam with a large quantity of small angular fragments of decomposing roof fall. A moderate amount of compacted ash is present in each along with a small percentage of bone fragments and charcoal flecks. Boundaries are smooth to wavy abrupt.

Stratum E: Light gray (10YR5.5/1 - dry, 10YR3/1 - moist) ashy clay loam stained with charcoal. A small amount of small angular decomposing rock fragments from roof fall, some burned and unburned faunal remains, charcoal flecks/fragments and root fibers are present. A smooth to slightly wavy abrupt boundary is present with the overlying stratum and a smooth abrupt boundary is present with the underlying stratum.

Stratum F: Light gray to gray (10YR5/1 - dry, 10YR3/1 - moist) ashy loam with a moderate amount of small decomposing angular rock fragments derived from roof fall.

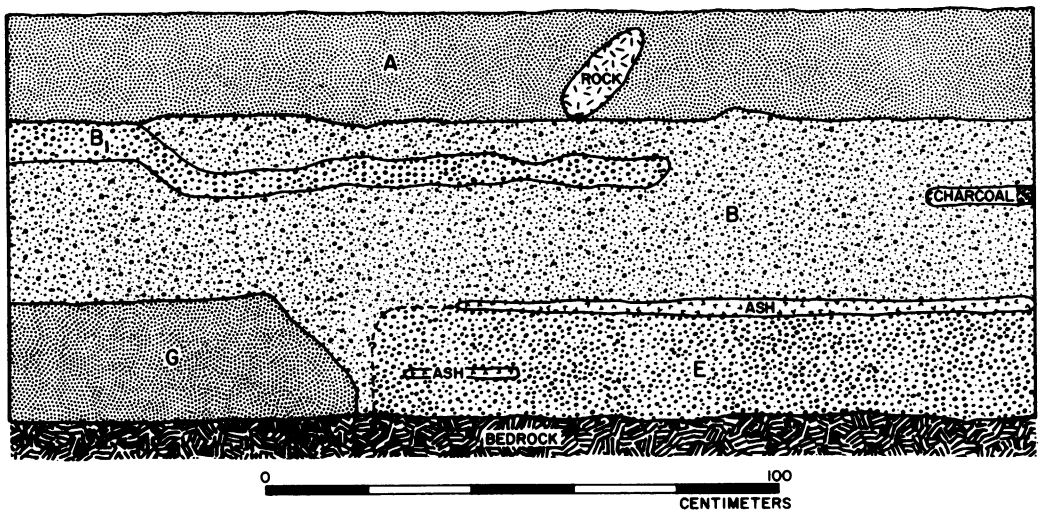


Figure 12a: Civa Shelter II - North Wall Profile, N8E0.

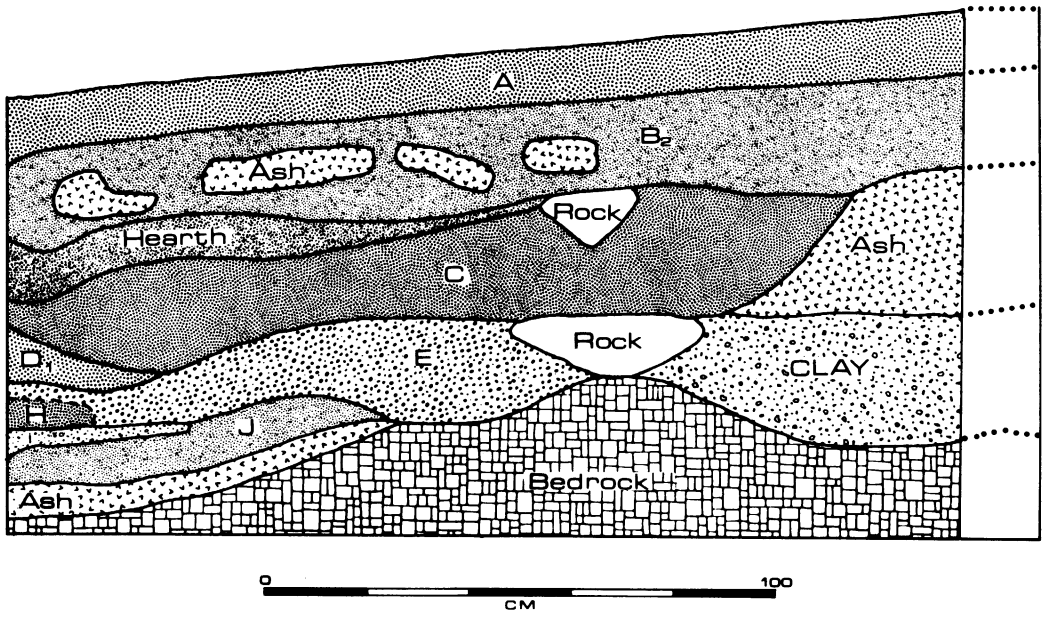


Figure 12b: Civa Shelter II - East Wall Profile, N6E0.

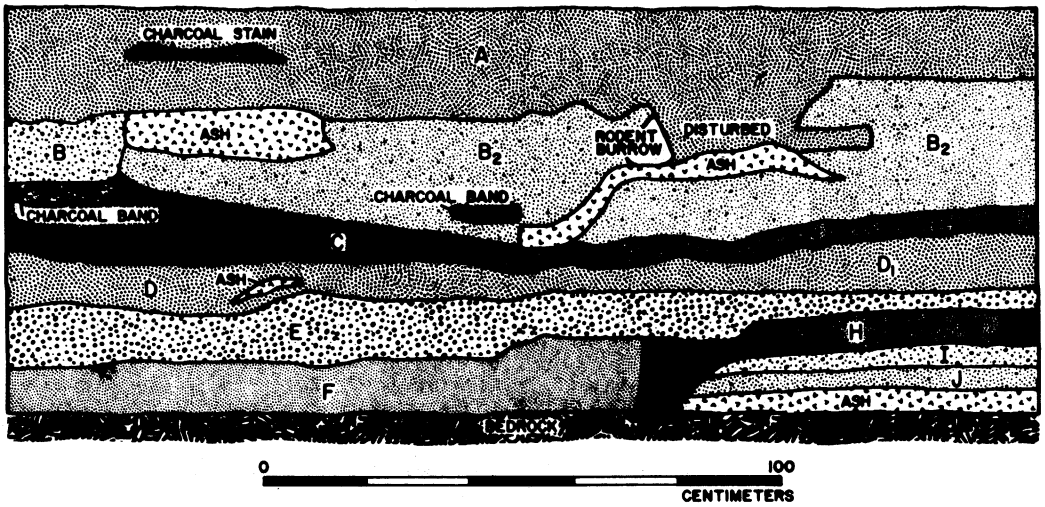


Figure 13a: Civa Shelter II - East Wall Profile, N8E0.

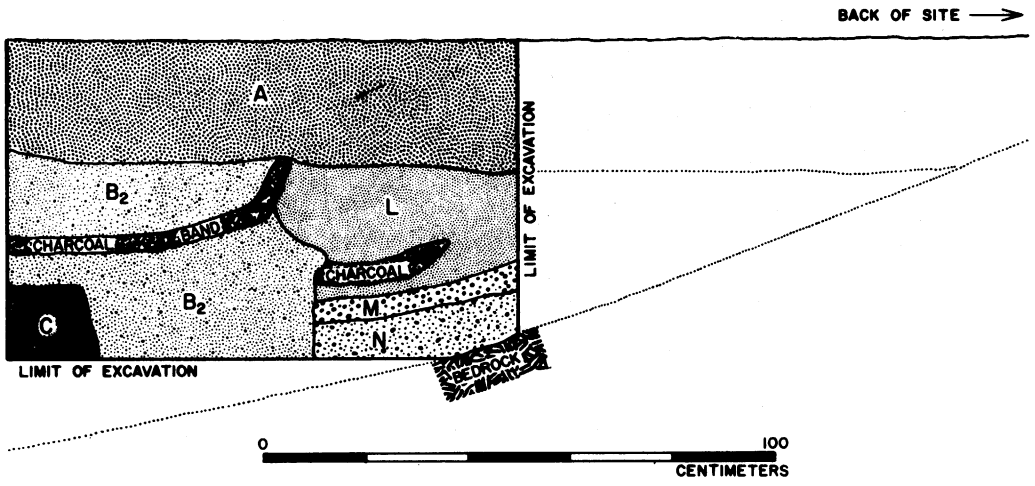


Figure 13b: Civa Shelter II - North Wall Profile, N8E2.

Flecks of charcoal are present along with root fibers and burned and unburned faunal remains in small quantities. Boundaries vary from smooth abrupt to wavy abrupt.

Stratum G: A gray (10YR5/1 - dry, 10YR3/1 - moist) sandy loam mixed with a moderate amount of charcoal fragments and a small amount of burned and unburned faunal remains. Small decomposing angular roof fall fragments make up a small percentage of this sediment. The boundary is smooth and abrupt with Stratum B.

Stratum H: This is similar to Stratum F except for a large concentration of charcoal flecks. It appears that this sediment was directly below a hearth and its slight color difference with Stratum F may be due to a combination of combusted material and color change due to heating/burning.

Stratum I: This is a fine gray (10YR5/1 - dry) ashy sediment stained with charcoal and containing numerous charcoal flecks. Chunks of compacted ash are present along with numerous decomposing angular roch fragments from roof fall. Boundaries are abrupt and smooth.

Stratum J: Gray (10YR5/1 - dry) ashy sediment discolored by burning. Numerous small to medium size decomposing angular rock fragments from roof fall and compacted chunks of ash comprise a major portion of this sediment. A small amount of charcoal flecks are present along with a few root fibers and faunal remains. The boundaries are smooth and abrupt.

Stratum L: This is a fine sediment similar to Stratum A with a moderate amount of charcoal flecks/fragments present. Boundaries are smooth and abrupt.

Stratum M: This is a layer of decomposing shelter parent material (ignimbrite) probably due to a roof fall at some time in the past. Boundaries are smooth and abrupt.

Stratum N: A gray (10YR5/1 - dry, 10YR3/1 - moist) ashy loam mixed with a small amount of decomposing angular rock fragments. Charcoal fragments/flecks, root fibers, unburned faunal remains as well as a few chert pressure flakes are present in small quantities. Boundaries are smooth and abrupt.

Firehearths

Several distinct firehearths and 'ashy' concentrations that continued intermittently downwards to the base of the deposits were exposed during the excavation of Civa Shelter II. While several discrete hearth areas were noted, the majority of the ash and charcoal concentrations were indistinct (i.e. had no definite boundaries or significant depth), probably due to slight mixing of the deposit by rodents and other natural/cultural means. Firecracked rocks, while not common, were noted throughout the fill.

Two hearths were noted with firecracked rock borders or rings. One was

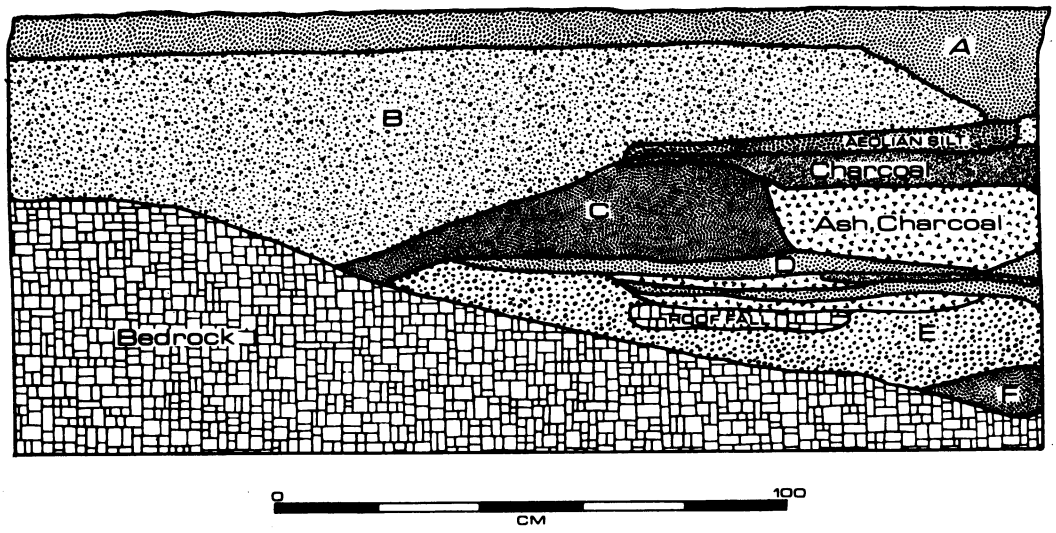


Figure 14: Civa Shelter II - East Wall Profile, N10E0.

present in N6E2, 60 cm below the surface with an inside diameter of 20 cm and another covered units N8E0 and N8E2, 20-40 cm below surface, with a diameter of 1.5 m. Two hearths were noted in N10W2. A small concentration of ash, 22 cm in diameter, was found at a depth of 39 cm and a major hearth, 90 cm by 76 cm was noted at a depth of 50-70 cm. Unit N10E0 likewise yielded two hearths. One of 40 cm diameter composed of ash and firecracked rock at 10-20 cm and another of 60 cm diameter at 68-80 cm below surface. Other units with reasonably distinct hearth areas were N8W2, 20-30 cm below surface; 20-40 cm, ca. 40 cm in diameter and N6E0, 50-60 cm and 70-80 cm below surface respectively.

Examination of some of the charcoal fragments with a binocular microscope indicates that sagebrush (Artemisia sp.) was used as a major fuel source. Many of the artifacts, pottery sherds, lithic debitage and faunal remains were found in the immediate or close vicinity of either the discrete hearth areas, especially N8E0, N8E2 or among the scattered concentrations of charcoal and ash.

During the course of the excavations, an experiment was performed by one of the crew members in regards to hearth location. Utilizing a portable hearth set up in different areas of the site, we noted that the smoke of any fire made outside of the dripline, especially in the vicinity of units N6E0 and N6W2, would be carried away by the prevailing winds. Fires made inside of the dripline tended to fill the shelter with smoke (Melkonian, personal communication, 1977). This experiment, while very inconclusive in view of the number of hearths present within the interior of the shelter, would appear to argue for the placement of the majority of any firehearths outside of the shelter proper. Charcoal stained midden present on the cave apron appears to offer some support for this conclusion.

In summary, scattered ash and charcoal along with several discrete hearths were noted during the excavation of Civa Shelter II, with the majority of the recovered material concentrated in the immediate or close vicinity of the hearth areas.

Radiocarbon Dates

One charcoal sample was radiocarbon dated of the dozen or so collected from the various firehearths. A sample from a hearth with a thick band of charcoal located in unit N8E2, 39-48 cm below the surface (approximately midway in the deposit) (Figs. 7 and 15) yielded a date of 864 ± 80 radiocarbon years: A.D. 1085 (I-9795). This date (A.D. 880-860 - A.D. 1030 corrected, Ralph, Michael and Han 1973) is in agreement (i.e. falls within the known chronological ranges) with the recovered projectile point sequence and ceramics recovered from the deposit.

Ceramics

A total of 350 sherds, one reconstructed vessel - a Snake Valley Black-on-Gray bowl and 4 other ceramic artifacts - were recovered from the deposits of Civa II. Of these, 4.6% were Fremont ceramic types, 95.1% are Shoshonean Tradition pottery and 0.3% are Virgin Branch Anasazi. Rudy (1953), Colton (1952), Madsen (1970), Madsen (1972, 1977), Aikens (1966), Anderson (1960), Tuohy (1956, 1963), Coale (1963) and Baldwin (1950) should be consulted for detailed type descriptions and discussions of Shoshonean, Fremont and Anasazi ceramics.

Fremont Pottery

The 16 sherds identified as belonging to the Fremont ceramic tradition have been typed as Snake Valley Gray Ware (14 sherds) and Snake Valley Black-on-Gray (1 sherd and 1 reconstructed bowl). These two wares are typical of the Summit and Paragonah Phases (A.D. 900-1200) of the Parowan Fremont subarea (Marwitt 1970; Madsen 1977). Steward (1936) originally defined this ware as a variety of Sevier Gray, but Rudy (1953) has redefined it and renamed it a separate type of Utah Desert Gray Ware (cf. Anderson 1960). The reconstructed bowl (Fig. 18w) from unit N6E0, 60-70 cm, has an IA5 rim (Colton 1952 nomenclature), averages 3.9 mm in wall thickness and is ca. 25 cm in diameter. The low luster black design present on the interior surface is in the Sosi style and consists of zigzag lines, solid triangles and straight line elements. Interior rim banding is present. A fugitive red exterior wash is present on the outside. The other recovered Snake Valley Gray rim sherd (Type IB3) suggests a jar neck diameter of ca. 15 cm. Wall thickness of the Snake Valley Ware ranges from 3.8 mm to 4.8 mm with a mean of 4.3 mm. These few Fremont sherds, restricted to the lower and middle levels of the site (20-80 cm), are important because they suggest trade or temporary occupation from the Parowan Fremont subarea to the east (cf. Fowler, et.al. 1973).

Anasazi Pottery

The single sherd classified as North Creek Black-on-Gray is associated with

the Virgin Branch of the Kayenta Anasazi (Colton 1952). The sherd conforms to the description of Spencer (1934) and Colton (1952) as well as with type sherds in the collection of the Lowie Museum of Anthropology. The decoration is restricted to carbon painting and the design elements present on the painted sherd could not be determined. The sherd appears to have slight edge grinding present, and it is probable that the specimen was transported from another area, perhaps from the nearby Pahranagat Valley (cf. Brooks 1977) to the shelter for some reason or another.

Shoshonean Pottery

The 330 Shoshonean sherds are within the range of variability specified by the published type descriptions (cf. Rudy 1953; Baldwin 1950) and are found throughout the cultural deposits. The sherd collection exhibits considerable variation in wall thicknesses (range 3.7 mm - 7.8 mm; mean = 5.3 mm) often within a single sherd, kind and amount of temper, hardness, and paste composition. Inspection of the sherds indicates the presence of both coiling and paddle-and-anvil construction. Fowler, et.al. (1973: 16) note that a combination of paddle-and-anvil and coiling construction techniques are reported ethnographically for the Southern Ute. Both means were apparently used in the pottery at Civa II. All sherds are primarily a mottled light gray/tan color but range to dark brown and dark gray, apparently indicating a rather poorly controlled firing in a reducing atmosphere as well as subsequent re-firing during use as cooking vessels. Many of the sherds have their interior portions coated with a carbonized organic material, probably residue from food cooking operations. Wiping marks, striations and some evidence of smoothing are present on a large number of the sherds.

The 14 rim sherds recovered indicate the presence of wide-mouthed jars with recurved rims as well as vertical, wide-mouthed vessels ("Flowerpot" shape) with rim diameters for both ranging from 11-25 cm in diameter. Rim form present are IA3 (4), IB3 (8), and IIIA2 (2).

No vessel decoration of any kind was noted on the sherds.

The distribution of Shoshonean Tradition has recently been discussed and surveyed by Fowler (1968a) and reviewed by Tuohy (1973). Based on this work, the ceramics present in the shelter are well within the expected distribution range of Shoshonean Tradition ceramics. Fowler, et. al. (1973) on the basis of their work at O'Malley and Conaway Shelters to the east, have indicated a temporal range of ca. A.D. 1000 to post contact times for Shoshonean ceramics in this portion of Nevada.

Other Ceramic Artifacts

Pottery Scrapers

Three irregular sherds of Shoshone ware were recovered with either one or two ground edges present. Diameters range from 3.8 cm to 4.2 cm, and while these

sherds may have had other aboriginal uses, they do conform to ethnographic descriptions of pottery scrapers.

Scoops (Fig. 18v).

One large Shoshone pottery fragment, the curved side of a large jar, has been ground completely around its circumference. Its shape can be described as elongate triangular with a maximum length of 10.7 cm and a width of 6.2 cm. The specimen is similar to the ceramic scoops illustrated in Marwitt (1970: Fig. 45).

Discussion

The presence and amount of Shoshonean Tradition pottery throughout the shelter's deposit indicated that Shoshonean groups were frequent users of Civa II. The small percentage of Fremont ceramics from the lower and middle levels of the site indicates apparent trade or temporary occupation by people of the Parowan Fremont subarea (Map 8), a not too unlikely possibility as Brooks (1977) has noted a predominance of Fremont ceramics at the Mariah Site in the Hiko area, while Fowler, et.al. (1973) have evidence of Fremont occupation of the Meadow Valley Wash area to the southeast. The single sherd of Anasazi pottery is probably the result of cultural transport of a sherd from a surrounding site or area, with subsequent discardal in the shelter. Brooks (1977) indicates the presence of Virgin Branch ceramics in the Hiko area to the southeast of Civa II and York (1977) notes surface finds of a "Pueblo Black-on-White" ware occurring in the Sunnyside area to the north. The presence of both Shoshone and Fremont ceramics in the lower and middle levels confirms the contemporaneity of these ceramic traditions in the area, although the precentage of Fremont pottery is quite low. O'Malley Shelter, the Conaway Shelter and the Scott Site in Meadow Valley Wash all have Shoshone, Fremont and Anasazi ceramics co-occurring (cf. Fowler, et.al. 1973), as does Pine Park Shelter slightly to the east of this area (Rudy 1954).

The single radiocarbon date of A.D. 1085 obtained from a middle level hearth appears to be in agreement with Fowler, et.al. (1973) contention of ca. A.D. 1000 for Shoshonean ceramics in southeastern Nevada. The Snake Valley Gray and Black-on-Gray wares have been well dated in the Parowan Fremont core area (cf. Madsen 1977) with a temporal range of ca. A.D. 900-1200. Thus, it would appear that Civa Shelter II was first occupied around ca. A.D. 800/900 (?) (or perhaps slightly earlier) due to the co-occurrence of Fremont and Shoshone ceramics and the radiocarbon date.

A unique aspect of Civa II is that pottery manufacture was apparently practiced during some period of occupation. In addition to the several pottery scrapers, two small (0.5 - 1.0 m maximum diameter) 'stockpiles' of clay (approximately 8-15 cm thick) were encountered in units N6E0 and N8E0 at depths of 60-70 cm and 15-25 cm respectively. One deposit was found mixed with moderate quantities of lithic debitage, primarily small pressure flakes. Samples from each deposit were analyzed by Mr. Jon Sandor (Department of Soils and Plant Nutrition). Both samples are montmorillonite clay with almost identical

percentages of sand (cf. Appendix I). Deposits of this clay almost certainly exist in the near vicinity but could not have formed in situ at the site (Sandor, personal communication, 1977). The high percentages of sand (36% and 41%) almost certainly represent the addition of material as clays high in montmorillonite generally have excessive shrinkage and cannot be used alone for pottery. The addition of sand and other organic materials as tempering agents would reduce the shrinkage and allow use of this clay for rather 'coarse' pottery similar to the Shoshonean Tradition ceramics already known for the area. As well, the shelter could have been used as a protected area for the firing of on-site manufactured pottery as the deposits are extremely ashy even though no ethnographic data exists on this possibility for the Great Basin.

The implications of the possibility of local ceramic manufacture are important when considering the duration of any occupation of the site. Pottery manufacture is a complex and time consuming task requiring a relatively extensive stay at any location. O'Malley Shelter to the southeast is the only other site in the region where local ceramics manufacture (in this case of Fremont pottery) is hypothesized to have taken place (Fowler et.al. 1973: 19).

In summary, Shoshonean Tradition ceramics dominate the assemblage from Civa Shelter II. It is quite probable that the shelter was exclusively used by Shoshonean groups after a brief period of early use by a Fremont group, or alternatively, Shoshone groups exclusively occupied the site but had contact (e.g. trade) with Fremont groups to the east.

Projectile Points

Civa Shelter II yielded 104 typable projectile points or projectile point fragments. Type classification follows the standard typologies established and in use for the Great Basin (cf. Hester and Heizer 1973a for a discussion).

Desert Side Notched (Table 3a, Fig. 17a-h, 19a-h)

Specimens: Complete (10) Incomplete (6)
Material: Chert (10) Obsidian (5) Chalcedony (1)
Description: These are small to medium sized (59.4 mm maximum length) slender triangular to elongate triangular projectile points with straight to slightly convex lateral edges. The bases range from slightly convex to basally notched. Fine side notches, perpendicular to the long axis of the point, range from 1.0 - 4.3 mm in depth and basal notched, ranging from 1.0 - 3.5 mm in depth are present on 8 of the specimens. All specimens are well made but two specimens appear unfinished. On one side, notches have not been completed and the striking platform of the flake is still present on the distal end of another specimen. The flaking is fine pressure and well done. Cross sections are plano-convex (2) and biconvex (14). All points fall within the range of variation noted for the DSN types (cf. Baumhoff and Byrne 1959; Lanning 1963; and Hester and Heizer 1973a).

Cottonwood Triangular (Table 3a, Fig. 17i-n, 18q-u, 20a-g).

Specimens: Complete (10) Incomplete (16)
Material: Chert (13) Incomplete (16)
Description: These points are triangular in outline with slightly convex to straight blade edges. The bases range from straight to slightly concave with depths ranging from 1.0 - 1.3 mm. The flaking is pressure and cross sections are plano-convex (5), biplano (1) and biconvex (20). Several specimens may be possible preforms.

Rose Spring Corner Notched (Table 3b, c, Fig. 18p, q, 20i-m, 21a-i, 22a-d).

Specimens: Complete (17) Incomplete (25)
Material: Chert (32) Obsidian (7) Chalcedony (3)
Description: These are small triangular points with slightly convex to straight blade edges. The barb ends are somewhat rounded to pointed with slight to medium protrusion. The notching is generally wide at an angle (ca. 45°) to the long axis of the point and ranges from 1.0 - 6.3 mm in depth. Maximum width positions are at the barb ends, although on more comvex sided specimens, it is somewhat above the barb ends. The stems are slightly expanded with straight to slightly concave bases. Transverse cross sections are biconvex and the pressure flaking is on the whole well done. Some mixed flaking is present on several of the specimens.

Rose Spring Contracting Stem (Table 3c, Fig. 20h).

Specimens: Incomplete (1)
Material: Chert (1)
Description: This is a small basal fragment of a RSCS projectile point with two shallow basal notches on each side of the contracting stem at the junction of the stem and main body of the specimen. The maximum width position is at the barb ends. The flaking is pressure and the cross section is biconvex.

Eastgate Expanding Stem (Table 3c, Fig. 21j).

Specimens: Complete (1) Incomplete (3)
Material: Chert (3) Obsidian (1)
Description: These are small, somewhat elongate triangular projectile points with straight to slightly convex sides. The barbed ends are squared with the notching generally parallel into the basal portion of the lateral edge. The barb bases are the maximum width position and none of the specimens have distinct, centralized basal notches. The stems are slightly expanding to straight. The pressure flaking is well done. These specimens intergrade into the Rose Spring Corner Notched type.

Elko Corner Notched (Table 3c, Fig. 19i-j).

Specimens: Complete (1)
Material: Chert (1)

Description: This is a medium sized triangular projectile point with straight to slightly convex sides. The barbs are slightly rounded and moderately projecting. The notching is at an angle to the lateral edge and is 3.2 mm deep. The proximal barb area is the maximum width position. The stem is expanding and the transverse cross section is biconvex. The flaking is pressure.

Elko Eared (Table 3c, Fig. 19k-p).

Specimens: Complete (4) Incomplete (5)
Material: Chert (7) Obsidian (1) Quartzite (1)
Description: These are moderate to large triangular to elongate triangular projectile points with straight to slightly convex lateral edges. Notching is wide and at an angle to the lateral edges of the point. Maximum width position is at the barb ends. The stems are generally expanded with the indented base giving an 'eared' or bilobed effect. The barb ends are moderately to markedly projecting with variable ends. The flaking is moderately to well done pressure (4) and percussion (3) with 2 specimens showing both pressure and percussion present. Cross sections are biconvex (8) and plano-convex (1).

Humboldt Concave Base A (Table 3c, Fig. 21k).

Specimens: Complete (1)
Material: Chert (1)
Description: This projectile point is lanceolate in form with parallel to slightly convex sides. The widest point is at the base. The flaking is moderately well done and the base is slightly concave. The cross section is biconvex.

Discussion

The projectile points from Civa Shelter II represent a range in time from 6400 B.C. to post contact times. Six distinct series of projectile points are known: Desert Side Notched, Cottonwood, Rose Spring/Eastgate, Elko Series and Humboldt Series.

The Desert Side Notched projectile points are common in late prehistoric times in the Great Basin and persist until the historic. Layton (1970, 1977) notes a DSN specimen in association with the remains of a domestic cow at Hanging Rock Shelter in northwestern Nevada, drawing the inference of use by the ethnographic Northern Paiute. The chronological distribution of this series, based on Hester and Heizer's (1973a) assessment of the known radiocarbon dates indicates that Desert Side Notched points appeared sometime after A.D. 1100-1200 and persisted into the Historic era. The radiocarbon date of A.D. 1085 for Civa II would appear to offer additional evidence towards this chronological sequence and perhaps indicate an earlier appearance in the region than that postulated by Hester and Heizer. Brooks (1977) indicates a range of A.D. 500 to historic times for southern Nevada but offers no supporting evidence for this conclusion. The DSN series is commonly found in association with the Cottonwood and Rose Spring/Eastgate Series and this is the case at this site.

PROJECTILE POINT DATA

UCLMA#	Type	Status	L	W	T	Wt.	CS	Material	BN	SN/CN	Provenience
2-59218	DSN	Comp.	20.0	13.0	3.1	0.7	BC	Chert	1.8	2.2	N8E0 - 19
2-59286	DSN	Frag.	17.0+	10.0+	3.0	0.6+	BC	Chert	-	1.8	N8E2 - 10-20
2-59306	DSN	Comp.	21.8	13.0	2.5	0.5	PC	Chert	2.4	2.2	N8E2 - 40-50
2-59316	DSN	Comp.	19.0	11.6	2.5	0.4	PC	Chert	2.1	2.0	N8E0 - 0-10
2-59328	DSN	Comp.	21.0	12.2	3.0	0.5	BC	Obsidian	3.5	2.0	N8E0 - 10-20
2-59352	DSN	Comp.	19.5	13.2	3.0	0.5	BC	Obsidian	-	2.1	N8E0 - 40-50
2-59379	DSN	Frag.	19.0+	12.5	3.5	1.1+	BC	Chalcedony	1.0	1.0	N8E2 - 50-60
2-59419	DSN	Comp.	21.0	12.0	3.5	0.8	BC	Chert	-	2.3	N8E2 - 50-60
2-59755	DSN	Comp.	18.3	15.6	3.0	0.8	BC	Chert	-	3.3	N10E0 - 10-20
2-59759	DSN	Frag.	-	9.6	2.1	-	BC	Chert	-	3.0	N10E0 - 10-20
2-59769	DSN	Comp.	18.0	13.0	2.8	0.8	BC	Chert	1.9	3.2	N10E0 - 20-30
2-59792	DSN	Frag.	-	10.4	2.3	-	BC	Obsidian	2.0	3.0	N10E0 - Sidewall
2-59800	DSN	Comp.	59.4	12.3	4.7	3.1	BC	Chert	-	2.2	N10E0 - 40-50
2-59936	DSN	Frag.	-	9.4	1.8	-	BC	Chert	-	1.1	N6W2 - 0-10
2-60308	DSN	Comp.	24.1	12.4	2.5	0.7	BC	Obsidian	-	4.3	N10E2 - 43
2-60360	DSN	Frag.	-	10.8	2.7	-	BC	Obsidian	-	2.6	N6E2 - 60-70
2-59219	CT	Frag.	-	14.5	3.0	-	BC	Obsidian	-	-	N8E0 - 20
2-59227	CT	Comp.	17.8	12.0	3.5	0.7	BC	Obsidian	-	-	N8E0 - 20-30
2-59228	CT	Frag.	-	13.8	3.2	-	BC	Chert	-	-	N8E0 - 20-30
2-59233	CT	Comp.	25.0	13.5	3.5	1.0	BC	Obsidian	-	-	N8E0 - 30-40
2-59250	CT	Comp.	26.0	24.0	5.5	3.7	BC	Chert	-	-	N8E0 - 58
2-59282	CT	Comp.	21.9	20.5	4.5	1.8	BC	Chert	-	-	N8E2 - 0-10
2-59318	CT	Frag.	-	12.8	2.2	-	BC	Obsidian	-	-	N8E0 - 0-10
2-59329	CT	Frag.	-	19.5	5.0	-	BC	Chert	-	-	N8E0 - 10-20
2-59343	CT	Frag.	-	11.5	3.0	-	BC	Obsidian	-	-	N8E0 - 30-40
2-59396	CT	Comp.	21.0	16.0	3.0	0.7	BC	Chert	-	-	N8E2 - 0-10
2-59401	CT	Frag.	-	13.5	2.2	-	BC	Chalcedony	-	-	N8E2 - 28
2-59408	CT	Frag.	-	11.5	3.0	-	BC	Chert	-	-	N8E2 - 20-30
2-59410	CT	Frag.	-	14.2	2.9	-	BC	Chert	-	-	N8E2 - 20-30
2-59646	CT	Comp.	32.8	16.7	4.3	2.6	BC	Obsidian	-	-	N8W2 - 0-10
2-59724	CT	Comp.	15.8	9.1	3.2	0.5	PC	Obsidian	-	-	N6E0 - 0-10
2-59786	CT	Comp.	17.5	11.1	2.1	0.5	PC	Obsidian	-	-	N10E0 - 30-40
2-59804	CT	Frag.	-	16.9	2.8	-	BC	Chert	-	-	N10E0 - 40-50
2-59847	CT	Frag.	-	14.0	3.0	-	PC	Chert	-	-	N8E0 - Sidewall
2-60122	CT	Frag.	-	12.6	2.8	-	PC	Obsidian	-	-	N6E2 - 30-40
2-60149	CT	Comp.	22.5	15.6	3.7	1.3	BC	Chert	-	-	N6E0 - 30-40
2-60250	CT	Comp.	24.5	14.1	4.0	1.5	PC	Obsidian	-	-	N10W2 - 40-50
2-60299	CT	Frag.	-	15.9	2.9	-	BC	Chert	-	-	N10E2 - 17
2-60302	CT	Frag.	-	12.4	2.9	-	BC	Chert	-	-	N10E2 - 20-30
2-60381	CT	Frag.	-	18.0	3.9	-	BC	Chert	-	-	N6E2 - 90
2-60384	CT	Frag.	-	17.0	2.9	-	BC	Obsidian	-	-	Unknown
2-60540	CT	Frag.	-	-	2.7	-	BP	Obsidian	-	-	N6W2 - 50-65

BN - Basal Notch Depth
SN/CN - Side/Corner Notch Depth
CS - Cross section (Plano-convex, Biconvex, Bi-plano)

(All measurements in mm and grams)

Table 3a

PROJECTILE POINT DATA

UCLMA#	Type	Status	L	W	T	Wt.	CS	Material	BN	SN/CN	Provenience
2-59249	RSCN	Frag.	-	19.0	3.2	-	PC	Chert	-	3.5	N8E0 - 50-60
2-59287	RSCN	Frag.	-	14.0	3.0	-	BC	Chert	-	-	N8E2 - 10-20
2-59311	RSCN	Comp.	23.0	18.5	3.5	1.2	PC	Chert	-	3.5	N8E2 - 46
2-59339	RSCN	Frag.	-	15.0	3.1	-	BC	Chalcedony	-	-	N8E0 - 30-40
2-59344	RSCN	Frag.	-	14.0	3.0	-	BC	Chert	-	2.5	N8E0 - 30-40
2-59353	RSCN	Comp.	22.5	14.0	3.5	1.1	BC	Chalcedony	-	2.5	N8E0 - 40-50
2-59357	RSCN	Frag.	-	-	3.0	-	BC	Obsidian	-	-	N8E0 - 50-60
2-59365	RSCN	Frag.	-	-	3.0	-	BC	Chert	-	-	N8E0 - 60-70
2-59366	RSCN	Frag.	-	12.5	3.0	-	BC	Chert	-	1.0	N8E0 - 60-70
2-59374	RSCN	Comp.	24.2	16.8	3.5	1.5	BC	Chert	-	3.9	N8E2 - 50-60
2-59377	RSCN	Frag.	-	18.0	4.0	-	BC	Chert	-	3.0	N8E2 - 40-50
2-59679	RSCN	Frag.	-	-	2.9	-	BC	Chert	-	-	N8W2 - 30-40
2-59685	RSCN	Frag.	-	16.1	3.9	-	BC	Chert	-	4.2	N8W2 - 30-40
2-59687	RSCN	Comp.	24.1	14.0	2.9	0.9	BC	Chert	-	3.0	N8W2 - 30-40
2-59746	RS	Frag.	-	15.6	3.7	-	BC	Chert	-	-	N10E0 - 0-10
2-59748	RSCN	Comp.	30.7	15.1	3.2	1.1	BC	Chert	-	3.9	N10E0 - 0-10
2-59782	RSCN	Comp.	31.1	18.0	3.9	1.8	BC	Obsidian	-	4.4	N10E0 - 30-40
2-59788	RSCN	Frag.	-	14.6	3.1	-	BC	Chert	-	3.8	N10E0 - Sidewall
2-59799	RSCN	Comp.	31.8	20.7	4.1	2.3	BC	Chalcedony	-	3.0	N10E0 - 43
2-59814	RSCN	Comp.	28.8	15.7	3.7	1.3	BC	Chert	-	3.2	N10E0 - 50-60
2-59821	RSCN	Comp.	21.8	16.9	3.3	1.0	BC	Chert	-	3.7	N10E0 - 50-60
2-59832	RSCN	Frag.	-	20.0	4.1	-	BC	Chert	-	5.2	N10E0 - 62
2-59839	RSCN	Frag.	-	17.9	3.4	-	BC	Chert	-	4.1	N8E2 - 60-70
2-59844	RSCN	Frag.	-	20.5	2.9	-	BC	Chert	-	6.3	N8E2 - 70-80
2-59878	RSCN	Comp.	29.8	13.3	3.2	1.1	PC	Obsidian	-	2.3	N8E2 - 48
2-59880	RSCN	Comp.	40.1	15.7	3.8	2.1	BC	Chert	-	3.2	N8E2 - 40-50
2-59944	RSCN	Frag.	33.0	-	3.2	-	PC	Chert	-	-	N6W2 - 0-10
2-59973	RSCN	Frag.	-	12.3	2.9	-	BC	Chert	-	-	N6W2 - 30-40
2-60161	RSCN	Frag.	-	13.7	3.6	-	BC	Chert	-	3.2	N6E0 - 40-50
2-60165	RSCN	Frag.	-	18.4	3.1	-	BC	Chert	-	-	N6E0 - 48
2-60183	RSCN	Frag.	-	14.3	3.8	-	BC	Chert	-	3.6	N6E0 - 50-60
2-60186	RSCN	Frag.	-	17.1	3.4	-	BC	Chert	-	3.4	N6E0 - 50-60
2-60191	RSCN	Frag.	-	-	2.6	-	BC	Chert	-	3.8	N6E0 - 50-60

BN - Basal Notch Depth
SN/CN - Side/Corner Notch Depth
CS - Cross section (Plano-convex, Biconvex)

(All measurements in mm and grams)

Table 3b

PROJECTILE POINT DATA

UCLMA#	Type	Status	L	W	T	Wt.	CS	Material	BN	SN/CN	Provenience
2-60204	RSCN	Comp.	22.7	15.0	3.5	1.1	BC	Chert	-	4.0	N6E0 - 60-70
2-60235	RSCN	Frag.	-	12.1	1.9	-	BC	Chert	-	2.4	N10W2 - 30-40
2-60263	RSCN	Frag.	34.1	13.5	3.2	-	BC	Chert	-	-	N10W2 - 50-60
2-60268	RSCN	Frag.	-	19.0	2.7	-	BC	Obsidian	-	-	N10W2 - 57
2-60275	RSCN	Comp.	32.2	15.4	4.0	1.7	BC	Chert	-	3.7	N10W2 - 50-60
2-60314	RSCN	Comp.	29.8	14.7	4.0	1.6	BC	Obsidian	-	4.3	N10E2 - 50-60
2-60320	RSCN	Frag.	-	13.7	3.3	-	BC	Chert	-	4.8	N10E2 - 60-70
2-60346	RSCN	Comp.	37.0	19.7	4.1	2.8	PC	Chert	-	3.9	N6E2 - 40-50
2-60364	RSCN	Comp.	30.5	18.5	3.4	1.6	BC	Obsidian	-	4.1	N6E2 - 60-70
2-60386	RSCN	Comp.	49.3	14.1	3.7	2.3	PC	Obsidian	-	3.4	Unknown
2-59258	RSCS	Frag.	-	21.0	4.5	-	BC	Chert	-	-	N8E0 - 60-70
2-59856	EGES	Frag.	-	25.9	2.7	-	PC	Obsidian	-	-	N10E0 - Sidewall
2-59872	EGES	Frag.	-	16.5	4.2	-	BC	Chert	2.9	-	N8E2 - 30-40
2-59942	EGES	Comp.	28.3	21.5	3.7	1.8	BC	Chert	3.7	-	N6W2 - 8
2-60318	EGES	Frag.	-	17.4	2.9	-	BC	Chert	3.0	-	N10E2 - 60-70
2-59680	Elko Series	Frag.	-	-	-	-	PC	Obsidian	-	-	N8W2 - 30-40
2-59924	ES	Frag.	36.8	21.0	6.5	-	BC	Basalt	-	-	N10W2 - 25
2-61505	ES	Frag.	-	-	-	-	-	Chert	-	2.2	N10W2 - 60-70
2-59820	ECN	Comp.	29.0	22.9	6.0	3.0	BC	Chert	-	3.2	N10E0 - 50-60
2-59718	Elko Eared	Comp.	36.5	25.0	4.2	3.2	BC	Chert	3.7	-	N8W2 - 63
2-59803	EE	Frag.	-	-	4.7	-	BC	Obsidian	-	3.0	N10E0 - 50
2-59907	EE	Frag.	-	31.0	5.5	-	BC	Chert	4.0	3.1	N10W2 - 18
2-59920	EE	Frag.	-	22.5	5.1	-	BC	Chert	-	3.1	N10W2 - 20
2-60116	EE	Frag.	-	28.0	4.0	-	BC	Chert	-	4.0	N6E2 - 20-30
2-60194	EE	Frag.	-	25.0	6.0	-	PC	Quartzite	-	-	N6E0 - 60
2-60216	EE	Comp.	39.1	25.5	6.2	6.3	BC	Chert	-	3.0	N6E0 - 67
2-60248	EE	Comp.	50.1	22.0	4.1	4.5	BC	Chert	-	3.0	N10W2 - 40-50
2-60538	EE	Frag.	-	-	4.1	-	PC	Chert	-	4.1	N6W2 - 61
2-60140	HCBA	Comp.	48.4	17.7	7.3	5.9	BC	Chert	-	-	N6E0 - 20-30

BN - Basal Notch/Concavity Depth
SN/CN - Side/Corner Notch Depth
CS - Cross section (Plano-convex, Biconvex)

(All measurements in mm and grams)

Table 3c

CIVA SHELTER II

Selected Projectile Point Metric Attribute Ranges

Type	Length	Width	Thickness	Weight	Total #
DSN	18.0 - 59.4	9.4 - 15.6	1.8 - 3.5	0.4 - 3.1	16
CT	15.8 - 32.8	9.1 - 24.0	2.1 - 5.5	0.5 - 3.7	26
RSCN	21.8 - 49.3	12.1 - 25.9	1.9 - 4.2	0.9 - 2.8	42
RSCS	20.0+	21.0	4.5	2.6+	1
EGES	28.3 - ?	16.5 - 25.9	2.7 - 4.2	1.8+	4
ECN	29.0	22.9	6.0	3.0	1
EE	36.5 - 50.1	22.0 - 31.0	4.0 - 6.2	3.0 - 6.3	9
HCB-A	48.4	17.7	7.3	5.9	1

(All measurements in mm and grams)

DSN - Desert Side Notched
CT - Cottonwood Triangular
RSCN - Rose Spring Corner Notched
RSCS - Rose Spring Contracting Stem
EGES - Eastgate Expanding Stem
ECN - Elko Corner Notched
EE - Elko Eared
HCB-A - Humboldt Concave Base A

Table 4

Lanning (1963) originally proposed the Cottonwood Series based on his analysis of the projectile points from the Rose Spring Site. Two varieties of the projectile point were recognized by Lanning: Triangular and Leaf-shaped. Heizer and Clewlow (1968) later described a third bipointed variety. Hester and Heizer's compilation of radiocarbon dates for Cottonwood Series points suggests a chronological range of ca. A.D. 900 to historic times. Dates reported by Fowler, et.al. (1973) of A.D. 1010 (RL-38) and A.D. 900 (RL-37) from Conaway Shelter in Meadow Valley Wash to the east correspond with the date from Civa II of A.D. 1085. Hester and Heizer (1973a) suggest that the Cottonwood Series may have begun prior to the date of A.D. 1300 suggested originally by Lanning (1963), and this would appear to be the case. Cottonwood Series points are commonly found with Desert Side Notched and Rose Spring projectile points and this holds true for Civa Shelter II.

The Rose Spring/Eastgate Series types were originally defined as separate types (cf. Lanning 1963; Heizer and Baumhoff 1961), but since they usually occur in association, many archaeologists suspect that they represent a continuum (cf. Heizer and Baumhoff 1961; Hester and Heizer 1973a for a discussion). Hester and Heizer (1973a) indicate that "both series experienced a major floruit between A.D. 600-700 and A.D. 1100, with examples continuing to be used into historic times" (1973a: 8). Aikens (1970) indicates a date of 2500 B.C. for the appearance of Rose Spring and Eastgate points in the eastern Basin and Layton's (1970) obsidian hydration measurements on specimens from the High Rock area suggest that the types may have been in use by 300 B.C. or earlier. More reliable dates will be needed before the chronological range for this series can be resolved.

Hester and Heizer's (1973a) compilation of C-14 dates suggests a time span of ca. 2000 B.C. to A.D. 1080 for the Elko Series. Aikens indicates a date of A.D. 1350 from Hogup Cave and questions the reliability of the Elko Series as time markers (cf. Aikens 1970: 51) as they persist from ca. 6400 B.C. to A.D. 1350 at least in the eastern basin. Although Hester and Heizer (1973a) suggest that recent dates from O'Malley Shelter (Madsen 1971; Fowler, et.al. 1973) may be aberrant, they appear to fit with the radiocarbon date for Civa Shelter II, where several Elko Series points were found in association with the Desert Side Notched, Cottonwood and Rose Spring/Eastgate Series.

The Humboldt Series was first defined by Heizer and Clewlow (1968). recognized three types: (1) Concave Base A; (2) Concave Base B; and (3) Basal Notched. The chronological range for this series appears to be somewhat uncertain. A date of 4000 B.C. is known from Newark Cave [Map 5] (Fowler 1968b), and Hogup Cave has yielded a range of ca. 5300 B.C. to 650 B.C. (Aikens 1970; Fry and Adovasio 1970). Hanging Rock Shelter (Layton 1970: 249) yielded Humboldt Series points (A, B, Basal Notched) and Layton indicates an early Anathermal to 3350 B.C. range. The Humboldt Concave Base A type is believed to be equivalent in age to the Pinto Series by Thomas (1971a: 91) from his work in the Reese River Valley. Roust and Clewlow (1968) have speculated that the Humboldt Series continued throughout the Great Basin projectile point

sequence decreasing in size through time. Based on the above data, a chronological range of 4000 B.C. to possibly A.D. 500/1000 is suggested. Additional dates are obviously needed to determine a reliable temporal range for this series.

In brief, the recovered projectile points are indicative of the late chronological sequence already established for the southeastern Great Basin in particular and the Great Basin in general. The stratigraphic distribution of the points apparently indicates the contemporaneity of the series described above. Utilizing these series in conjunction with the ceramics and radiocarbon date, it is probable that the shelter was intermittently used from ca. 800/900 to historic times.

Projectile Point Fragments (Table 5)

Ninety-six non-diagnostic projectile point fragments were recovered during the excavations. Chert is the predominant raw material choice (90.6%) with obsidian following (9.4%). Distal fragments make up 60.4% of this category (chert 75.0%, obsidian 25.0%) with medial sections (15.6%), lateral fragments (17.7%) and proximal specimens (6.3%) following (Table 5).

The majority of the fragments are pressure flaked and biconvex in cross section. Several have a combination of pressure and percussion flaking present, and several have plano-convex cross sections. Since the specimens are non-diagnostic (i.e. cannot be identified as to a known type), no further analysis will be attempted. It should be noted, however, that the fragments may be portions of previously noted projectile point series.

Table 5

Category	Chert	Obsidian
Distal	51	7
Medial	14	1
Proximal	5	1
Lateral	17	-
TOTAL	87	9

Bifaces

Bifaces have long been relagated to minor descriptions and analyses in the majority of site reports for the Great Basin. There is thus a need for reasonably detailed descriptions and attribute analyses for use in comparisons from region to region and from site to site. In brief, some degree of 'standardization' in description is needed in attempting to discover culturally meaningful distributions (e.g. projectile points, 'knives,' blanks, preforms, etc.) in the large amorphous category referred to as 'bifaces.' The preliminary analysis presented below is an initial attempt to more fully describe and understand this artifact class.

The chipped stone specimens assigned to this category are pieces that show evidence of extensive bifacial flaking with at least one lateral edge capable of being utilized for a cutting/scraping/sawing action. These artifacts are probably multi-purpose in function and range in form from a crudely worked flake or blade to a carefully flakes piece suitable for hafting. Projectile points, 'blanks,' and preforms are not included in this category and are discussed elsewhere.

The various biface forms are separated into distinct types based primarily on the overall gross morphology of the specimens. These are pictured in Fig. 16 (after Kleindienst 1962). These categorizations are in a sense qualitative judgements and represent a single attribute simplistic typological differentiation. Unfortunately, the number of complete or 'typable' specimens precludes a multi-attribute quantitative approach to my categorization of the bifaces from the Garden/Coal Valley region. It is hoped that future excavation and further surface reconnaissance will increase the available sample of 'bifaces' from this region.

Nineteen typable specimens were recovered from Civa Shelter II and have been separated into 10 types/subtypes. Chert is the primary raw material choice (89%), no doubt due to its availability in the near vicinity, with only one specimen each of basalt and rhyolite. Cross sections range from biconvex (16) to biplano (2) to plano-convex (1). Morphologically the specimens range from ovate to limande in form (Table 6, Fig. 16). Percussion flaking is dominant although some pressure flaking is present on certain specimens. The edges of many of the specimens show evidence of minor crushing, nibbling and polish. No edge wear analysis was conducted, although such a study would definitely be of some value in determining the function of these 'bifaces' and aid in a comparative study of the O'Malley Shelter material (cf. Fowler, et.al. 1973).

The classification presented below, although in no way definitive because of the bias inherent in the sample size, is based on a variety of attributes, including a consideration of morphology, measurements and edge angle determinations. The specimens utilized were either complete or nearly complete. No proximal, medial, lateral or distal fragments were included, although the data obtained from the analysis of these numerous pieces is included in the Biface Fragment section following.

Type I - Ovate (Table 7, Fig. 23 a-b).

Specimens: Complete (2)
Material: Chert (2)
Description: These specimens are ovate in form (Fig. 24) with convex bases. The lateral edges are convex and converge to form a blunt point at the distal end. The cross sections are biconvex.

Measurements:	Length:	47.3 - 48.0 mm	Thickness:	4.9 - 13.0 mm
	Width:	30.3 - 32.1 mm	Edge Angle:	32° - 40°

Table 6

Biface Types

Type I - Ovate

I -	Ovate
Ia -	Pointed Ovate
Ib -	Long Ovate
Ic -	Broad Ovate
Id -	Asymmetrical Ovate

Type II - Lanceolate

II -	Narrow Lanceolate
IIa -	Elongate Lanceolate
IIb -	Lanceolate

Type III - Triangular

III -	Large Elongate Triangular
IIIa -	Elongate Triangular
IIIb -	Triangular
IIIc -	Large Triangular

Type IV - Subtriangular

IV -	Subtriangular
IVa -	Large Subtriangular

Type V - Limande

V -	Elongate Limande
Va -	Limande
Vb -	Asymmetrical Limande

Type VI - Unidentified - Type I

VI -	Square base, parallel sides

Type VII - Bi-Point

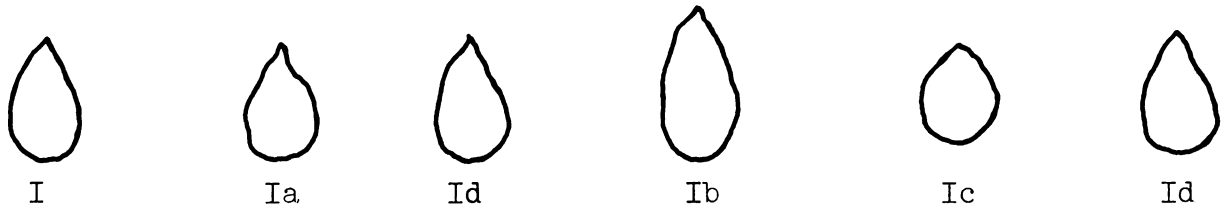
VII -	Bi-point

Crude Bifaces - Not illustrated

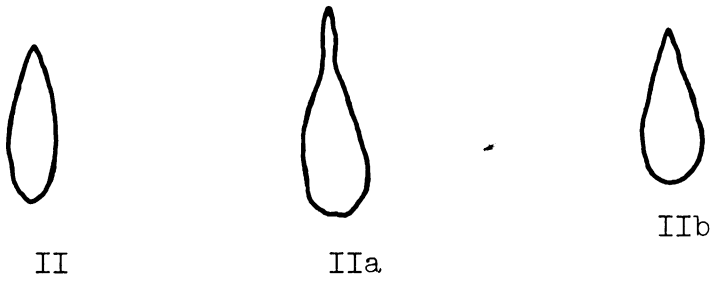
Large crudely trimmed flakes with minimal evidence of bifacial flaking. Forms range from triangular ovate to elongate ovate. "Possibly biface blanks."

BIFACE TYPES

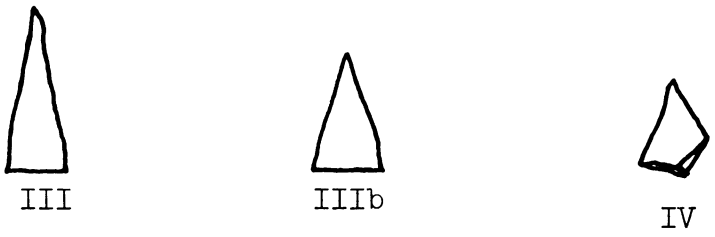
TYPE I - OVATE



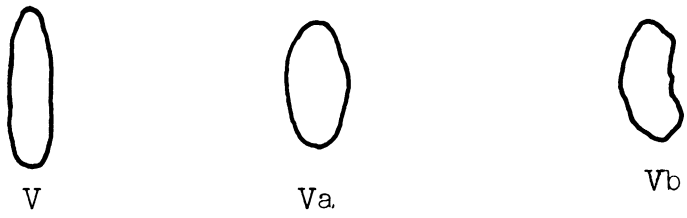
TYPE II - LANCEOLATE



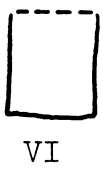
TYPES III & IV - TRIANGULAR



TYPE V - LIMANDE



TYPE VI



TYPE VII - BI-POINT

Figure 16

Type Ia - Pointed Ovate (Table 7)

Specimens: Complete (1)
Material: Chert (1)
Description: This is similar to Type I except that the lateral edges converge to a distinct point at the distal end. The cross section is biconvex.
Measurements: Length: 40.2 mm Thickness: 5.0 mm
Width: 28.9 mm Edge Angle: 30° - 33°

Type Ib - Long Ovate (Table 7, Fig. 23c-i).

Specimens: Complete (2) Incomplete (3)
Material: Chert (4) Basalt (1)
Description: These specimens are slightly elongate versions of the Type I bifaces. The lateral edges are moderately convex to straight with the bases slightly convex. Cross sections range from plano-convex (1) to biconvex (4).
Measurements: Length: 40.0 - 43.5 mm Thickness: 4.5 - 6.0 mm
Width: 24.2 - 26.5 mm Edge Angle: 34° - 37°

Type Ic - Broad Ovate (Table 7, Fig. 24a).

Specimens: Complete (2)
Material: Chert (2)
Description: This category is similar to Type I except that the specimens are more 'squat' or circular in form. Cross sections are biconvex.
Measurements: Length: 40.0 - 42.0 mm Thickness: 10.0 - 13.0 mm
Width: 32.0 - 39.7 mm Edge Angle: 37° - 39°

Type II - Narrow Lanceolate (Table 7).

Specimens: Complete (1)
Material: Chert (1)
Description: This category is narrow lanceolate in outline with a slightly convex base. The lateral edges are straight to slightly converging. Small serrations are present on the butt of this specimen.
Measurements: Length: 122.5 mm Thickness: 7.3 mm
Width: 32.2 mm Edge Angle: 32°

Type III - Large Elongate Triangular (Table 7, Fig. 23j-l).

Specimens: Complete (3)
Material: Chert (3)
Description: These specimens are elongate triangular in outline with straight to very slightly convex sides. The bases range from straight to convex to slightly concave. Maximum width position is at the base. Cross sections are biplano (1) and biconvex (2).

Judging from the excellent degree of finish and thinning, it is conceivable that the specimens could be considered as 'generalized' preforms.

Measurements: Length: 68.0 - 84.0 mm Thickness: 5.0 - 7.0 mm
Width: 28.0 - 38.0 mm Edge Angle: 31° - 42°

Type IIIb - Triangular (Table 7, Fig. 24b).

Specimens: Incomplete (1)
Material: Chert (1)
Description: This specimen is triangular in outline with straight lateral edges. The cross section is biconvex and the greatest width position is at the base.

Measurements: Length: - Thickness: 5.0 mm
Width: 29.1 mm Edge Angle: 33° - 36°

Type IIIc - Large Triangular (Table 7, Fig. 24c).

Specimens: Complete (1)
Material: Chert (1)
Description: This specimen is similar to Type IIIb except that it is much larger. One lateral edge is straight and the other slightly convex. The base is straight with slightly rounded corners present at the intersection of the lateral edges and base. The lateral edges do not converge to a point, but to a deliberately worked 'flat' tip, giving the specimen technically a 'rhomboid' shape rather than a strictly triangular one. Alkali deposit is cemented to the piece at several points on its surface, giving it an appearance similar to specimens collected from Coal Valley Dry Lake. It is suggested that this specimen may have been recovered from the dry lake and reused at Civa II as this is the only artifact recovered from the site with this distinctive deposit adhering to it.

Measurements: Length: 62.3 mm Thickness: 4.5 mm
Width: 41.2 mm Edge Angle: 23° - 27°

Type V - Elongate Limande (Table 7, Fig. 24d).

Specimens: Incomplete (1)
Material: Chert (1)
Description: This specimen is elongate limande in form. Both lateral edges as well as the base are straight. The cross section is biconvex.

Measurements: Length: - Th Thickness: 8.1 mm
Width: 26.5 mm Edge Angle: 32° - 37°

Crude Bifaces (Table 7).

Specimens: Complete (2)
Material: Chert (2)
Description: These are crudely flaked chert cobbles with convex lateral edges and convex bases. The lateral edges converge to a point at the distal ends. Both specimens

are made by hard hammer percussion. The cross sections are biconvex.

Measurements:	Length:	72.0 - 76.0 mm	Thickness:	24.0 -26.8 mm
	Width:	42.5 - 46.3 mm	Edge Angle:	-

Discussion

The low number of complete specimens recovered (19) compared to the large number of biface fragments apparently indicates an extremely high breakage rate, quite possibly during use (highly probable) or manufacture. The typable bifaces are similar to those from the Coal Valley Dry Lake localities (cf. Chapter V), Slivovitz Shelter (Chapter VI) and the surface collections in the study area. These artifacts quite probably represent cutting, scraping or sawing tools.

Edge angles range from 23^{o} to 42^{o} with a mean of 37^{o} for 32 determinations (Table 7). The angles in this range are steep enough to hold an edge yet are low enough for a reasonably sharp cutting edge (cf. Semenov 1964).

Biface Fragments (Fig. 24e-g).

One hundred and twenty-nine non-diagnostic biface fragments were recovered from the deposits. Chert is the predominant raw material choice (86.0%) with obsidian following (14.0%). Distal fragments make up 33.3% of this category (chert 83.7%, obsidian 16.3%) with medial sections (13.7%), lateral fragments (17.0%) and proximal specimens (36.4%) following (Table 8).

The majority of the fragments are percussion flaked and biconvex or plano-convex in cross section. Several specimens have a combination of pressure and percussion flaking present. Since the specimens are non-diagnostic (i.e. cannot be classified into the regional typology), no future attribute analysis will be attempted.

Discussion/Comments

The large number of distal and proximal fragments with snap fractures (cf. Crabtree 1972) present suggests that repair/maintenance activities were conducted at the shelter along with the manufacture/finishing of the bifaces. The regional preference for chert is clearly confirmed in the large number of chert bifaces present. From inspection, the majority of the specimens fall into a less than 10 cm in length category.

Artifacts

The excavated deposits of Civa II yielded a total of 237 artifacts, including chipped and ground stone implements, worked bone and shell and perishable materials such as leather scraps and basketry fragments. Projectile points, bifaces and ceramics are not included in the above total and have been discussed previously.

For ease of presentation and discussion the artifacts have been categorized into a descriptive typology or referenced to previous typologies relevant to the area. The prime purpose of this typology is the analysis of the chipped stone artifacts with respect to certain recognized 'stages' of manufacture along the lines suggested by Muto's blank-preform-product continuum (Muto 1971a, 1971b) and the recognition of the method of retouch employed in the manufacture of these stone tools as outlined by Crabtree (1972). All of the chipped stone artifacts were analyzed for the following traits or characteristics.

1. The stage of manufacture as evidenced by the type of flake utilized (e.g. primary cortex (Hester 1971; Shafer 1969); secondary cortex (Hester 1971; Shafer 1969); interior flakes (Hester 1971; Shafer 1969); and biface thinning flakes (Epstein 1969)).
2. The placement of retouch present - e.g. end, side, lateral edge.
3. The type of retouch (unifacial, bifacial) and the technological method (or process) employed in retouch (hard hammer, soft hammer percussion flaking, pressure flaking, notching, denticulation, abrasion and so on.

The secondary purpose of the typology is to present the usual metric attributes, raw material types and to measure (where appropriate) working edge angles or other relevant characteristics. It is hoped that a detailed typology of this type will aid in the comparison of other materials from sites both in and outside of the study area.

Drills/Perforators

Eight specimens (5 complete, 3 fragmentary) comprise this category assumed to have been used in drilling and perforating activities. The finished drills fall into 5 distinct types. Six specimens are made on chert, one on obsidian and one on basalt.

Type I

This drill has been produced by the reworking of an Eastgate Series projectile point and is similar to the reworked Parowan Basal-Notched Type I drills described by Marwitt (1970: 74). The specimen is of chert and has one ear snapped off. Its length is 3.0 cm. N10E0, sidewall.

Type 2 (Fig. 22e).

One complete chert specimen comprises this category. It is similar to Marwitt's (1970: 79) Type 2 with a long thin cylindrical bit and a short wide flaring base. Its length is 4.3 cm; widest bit width 0.95 cm; narrowest bit width 0.5 cm and base width 3.2 cm. N6E2, 20 cm.

Table 7

Typable Biface Data

UCLMA#	Type	Status	Material	Rt. Edge Angle	Lf. Edge Angle	L	W	T	CS	Provenience
Uncat.	I	Comp.	Chert	39°	40°	47.3	30.3	13.0	BC	N8E0 - 70
2-60375	I	Comp.	Chert	34°	32°	38.0	32.1	4.9	BC	N6E2 - 80
Uncat.	Ia	Comp.	Chert	30°	33°	40.2	28.9	5.0	BC	N6E2 - 27
2-60123	Ib	Comp.	Basalt	39°	35°	48.3	26.3	5.7	BC	N6E2 - 58
2-59678	Ib	Comp.	Chert	-	36°	43.5	24.2	6.0	BC	N8W2 - 30-40
2-59647	Ib	Frag.	Chert	34°	34°	41.5+	24.5	4.9	BC	N8W2 -14
2-59699	Ib	Frag.	Chert	34°	34°	-	29.5	5.0	PC	N8W2 - 49
2-59740	Ib	Frag.	Chert	37°	34°	-	26.5	4.5	BC	N10E0 - 0-10
2-60090	Ic	Comp.	Chert	38°	-	42.0	32.0	10.0	BC	N12W2 - 10-20
Uncat.	Ic	Comp.	Chert	37°	39°	40.0	39.7	13.0	BC	N8E0 - 50-60
2-60193	II	Comp.	Rhyolite	32°	32°	122.5	32.2	7.3	BC	N6E0 - 60
1-59753	III	Comp.	Chert	42°	42°	84.0	38.0	7.0	BC	N10E0 - 10-20
1-59901	III	Comp.	Chert	34°	39°	79.0	36.2	5.0	BP	N10W2 - 16
2-60310	III	Comp.	Chert	31°	31°	68.0	28.0	6.0	BC	N10E2 - 50
2-59701	IIIb	Frag.	Chert	36°	33°	-	29.1	5.0	BC	N8W2 - 43
2-59955	IIIc	Comp.	Chert	27°	23°	62.3	41.2	4.5	BP	N6W2 - 10-20
2-59702	V	Frag.	Chert	37°	32°	-	26.5	8.1	BC	N8W2 - 48
2-59731	Crude	Comp.	Chert	-	-	76.0	46.3	26.8	BC	N6E0 - 10-20
2-60214	Crude	Comp.	Chert	-	-	72.0	42.5	24.0	BC	N6E0 - 64

CS - Cross section
BC - Biconvex
BP - Biplano
PC - Plano-convex

(All measurements in mm)

Type 3 (Fig. 24h-i).

One nearly complete chert specimen with a damaged base and two fragmentary specimens, both bases (obsidian and chert) comprise this type. All have almost rectangular to slightly elliptical bases from which a long slender drill bit gradually tapers. One of the broken bases appears to have had a rather slender long bit, while the other has a rather short thin one. The complete specimen's length is 3.5 cm, width of base 1.3 cm, width of bit taper 0.75 - 0.20 cm. Base widths on the non-complete specimens range from 1.65 - 1.70 cm. N6E0, 40-50 cm; N8E0, 0 - 10 cm; N10E0, 40 - 50 cm.

Type 4 (Fig. 24k).

This complete chert specimen is pointed ovate in outline. Dulling and slight crushing are present on the tip. Its length is 3.8 cm, and has a width of 2.4 cm. Provenience unknown.

Type 5 (Fig. 22f).

One complete basalt specimen comprises this type. It has a moderately elongate rectangular base from which the long slender drill bit gradually tapers. A slight shoulder is present on one side of the bit. This drill was made on an interior flake and the striking platform is still present on the base. Its length is 4.8 cm, width (base) 1.5 cm, width (bit) 0.8 - 0.3 cm and thickness 0.6 cm. N8E0, 50 - 60 cm.

Unclassifiable Drill/Perforator Fragments (Fig. 24j).

One moderately long chert tapering drill bit fragment was recovered from N8E0, 65 cm. A snap fracture is present at the base and it is probable that the specimen broke during use. N8E0, 65 cm.

Scrapers

Unifacial Side Scraper (Fig. 19q).

This is a chert flake with steep unifacial pressure retouch extending along the entire length of one lateral edge parallel to the striking platform. Unifacial nibbling and minor areas of retouch are present at other points on the circumference of the specimen. Length is 46.5 mm, width 31.5 mm and thickness 6.5 mm. Provenience is N6E2 - 74 cm.

Choppers

Light Duty Choppers (Table 8).

These five specimens are manufactured on either small side struck split rounded cobbles or on tabular fragments. Modification has been by either slight unifacial

percussion flaking or by bifacial percussion flaking. The working edges show edge battering or small flake removals.

Table 8

UCLMA#	L	W	T	Raw Material	Provenience
2-59704	83.5 cm	59.0 cm	20.0 cm	Limestone	N8W2 - 50 cm
2-59913	75.5 cm	58.1 cm	28.5 cm	Chert	N10W2 - 25 cm
2-60270	65.0 cm	48.0 cm	17.1 cm	Limestone	N10W2 - 50-60 cm
2-60351	58.9 cm	51.0 cm	27.8 cm	Chert	N6E2 - 50-60 cm
2-61524	74.0 cm	61.1 cm	26.0 cm	Rhyolite	N8W2 - 40-50 cm

Retouched Flakes

Unifacially Retouched Flakes (Table 9).

The five specimens assigned to this category are flakes or flake fragments with deliverate unifacial pressure or percussion retouch present at one or more points on the lateral edges (cf. Edge Damage for a discussion of 'edge damaged' flakes). Two flakes are chert, one silicified rhyolite, one obsidian and one is basalt. Four are interior flakes and one is a primary cortex flake. One specimen has a serrated edge present on the end opposite the striking platform.

Bifacially Retouched Flakes

The three specimens in this category have bifacial retouch present at one or more points on the lateral edges. Two flakes are obsidian interior flakes and the other is a chert interior flake. N6E2, 80 cm; N10W2, 30-40, 40-50 cm.

Naturally Backed Unifacially Retouched Flakes (Fig. 22).

Two specimens are included in this category. One is a chert interior flake with one unifacially pressure flaked lateral edge and a natural backing on the opposite edge. Its length is 42.5 mm, width 24.0 mm and a thickness of 8.0 mm. The other specimen is an obsidian secondary cortex trim flake with a unifacial pressure retouch along 80% of a lateral edge. The lateral edge opposite to the retouched portion of the specimen has cortex present forming a naturally backed edge. Its length is 38.0 mm and it has a width of 20.0 mm. N8E0, 20-30 cm; N8E2, 30-40 cm.

Discussion

All of the above specimens were probably used in a cutting/slicing/scraping action.

Table 9

Category	Provenience
Unifacially Retouched	N6E0 - 40-50 cm N6E2 - 60-70 cm N6W2 - Surface N10W2 - 33 cm N12W2 - 32 cm

Cores

Seven cores were recovered from the deposits at Civa II. The terminology used in the descriptive section below follows Shafer (1969).

Double Platform Bidirectional

This core is a small chunk of chert from which 3 small (less than 20.0 mm) flakes have been detached from one edge and another 3 small flakes have been removed from the opposite edge. Extensive nibbling and crushing is present on one edge opposite a natural ledge and it is probable that his core served as a cutting/scraping tool after being discarded. Length is 53.0 mm, width 33.5 mm and thickness 22.0 mm. Provenience is N8E0, 60 cm.

Double Platform Unidirectional

This is a small chunk of chert with two striking platforms from which usable flakes have been struck on only one face. Light to moderate battering is present at several points on the circumference, indicating possible utilization as a tool after discardal. Length is 68.0 mm, width 61.0 mm and thickness 36.1 mm. Provenience is N6E0, 50-60 cm.

Exhausted Cores

Five specimens comprise this category. These can be described as the nuclei of cores, that is, the amorphous chunks of raw material which are a residual by-product of flaking cores. Presumably these cores were too small for further flaking and were discarded. Lengths range from 37.5 - 55.5 mm, width from 35.1 - 67.5 mm and thickness from 16.9 - 24.1 mm. All specimens were recovered from the first 40 cm of the deposit.

Discussion

The paucity of cores coupled with the analysis of the lithic debitage appears to lend support to the hypothesis that manufacturing was primarily confined to secondary and tertiary processing, rather than with primary processing, i.e. the manufacture of flakes for further modification.

Raw Material

Three angular chert chunks and/or nodules with several negative flake scars present on each were recovered from Civa II. These range in length from 8.0 - 15.0 cm and are 4.0 - 8.0 cm thick. The weights range from 500.0 to 4000.0 grams. Since chert materials of this type do not occur in the immediate vicinity of the site, these specimens were probably brought into the shelter for use as a source of raw material in the manufacture of various tools. Proveniences are N10W2, 29 cm, N10E0, 39 cm and N6E0, 24 cm.

Edge Damaged/Utilized Flakes

Twenty-seven complete flakes or flake fragments comprise this category. All have various degrees of edge damage and/or light pressure retouch/unifacial nibbling present on the lateral edges. Ten are on obsidian flakes, 2 on basalt, 13 are chert and one is rhyolite. Twenty-one are interior flakes, 2 are secondary cortex flakes and 4 are primary cortex flakes. Several specimens have dorsal trim scars present. The flakes range in length from 1.4 to 8.8 cm; in width from 1.0 to 7.5 cm; and in thickness from 0.25 to 2.6 cm. Weights range from 0.3 to 20.3 grams. The specimens were recovered from throughout the deposit.

Discussion

Edge damaged flakes have often been confused with a category of unmodified flakes described as 'utilized,' by which is meant flakes which have no formal retouch present but which have been or may have been utilized in some task. The category described here consists of various types of flakes with slightly damaged edges or flakes which exhibit more prominent patterns of use-modification or use wear (crushing, nibbling, retouch) present on the lateral edges as noted by visual inspection or low power magnification (cf. Semenov 1964; Keeley 1974; Tringham, et.al. 1974). Their function is uncertain but they may have been casually used for cutting and scraping purposes. Hester and Heizer's (1973b) extensive bibliography on experimental archaeology and lithic technology cites numerous studies dealing with the function of chipped stone tools through wear pattern analysis and numerous additional studies have appeared in the literature since its publication. Studies of this type have enhanced the ability of archaeologists to determine the function of many morphologically amorphous stone artifacts. However, there is still much confusion with the proper identification of culturally 'utilized' flakes and their separation from edge damaged flakes. Keller (1966) has demonstrated the extent to which natural processes can produce spurious artifacts, e.g. edge damaged flakes mistaken for culturally utilized flakes, while Wylie (1975) cautions against improper laboratory techniques (e.g. washing, loose tray storage of artifacts, improper handling - "bag clatter"), producing spurious edge damage interpretations on specimens. The results of a recent deer butchering experiment (Hester, Spencer, Busby and Bard 1976) are directly relevant to this problem. The obsidian flakes used in this experiment showed little evidence of 'utilization' as determined by edge wear analysis if the tool did not come into repeated contact with the bone. Thus,

it would appear that, of the flakes recovered from archaeological contexts, exhibiting little to no use-wear ('utilization') or edge damage, either may never have been used for any purpose, or may have served as convenient cutting, slicing and scraping tools while moderately edge damaged flakes may only be the result of the natural factors discussed by Keller (1966) rather than cultural factors.

Therefore, this category is included for information only and will not be considered as a formal artifact category in the sense of deliverate manufacture and use, although they may have been deliberately manufactured for some purpose. More research on 'utilized' or edge damaged flakes (the term I prefer to use) would seem to be in order to determine if cultural or natural factors can account for the patterns of 'wear' or 'damage' seen on many otherwise deliberately unmodified flakes.

Lithic Debitage (Table 10).

An analysis of the lithic debitage recovered from Civa II was carried out in order to determine the nature and characteristics of manufacturing and maintenance activities present at the site. All the debitage from each unit was segregated according to raw material type (chert, obsidian, rhyolite/basalt) and debitage category (whole flakes - striking platform present, body at least 90% complete; partial flakes - striking platform absent; and angular waste). No natural or cultural stratigraphic analysis was attempted but the number and weight percentages of total debitage per level was plotted to see if any pattern of site use could be determined. [1]

Chert is the dominant raw material of the 12,365 pieces of recovered debitage. Chert made up 72.0% of the total number and 62.4% by weight. Overall the amount of chert debitage ranges from 51.6% to 81.2% in number by unit and from 45.0% to 81.4% in weight by unit. Obsidian is a poor second (number 22.8%, weight 13.9%) with basalt/other (number 5.2%, weight 23.7%) following. Undoubtedly the preference for chert is no doubt due to its easy availability in the alluvial fans present in the Garden and Coal Valley area.

In terms of debitage concentration, the analysis appears to indicate a concentration of material from ca. 20-30 cm to 70 cm. This appears to be in general agreement with the other date (e.g. pottery, biface fragments, projectile points), inferring either 'intensive' or more frequent use in the middle and lower portions of the site. [2]

An examination of the whole and partial flakes indicates a very high percentage of interior and biface thinning flakes with only a few primary and secondary cortex flakes present. (Definitions of the flake categories in general follow Epstein 1969; Shafer 1969 and Hester 1971). This would appear to suggest that the primary stage of lithic manufacture (e.g. decortification of the raw material, especially chert nodules) was carried out at some location other than the shelter. A surface reconnaissance carried out in the immediate vicinity of the site failed to yield any primary processing area or quarry.

The lithic debitage argues for a pattern of little primary processing of raw material with emphasis instead placed on the production of interior flakes and the thinning and finishing of preforms, projectile points and bifaces. As well, maintenance activities (e.g. resharpening of damaged/broken bifaces, projectile points, etc.) were also probably carried out. Numerous small pressure flakes of chert and obsidian were noted in the soil samples and could be seen falling through the 1/4" mesh used for all but one unit (N6W2) during screening operations. One unit (N6W2) was totally screened using 1/8" mesh screen, and the majority of flakes recovered were small pressure flakes.

Table 10

Lithic Debitage

Unit	Debitage #	Weight
N6E0	2726	2718.1
N6E2	1483	1520.3
N6W2 *	2671	1080.3
N8E0	1092	1297.3
N8E2	664	710.7
N8W2	1509	1728.6
N10E0	886	1122.8
N10E2	118	142.1
N10W2	1153	2381.3
N12W2	63	249.3
TOTAL	12,365	12,950.8

[* - 1/8" mesh used]

Ground Stone Artifacts

Manos

Eight complete or nearly complete specimens were found at Civa II. No fragments were noted in spite of the large number of ground stone fragments present. Several categories are recognizable, based on the amount/degree of modification noted on the specimen.

I. Shaped, Rectangular in Cross Section, Abraded on Two Sides

One complete specimen made on a well sorted sandstone, 9.5 cm long, 6.5 cm wide and 2.2 cm thick, was recovered. N10W2, 60-70 cm.

II. Unshaped, Broad Ovals, Abraded One Side

This category has one complete and 4 fragmentary specimens. These all appear to be cobbles that have been utilized with very little modification for manos. Battering and abrasion are present on the ends and lateral edges of some of the pieces. Unidentifiable staining and food residue are found on the grinding surface of one specimen. The length of the complete specimen is 10.0 cm, width 8.0 cm and thickness 6.2 cm. The four fragments vary in thickness from 3.2 cm to 6.0 cm. Materials are sandstone, limestone, granite and basalt. N6E0, 0-10 cm; N6W2, 10-20, 20-30 cm; N8E0, 40-50 cm; N8W2, 0-10 cm; N8W2, 0-10 cm.

III. Unshaped, Triangular in Cross Section, Abrasion on One Side

Only one complete specimen of this type was recovered. Of granite, it is 9.5 cm in length, 8.5 cm wide and 4.2 cm thick. The grinding surface is well smoothed by abrasion. N6E2, 30-40 cm.

Metates (Table 11).

Fifteen complete or identifiable specimens and 34 fragments comprise this class. Based on morphological features, this group of artifacts can be divided into two categories - block/chunk and slab. The metate fragments are evenly divided between the two categories.

I. Block/Chunk Metates

Five specimens, 4 complete and 1 fragmentary, were noted at Civa II. The specimens are crudely shaped and exhibit evidence of smoothing and grinding, the depressions ranging from circular to ovate in form (0.4 to 2.0 cm deep), on one surface. Only one specimen has evidence of grinding on both sides. This partial specimen is roughly rectangular in outline with a large grinding surface area on one side and a smaller area on the other. One depression is much deeper than the other (2.0 cm deep) and it is possible that once one side was of no further use (i.e. effective surface grinding area decreased through use), the metate was simply turned over and re-used on the remaining pristine surface. The complete specimens range in length from 15.0 to 28.0 cm, width 15.0 to 21.0 cm and thickness 9.0 to 14.0 cm. The materials are basalt (1), rhyolite (3) and limestone (1).

II. Slab

In contrast to the block/chunk metates, this group consists of reasonably carefully shaped specimens. Ten fragmentary pieces comprise this category. The specimens appear to have ranged from oval to rectangular in completed form and all have slight to marked grinding depressions (0.1 to 1.0 cm) in the central portions of the pieces. No specimens show grinding or abrasion on more than one surface. Several fragments indicate deliberate shaping by the presence of grinding and battering marks on the lateral

edges. Two specimens have traces of red pigment or food residue present on the grinding surface. The ten fragments vary from 1.4 cm to 5.2 cm in thickness. Materials are rhyolite (9) and limestone (1).

Metate Fragments (Table 11).

Thirty-four rhyolite, basalt, sandstone and limestone metate fragments were recovered. All show evidence of grinding/smoothing on one or more of the plane surfaces. Fragments in many cases have been shaped by percussion and/or abrasion on the lateral edges. Both categories are evenly represented with thicknesses ranging from 1.5 cm to 15.0 cm.

Table 11

Category	#	Provenience
I	5	Surface (2) N6E0 - 40-50 cm N6E2 - 70-80 cm N10W2 - 40-50 cm
II	10	N6E0 - 20-30 cm 50-60 cm N6E2 - 20-30 cm N6W2 - 20-30 cm N8E0 - 20-30 cm N8E2 - 20-30 cm N8W2 - 40-50 cm N10W2 - 20-30 cm (2) 30-40 cm
III	34	N6E0 - 30-40 cm 40-50 cm (2) 50-60 cm (3) 60-70 cm (2) N6E2 - 30-40 cm (4) N6W2 - Surface 0-10 cm 10-20 cm 20-30 cm (2) N8E2 - 0-10 cm N8W2 - 20-30 cm 30-40 cm 40-50 cm 50-60 cm (2) 60-70 cm

Table 11 (continued)

Category	#	Provenience
III	34	N10W2 - 10-20 cm
		20-30 cm
		30-40 cm (2)
		40-50 cm (2)
		50-60 cm (3)

Pestles

Two pestle fragments, probably complementary pieces, were recovered in N8W2 at depths of 25.0 cm and 40.0 cm respectively. One specimen is the butt portion and the other the distal end. The medial section of the pestle was not recovered. The cross sections are ovoid and the pieces have been shaped by pecking and abrasion on the lateral edges. Battering is present on both the butt and distal ends. It is probable that the two pieces were used in a pounding fashion after the complete pestle was broken. They are 14.5 cm and 8.5 cm long, 11.7 cm and 8.0 cm at the widest points and 8.3 cm and 6.5 cm in thickness. From inspection the material is limestone.

Battered Stones

This category is composed of fist-sized cobbles and angular rocks that show little modification except for the presence of edge battering at one or more areas on their circumference. Three categories are recognized, based on the gross morphology of the specimens. These battered stones could have served for a variety of activities which require crushing and battering. Some of the specimens were undoubtedly used as hard hammer percussors. Distribution is throughout the deposit.

I. Spheroids

Six specimens of this type are present. These are small stones, roughly spheroid in shape with battering/pounding marks present at one or more points on their circumference. The five specimens range from 6.5 cm to 10.5 cm in length, 5.0 to 8.2 cm in width and 3.8 cm in thickness. The materials are rhyolite (2), chert (3) and limestone (1).

II. Tabular Cross Section

These three specimens have an essentially tabular cross section and range in form from sub-rectangular to ovate to elongate ovate. Battering/abrasion marks are present at one or more parts along their circumference. The specimens range from 6.5 cm to 9.0 cm in length, 6.5 cm to 8.0 cm in width and 2.3 cm to 2.9 cm in thickness. The materials are limestone (1), sandstone (1), and basalt (1).

III. Irregular/Angular Stones

These five specimens are small fist-sized irregular angular fragments of rock with battering and/or abrasion present at one or more points on their circumference. The specimens range from 7.7 cm to 13.1 cm in length, 5.6 cm to 6.6 cm in width and 3.7 cm to 4.3 cm in thickness. The materials are siltstone (1), basalt (2), chert (1) and limestone (1).

Ochre/Pigment Stones

Red (11) and yellow (2) ochre fragments (up to 3.0 cm in diameter) were found throughout the deposits of Civa II. Much of the ochre was uncollectable due to decomposition and fragmentation. The ochre was probably used for facial and artifact decoration/ornamentation. Ochre staining was observed on some of the recovered artifacts and unmodified faunal remains. Proveniences are primarily from below 30 cm BS.

Miscellaneous Stone Specimens

Tabular Fragments (Fig. 21l).

Eighteen thin tabular fragments, irregular in form, of rhyolite and fine grained sandstone, with evidence of distinct, shallow, criss-cross striations/scratches were recovered from several units. The majority appear to be fragments of several, much larger, deliberately shaped artifacts that have traces of edge grinding/shaping around the margins. The maximum length is 12.0 cm and the maximum thickness is 2.3 cm. The function of these tabular specimens is problematical but it is probable that they were used in a tool manufacturing process (e.g. projectile point or biface manufacture) in which the lateral edges of a specimen (a preform, 'blank', etc.) are dulled or edge ground preparatory to direct pressure or percussion flaking (cf. Sheets 1973; Crabtree 1970; Muto 1971b). Proveniences are scattered throughout the deposit.

Bone Artifacts

Bone Awls (Table 12, Fig. 26d, e).

A total of 8 complete (2) or fragmentary (6) bone awls were recovered from the deposits of Civa Shelter II. Two have been identified, based on Marwitt's (1970: 106-113) adaptation of Kidder's (1932: 211-213) and Ambler's (1966: 55-56) classifactory procedures for bone awls.

Kidder's system of classification of mammal leg bone awls is based on the amount of shaping required (particularly on the head of the bone) to produce an awl from unmodified bone, while Ambler (1966: 55-56) classifies awls into 3 types based strictly on tip taper - gradual, abrupt and recurved.

Unusual Awls (Fig. 26d).

The two complete specimens are made on a fragment of a medium mammal pelvis and on a tibia of a jackrabbit (Lepus californicus) respectively. The pelvis fragment (illium) bears only slight traces of modification (cutting - possibly butchering marks and slight grinding) on the body. One end has been broken and shaped by grinding into a short recurved tip. The tip has the distal end snapped off and is highly polished through use. Its length is 83.0 mm. The other specimen is made on a tibia with the distal end removed and one lateral edge shaped into a gradually tapering tip. No other modification is present. Its length is 80.0 mm.

Unclassified Fragments (Fig. 26e).

Of the six pieces in this category, 3 are tip ends and 3 are midsection fragments. Two of the tip fragments are gradually tapering. These six fragments are believed to represent six additional awls.

Discussion

These awls, while ranging in size and degree of finish, were probably multipurpose in use and probably employed in leather working or basketmaking. They appear to be randomly distributed throughout the site, both horizontally and vertically, although N12W2 has 3 specimens in the 10-30 cm level.

Flaking Tools (Table 12, Fig. 25k, 26a-c).

Four artifacts (3 bone and 1 antler) comprise this category. Three are long bone fragments of large mammals and the other a split antler tine fragment. Two of the flakers are long specimens, ground and polished on the shaft and lateral edges in the vicinity of the working end. Both tips are reasonably blunt, although only one has any scarring present. Lengths range from 98.0 mm to 160.0 mm. The third flaker is an otherwise unmodified large mammal long bone fragment with scarring present on its tip. The entire piece has been worn smooth through use. Its length is 40.0 mm. The specimen made on a split antler tine appears to be more 'awl-like' (Fig. 25k) with its sharper point than the other flaking tools. However, its tip shows characteristic scarring and chipping similar to that found on the other specimens. Slight grinding and polishing are present on the lateral edges below the tip. Its length is 110.0 mm.

Bone Beads (Table 12, Fig. 22h, 25c).

Three definite tubular bone beads were recovered and are similar to Marwitt's (1970: 105) Type B category. The three are made on small/medium mammal long bone midsections and can be distinguished by size. Two are reasonably large and the third small. One specimen (Fig. 25c) has been extensively smoothed and polished, both on the exterior and interior. No traces of any original cutting or grinding marks are present.

Its length is 39.0 mm and diameter is 10.5 mm. The other large specimen (Fig. 22h) has slight traces of abrasion and polish as well as cutting marks present on both ends and the main body. The interior has been 'hollowed' out leaving a large opening at one end and 2 small side-by-side openings at the other. Its length is 13.0 mm and diameter 9.0 mm.

The small bead has been ground and smoothed over the entire surface. Cutting and grinding have been used to form a slight taper at each end. Its length is 7.0 mm and diameter 3.5 mm. All specimens are undecorated.

Incised Bone (Table 12, Fig. 25a, e).

Two specimens were recovered. One piece is made on a flat, medial, long bone fragment of a medium sized mammal. The proximal end is broken off and the distal portion shows evidence of cutting. The shallow, incised lines, perpendicular to the long axis of the fragment, are present on both leading edges of the fragment and consist of 20 and 18 lines respectively. Its length is 29.0 mm and width 8.0 mm. The other specimen is a fragment of a medium mammal long bone with 3 deeply incised lines girdling the shaft (Fig. 25a). On the complete specimen these lines probably encircled the shaft. It is possible that this is a fragment of a gaming piece.

Worked/Utilized Bone (Table 12, Fig. 26h).

This category consists of 8 long bone fragments and splinters along with two worked, small long bone midsection fragments and the distal end of a Lepus californicus phalanx. All pieces show evidence of cutting, smoothing, or polish indicative of deliberate use on the shaft or lateral edges. The two small long bone tubular midsections and distal fragment probably represent the waste products of bone bead manufacture. The majority of these specimens are two fragmentary for any identification.

Bone Pendant (Fig. 25d).

One fragmentary specimen made on a section of medium mammal long bone is present at Civa II. The pendant is roughly elongate triangular in form and has the remnants of a drill hole present at the narrow end. Traces of slight polish and grinding are present on both sides, probably due to wear and manufacture. No surface decoration is present. Its length is 49.0 mm, width at the narrow end 8.5 mm; width at the widest end 12.2 mm and thickness 2.8 mm. Provenience is N12W2, 20-30 cm.

Table 12

Bone Artifacts

Category	Provenience
Awls	N6E0 - 27 cm - 40-50 cm

Category	Provenience
Awls	N6E2 - 30-40 cm N10E2 - 60-70 cm N10W2 - 40-50 cm N12W2 - 18 cm - 20-30 cm (2)
Flakers	N10E0 - 32 cm - 33 cm N12W2 - 20-30 cm (2)
Beads	N6W2 - 30-40 cm N8E2 - 0-10 cm N12W2 - 0-10 cm
Incised Bone	N8E2 - 50-60 cm N10E2 - 70-80 cm
Worked/ Utilized Bone	N6E0 - 40-50 cm - 61 cm N6W2 - 10-20 cm N8W2 - 40-50 cm N10E0 - 20-30 cm - 60-70 cm (2) N10W2 - 16 cm - 60-70 cm N12W2 - 20-30 cm - 47 cm

Tubular Bones or Bone Beads (Fig. 25g, 26f-g).

Twenty-two specimens (11 complete, 11 fragmentary) comprise this category. The specimens are hollow sections of small to medium mammals (mostly Lepus sp.; possibly a few bird long bones) with both ends having various degrees of cutting and smoothing present. The majority of the bones show a slight surface polish possibly resulting from use wear or intentional polishing during manufacture. No surface decoration is present on any of the specimens except for 3 shallow incised lines near one end on one specimen. The pieces range in length from 15.0 mm to 66.0 mm and from 3.0 mm to 6.0 mm in diameter. The majority of the specimens cluster around the midpoints of the ranges. The identification of these specimens as bone beads is somewhat problematical but there is no doubt that they could have been easily strung for a decorative purpose. The specimens are randomly distributed throughout the deposit.

Gaming Counters (Fig. 25b, f).

Two Type A counters (cf. Marwitt 1970: 101, Fig. 69a-h) were recovered. One specimen is unfinished and is made on a ground and shaped tabular piece of long bone. This piece has two shallow uncompleted drill holes present, one on each side of the specimen, although if drilled completely through, the holes would not line up with each other. Its length is 22.1 mm,
Provenience is N10E0, 30-40 cm.

The other specimen is a center-drilled fragment of a somewhat more crudely finished counter. This counter has been biconically drilled completely through the bone. Its width is 12.5 mm and thickness 4.0 mm. Provenience is N10W2, 50-60 cm.

Both specimens have no surface decoration present, although traces of a red ochre (?) wash can be seen on both pieces.

Shell Artifacts

Shell Beads (Fig. 25h, i).

One complete clam shell (Tivela sp. (?)) disc bead with a center drilled hole was recovered in unit N6E2, 40-50 cm. The bead corresponds to Type 53 illustrated in Bennyhoff and Heizer (1958) and is well made. It has a diameter of 7.1 mm.

One Olivella biplicata bead, similar to the type 3b1 of Bennyhoff and Heizer (1958) was found in N6E0, 40-50 cm. The specimen has a uniconically drilled hole with a diameter of 2.0 mm present, slightly offset from the center of the piece. Smooth marks and grinding striations are present on the exterior surface of the shell.

Shell Bead/Pendant (Fig. 25j).

One Haliotus sp. half ovate shell bead fragment similar to Gifford's (1947) AB5 category was recovered from unit N8E0 during a small cave-in. Two biconically drilled holes (1.5 mm and 2.5 mm in diameter) are present near one end along the straight edge.

Discussion

The three specimens are probably trade items and represent either direct or indirect contact with trade routes to the Southwest (cf. Bennyhoff and Heizer 1958; Colton 1941; and Kean 1965).

Perishables

Knotted Vegetal Material

A totally carbonized piece of twisted vegetal material with a single overhand knot was noted in N8E2, 40-50 cm in the vicinity of a hearth.

Leather

One decomposing fragment of leather was recovered in N8E0, 0-10 cm.

Basketry

One small rim fragment of a slightly charred coiled basket was recovered from N8E2, 0-10 cm. The fragmentary nature of the specimen precludes any additional study.

Discussion

The paucity of any perishable materials is undoubtedly due to the damp nature of the deposit.

Historical Artifacts

One historical artifact, a brass .41 caliber revolver cartridge casing probably used in a .41 long Double Action Colt was recovered from the surface of N8E2. From the head stamp, it was manufactured by the Western Repeating Arms Company in the 1880s (James, personal communication, 1976).

Human Skeletal Material

Two fragments of human skeletal material were noted. A burnt femoral head of a juvenile (est. age 4-6 years) was recovered from N8E0, 10-20 cm (Hoffman, personal communication, 1976). A human phalanx (Northey, personal communication, 1978) was recovered from N6E0, 50-60 cm. It is possible that the two specimens are from a possible cremation burial although no burials were uncovered during our excavations at the site.

Faunal Remains (cf. Appendix II).

The faunal remains indicate a heavy reliance on the hunting or snaring of jackrabbit (Lepus californicus). Big horn sheep (Ovis canadensis) is present in the deposit in small quantities but was probably not hunted in the surrounding area. Rather it is possible that the remains indicate culturally transported meat from the higher elevation hunting areas (e.g., Quinn Canyon Range - Slivovitz Shelter). Several rodent and a small quantity of cottontail (Sylvilagus sp.) along with several tentatively identified bison remains comprise the rest of the faunal assemblage. In general, the faunal remains indicate a primary emphasis on the hunting of jackrabbit by a small group.

Summary/Interpretations

Civa Shelter II was an intermittently utilized, seasonal, temporary occupation site probably used by both Shoshone and Southern Paiute groups (cf. Steward 1938; Kelly 1934; Stewart 1966). The site can be assigned a relative dating using the recovered projectile points at ca. A.D. 600/700 to historic times (A.D. 1850) and a radiocarbon age determination on a charcoal sample from a hearth midway through the deposit yielded a date of A.D. 1085 tends to support this chronological range.

The ceramic assemblage, dominated by Shoshone Tradition ware, offers further evidence for the identity of the groups and the time range of shelter use. A small amount (5%) of Fremont ceramics from the Parowan subarea was recovered throughout the cultural deposit and appears to indicate either early or contemporaneous use of the shelter with Shoshone groups by Fremont groups or trade/contact by Shoshone peoples with the Fremont groups in the Meadow Valley Wash area to the southeast. Perhaps both Fremont use and Shoshone trade occurred in the area as Brooks's excavations at the Mariah Site (Brooks 1977) recovered only Puebloan ceramics. It is probable that the site was utilized as a hunting/gathering base camp because of its excellent view of the valley, the protection it offered from the elements and its nearness to a seasonally available source of water in the form of several ephemeral streams. This inference of a base camp is further strengthened by a cache of pure montmorillonite clay intermixed with lithic debitage found in one of the excavation units. As this clay could not have formed in situ, its probably future use was undoubtedly for pottery manufacture. The presence of several pottery scrapers in the deposit adds additional evidence for this inference. The moderate quantity of artifacts and lithic debitage recovered along with the faunal remains, argues for a lack of primary manufacturing or processing activities quite possibly due to the briefness of occupation or their location/occurrence elsewhere away from the main occupation area.

Undoubtedly, the broad open area directly in front of the shelter was used for many of these activities while the shelter proper was occupied during inclement weather. Randon surface collections from this open area appear to indicate that primary processing of lithic material (e.g., primary cortex flakes, exhausted cores, discarded raw material chunks, etc.) was carried out in the surrounding area. As well, the surface projectile point collections (e.g., Humboldt, Pinto, Elko Series as well as Rose Spring Corner Notched and Desert Side Notched specimens) appear to indicate a greater time depth (ca. 4000 B.C.) for the occupation or use of the surrounding open areas as contrasted to the rather late occupation of the shelter proper.

The faunal remains indicate that jackrabbit (Lepus californicus) was the favored game species with some bighorn sheep (Ovis canadensis) remains present. The jackrabbits were hunted locally while the bighorn were probably procured in the surrounding higher mountain ranges. The lithic debitage present in the shelter indicates that secondary and tertiary manufacturing processes were carried out.

The metates and manos present, both on the surface outside of the shelter and in the deposit, indicate the presence of seed gathering and related processing activities. Contact and/or trade with groups to the south is indicated from the shell beads and ornaments and the Anasazi North Creek Black-on-Gray pottery sherd recovered.

In brief, Civa Shelter II and its artifact assemblage support the conclusion of a temporary base camp of a fairly late date intermittently occupied by various Fremont and Shoshone/Southern Paiute groups from ca. A.D. 600/700 to historic times.

NOTES

1. Charts are available in Busby (1978).
2. Charts are available in Busby (1978).

Figure 17

a-h. Desert Side Notched Projectile Points (2-59306; 2-59218; 2-59284; 2-59919; 2-59342; 2-59379; 2-59328; 2-59316); i-n. Cottonwood Series Projectile Points (2-59396; 2059410; 2-59282; 2-59219; 2-59329).

Figure 18

a-e. Rose Spring Corner Notched (2-59878; 2-60320; 2-60314; 2-59799; 2-59788); f-k. Rose Spring Corner Notched (2-59748; 2-59687; 2-59685; 2-60318; 2-60161; 2-60204); l-p. Rose Spring Corner Notched (2-60275; 2-60346; 2-59872; 2-59844; 2-59832); q-u. Cottonwood Series (2-60250; 2-60149; 2-59786; 2-59646; 2-59724); v. Shoshone Ware Pottery Scoop (2-59797); w. Snake Valley Black-on-Gray Reconstructed Bowl Fragment.

Figure 19

a-h. Desert Side Notched Projectile Points (2-59792; 2-59759; 2-59936; 2-60308; 2-59769; 2-60360; 2-59755; 2-59800); i-j. Elko Corner Notched Projectile Points (2-59820; 2-59820 [Ventral and Dorsal Sides]); k-p. Elko Eared Projectile Points (2-59803; 2-59920; 2-59907; 2-60248; 2-60216; 2-60116); q. Unifacial Side Scraper (2-60369).

Figure 20

a-g. Cottonwood Series Projectile Points (2-59233; 2-59401; 2-59228; 2-59250; 2-59318; 2-59227; 2-59343); h. Rose Spring Contracting Stem (2-59248); i-m. Rose Spring Corner Notched Projectile Points (2-59344; 2-59339; 2-59249; 2-59266; 2-59287).

Figure 21

a-i. Rose Spring Corner Notched Projectile Points (2-59821; 2-59814; 2-59821; 2-60364; 2-60186; 2-60386; 2-60263; 2-59782); j. Eastgate Expanding Stem Projectile Point (2-59942); k. Humboldt Basal Notch A Projectile Point (2-60140); l. Tabular Fragment (2-599241).

Figure 22

a-d. Rose Spring Series Projectile Points (2-59357; 2-59374; 2-59365; 2-59311); e. Type 2 Drill/Perforator Fragment (2-59320); f. Type 5 Drill/Perforator (2-59320); g. Naturally Backed Retouched Flake (2-59223); h. Type B Bone Bead (2-59279).

Figure 23

a,b. Type I Biface (2-60375; uncatalogued); c-i. Type Ib Biface (2-59647; 2-59678; 2-59740 [ventral]; 2-59740 [dorsal]; 2-59699; 2-60123); j-l. Type III Biface (2-59901; 2-59753; 2-60310).

Figure 24

a. Type Ic Biface (2-60090); b. Type IIIb Biface (2-59701); c. Type IIIc Biface (2-59955); d. Type Vc Biface (2-59702); e-g. Biface Fragments (2-59933 [distal]; 2-50011 [distal]; 2-59645 [proximal]); h-i. Type 3 Drill (2-60172; 1-59809); j. Drill Bit Fragment (2-59364); k. Type 4 Drill (2-60387).

Figure 25

a. Incised Bone (2-60328); b. Type A Gaming Piece (2-60267); c. Bone Bead (2-60085); d. Bone Pendant (2-60101); e. Incised Bone (2-59380); f. Type A Gaming piece (2-59784); g. Tubular Bone/Bone Bead (2-59779); h. Clam Shell Disc Bead (2-60341); i. Olivella biplicata Bead (2-60159); j. Haliotus sp. Pendant (2-59275); k. Antler Flaking Tool (2-59783).

Figure 26

a-c. Bone Flaking Tools (2-59775; 2-60093; 2-60094); d. Unusual Bone Awl, Lepus californicus tibia (2-60097); e. Bone Awl Tip Fragment (2-60244); f-g. Tubular Bones or Bone Beads (2-59816; 2-59802); h. Worked/Utilized Bone (2-60187).

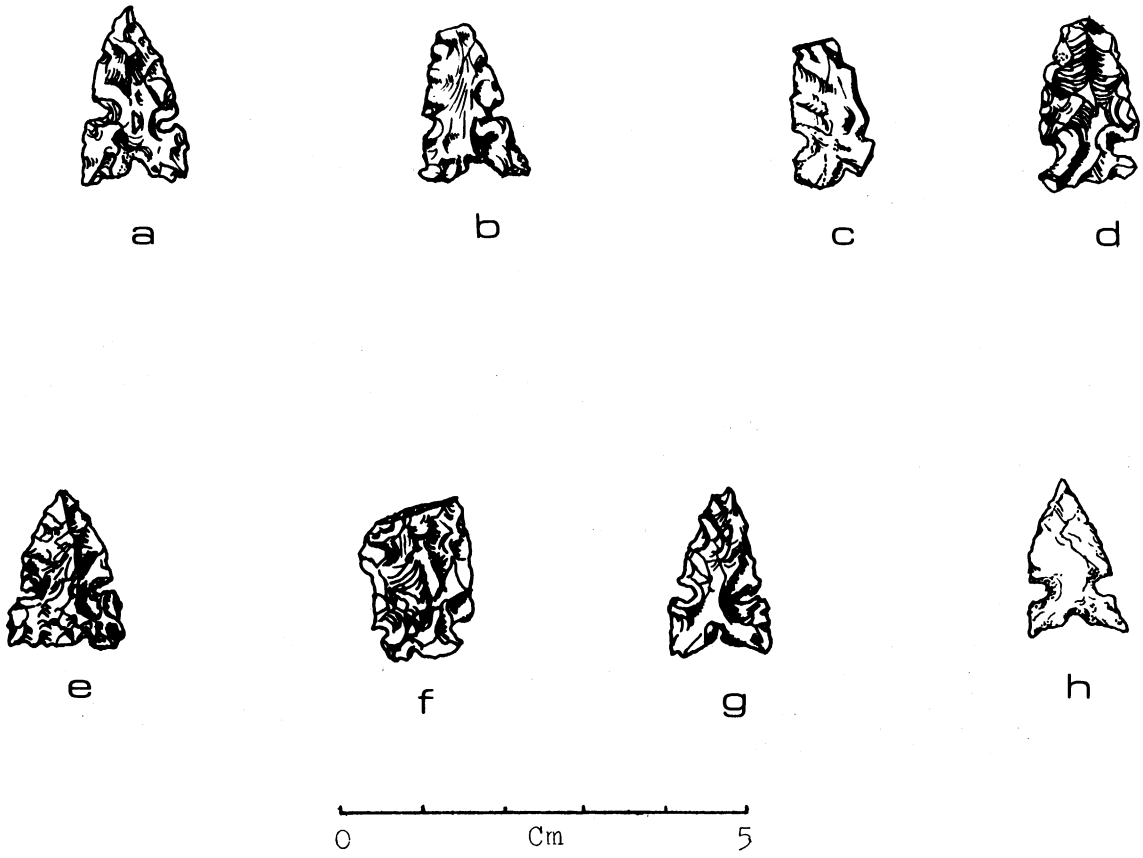
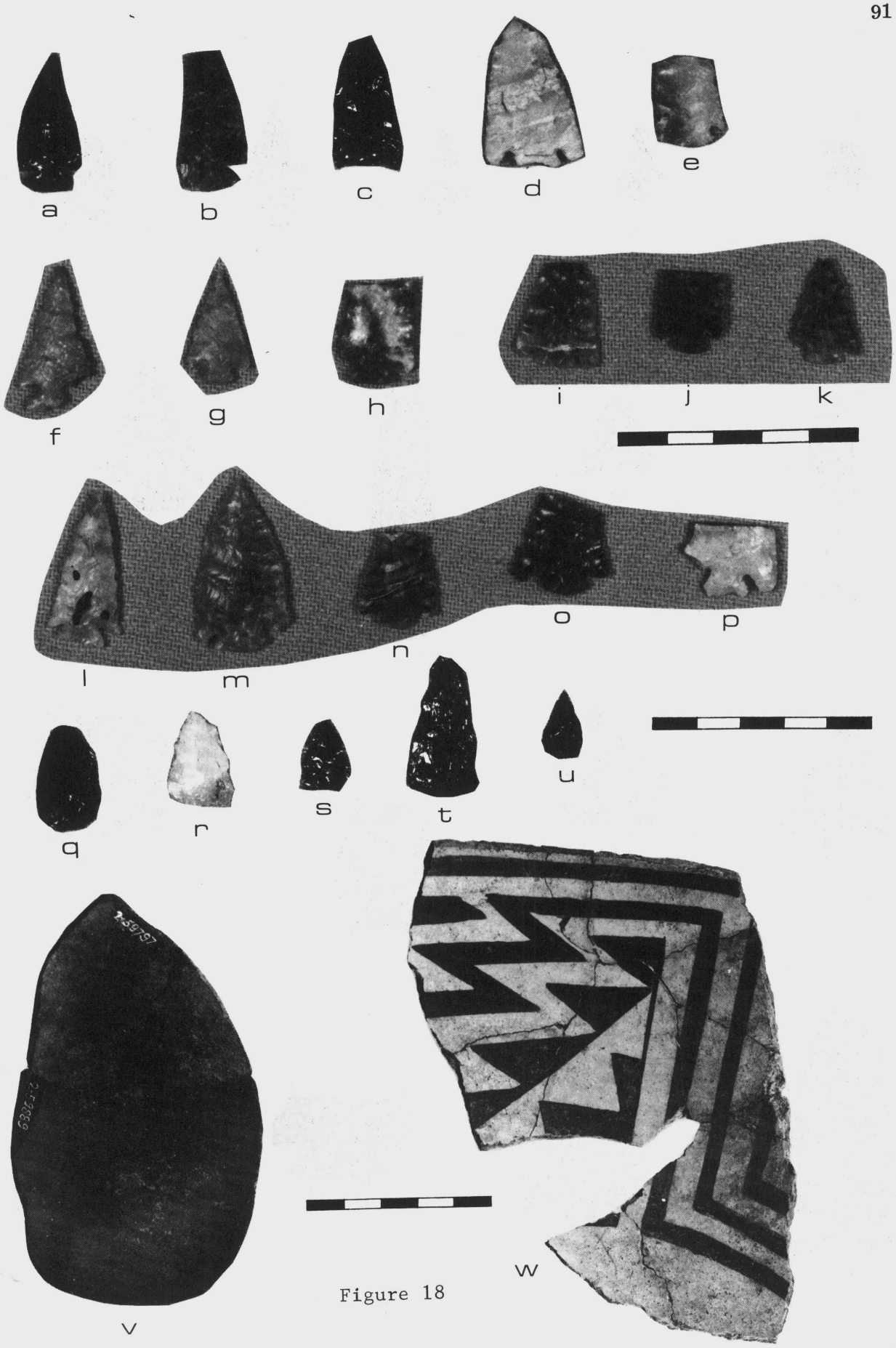


Figure 17



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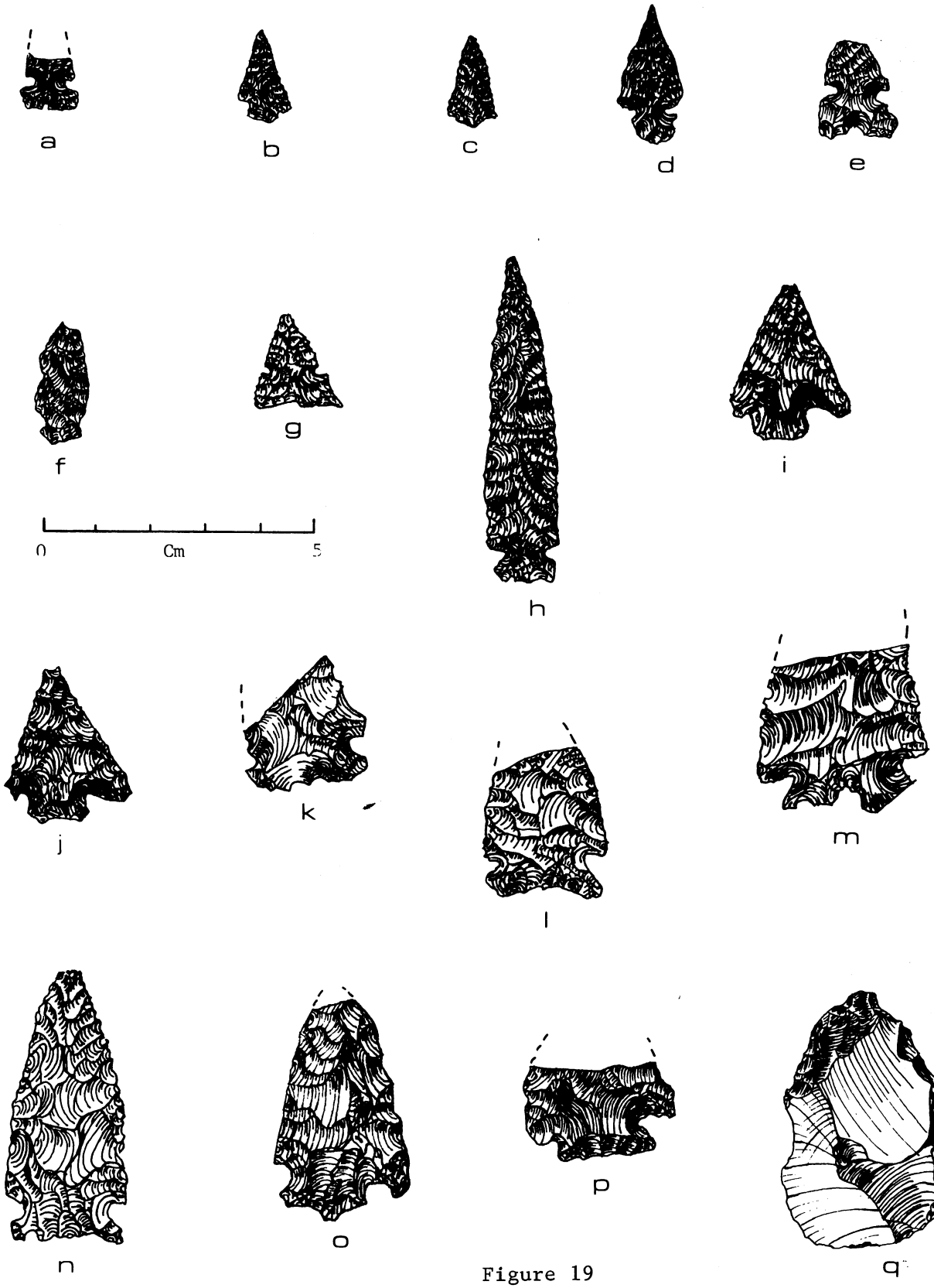

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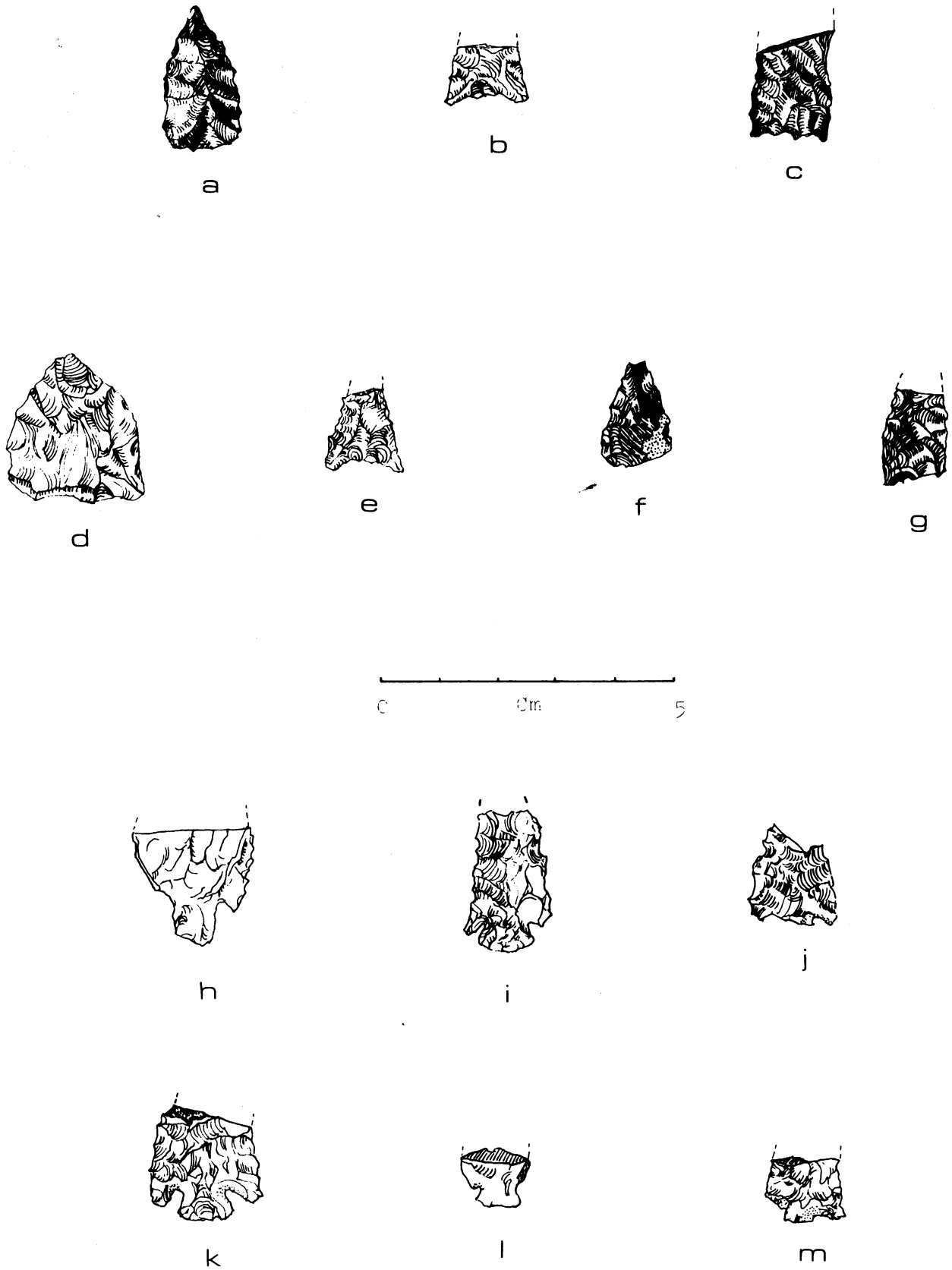

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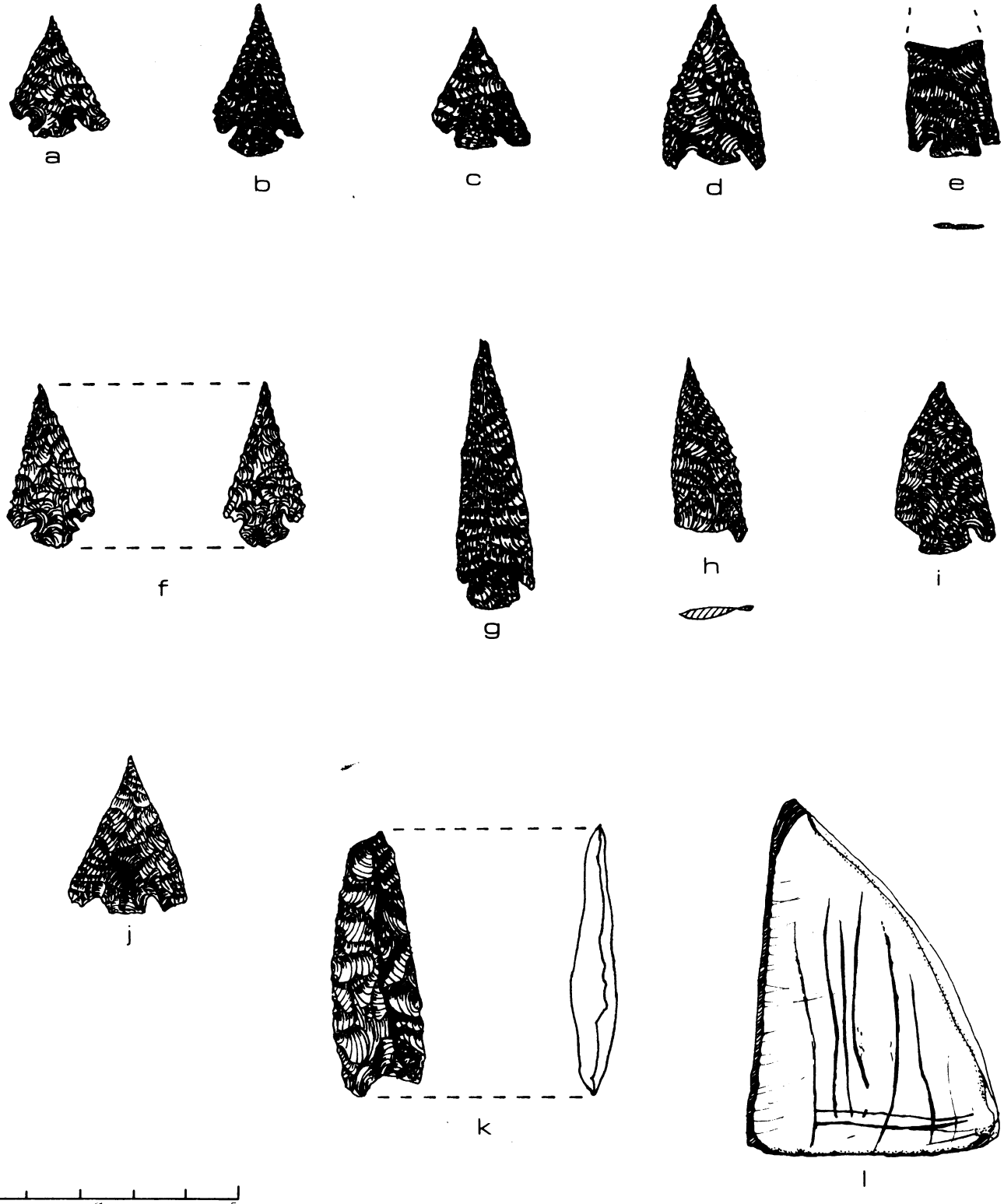

Figure 21

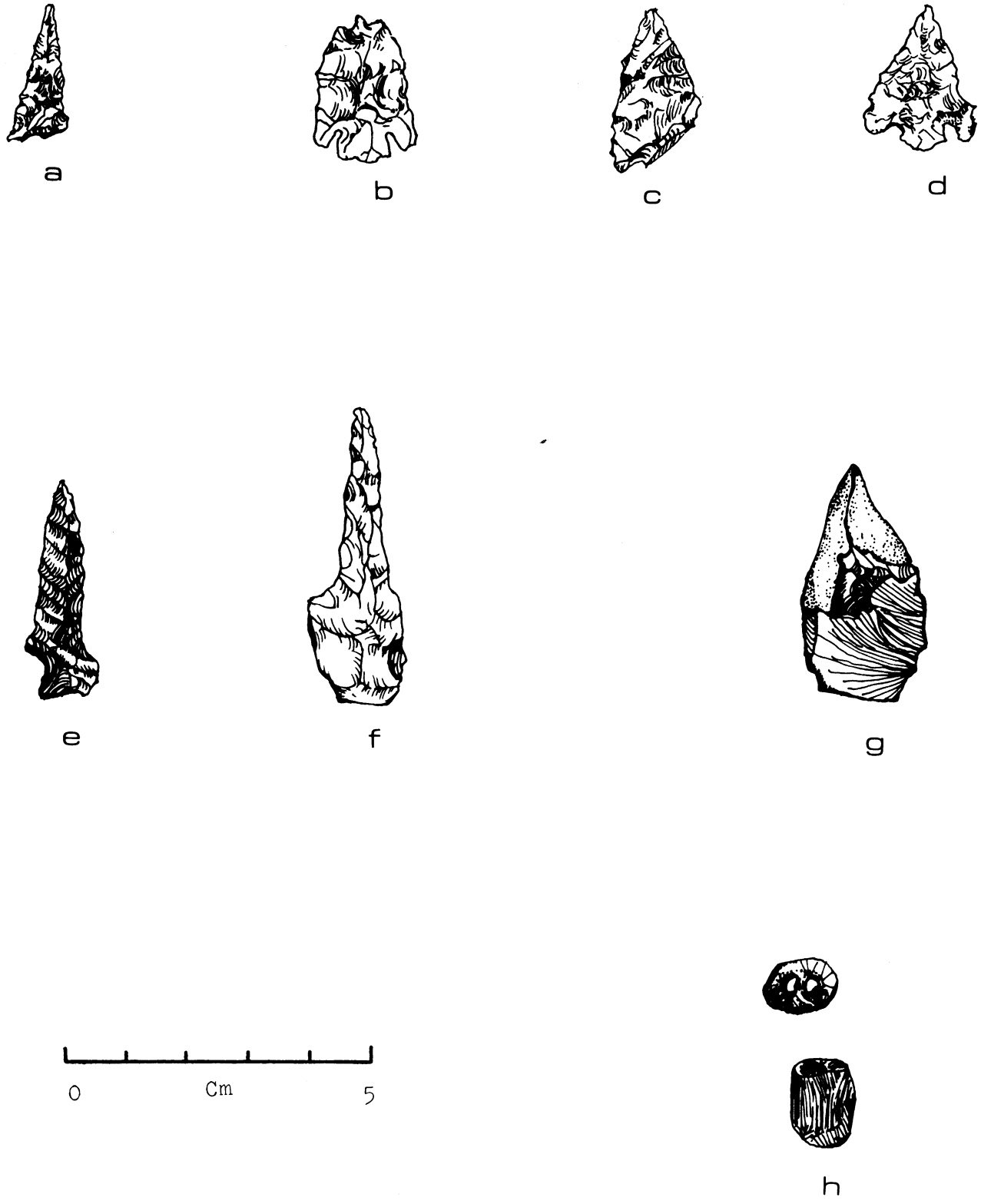

Figure 22

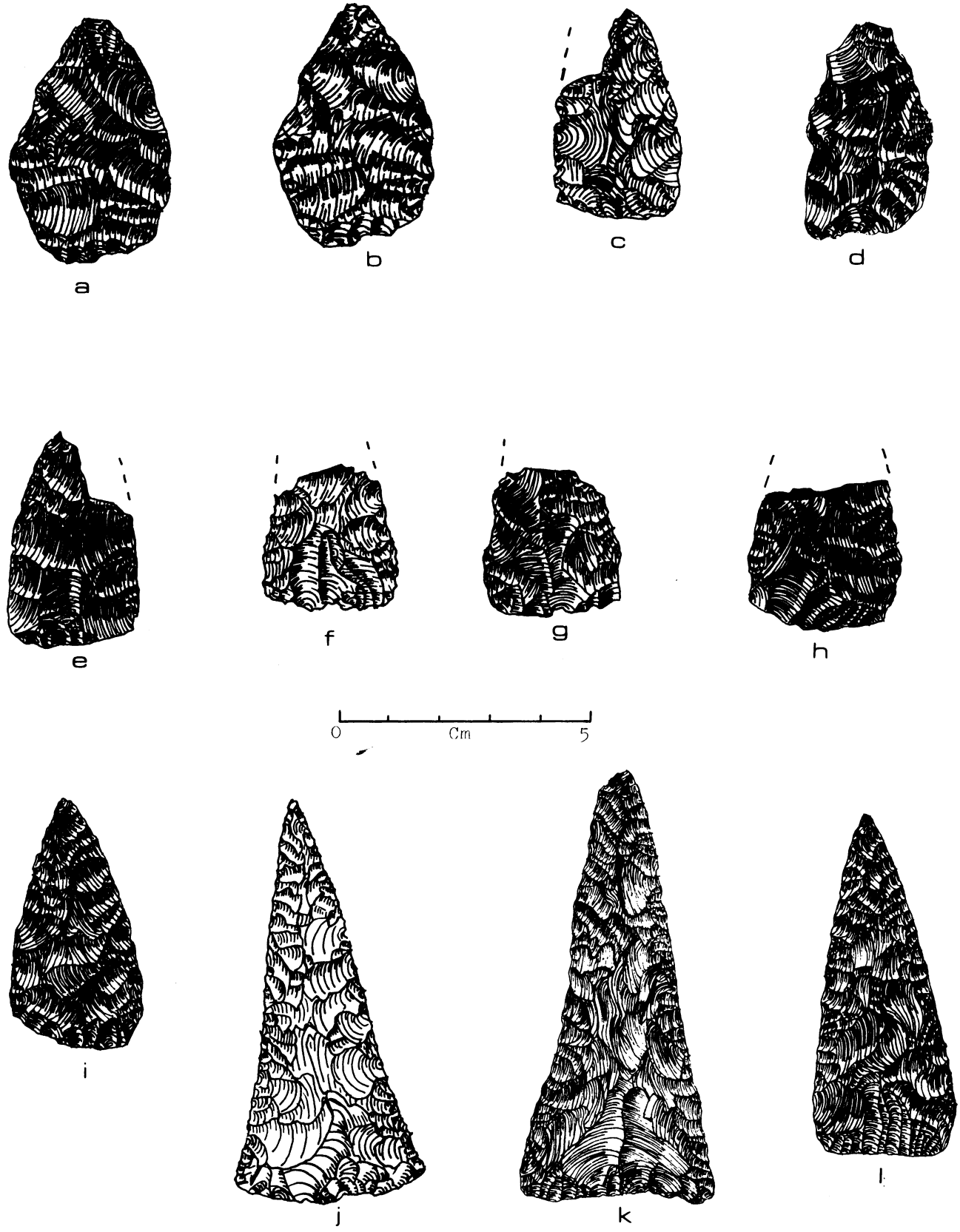

Figure 23

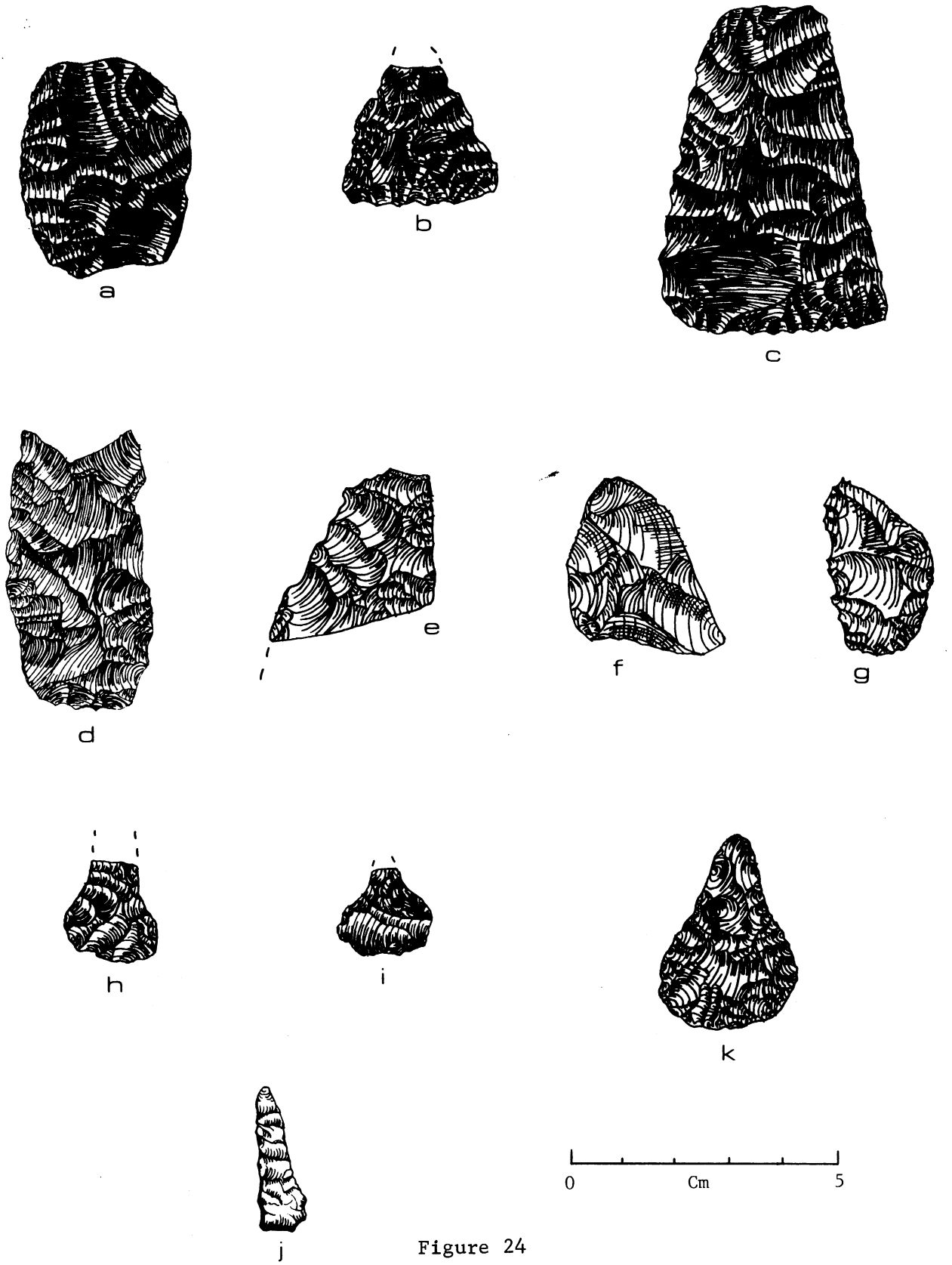

Figure 24

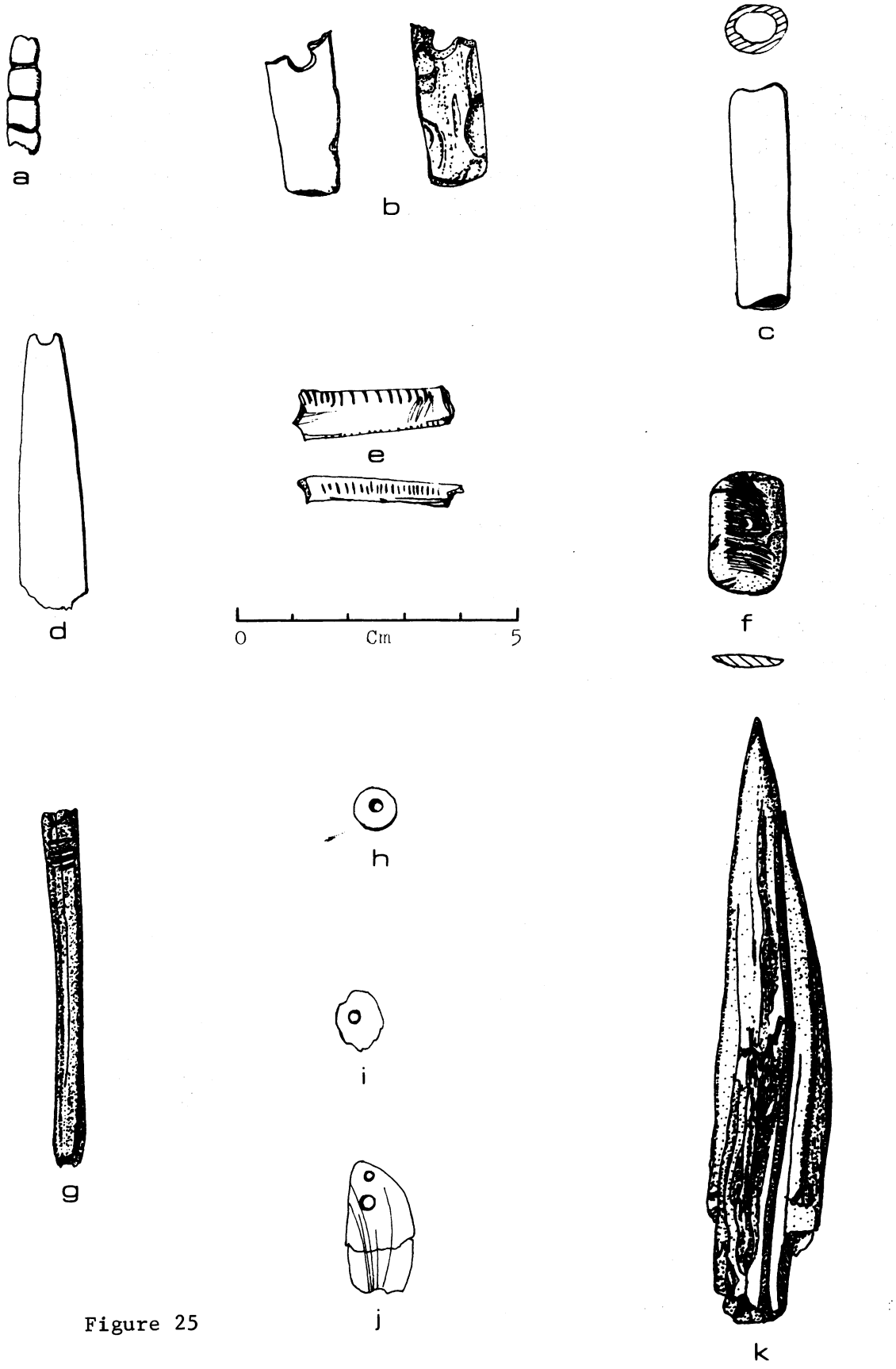

Figure 25

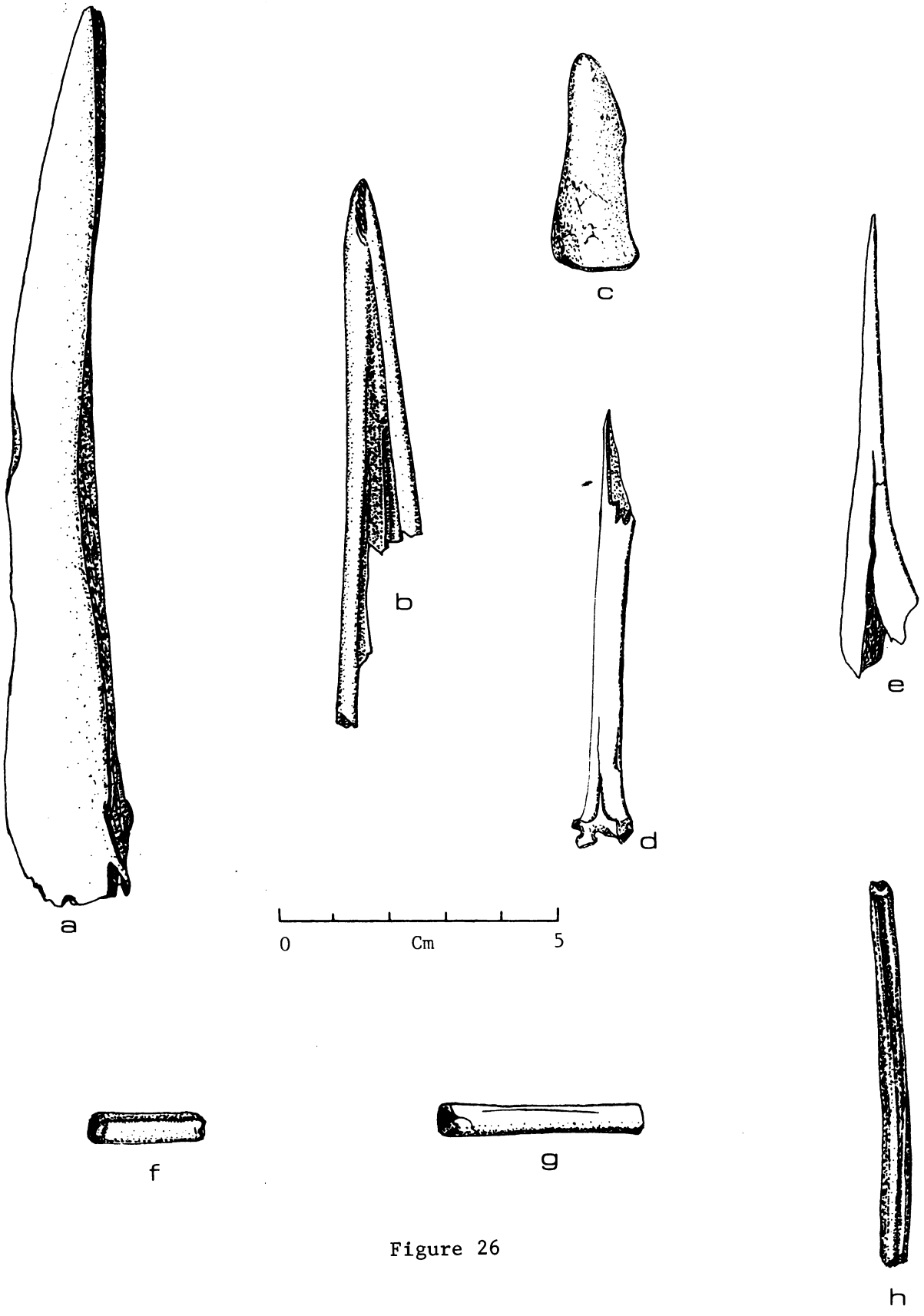

Figure 26

Chapter V

Coal Valley Dry Lake Sites

The Coal Valley Dry Lake sites are located in Coal Valley within the former shoreline boundaries of the now dry Coal Valley Pleistocene lake (cf. Natural Setting for a description of the area). Specifically all the sites are present in severely deflated area along old shorelines and beach terraces in the central southern portions of the basin (Fig. 2). The major locality, "Campsite," Ln 1518 in the files of the Nevada State Museum (T 1S, R 59E, Section 3) consists of a series of discrete lithic scatters extending over ca. 1000 m^2 and can be classified as 'temporary' open campsites. The sites are small 'mounds' of surface cultural material situated on low rises of former lake bottom sediments ('blowouts') that have not yet been eroded to the level of the present hard-pan surface (Fig. 29). Surface scatters of lithic debitage, ground stone artifact fragments, pottery sherds, and chipped and ground stone artifacts on and in the immediate vincinity of these mound-like rises. While sheet wash, wind transport of debitage,[1] deflation and other natual factors have conspired to disturb the integrity of these discrete sites, it is readily apparent from the concentrations of surface material that each site represented an independent locus of occupation in time within the locality. Presumably these sites may have been utilized repeatedly through time, but deflation and erosion have destroyed any stratigraphic contexts that may have once been present.

Compared to the 'Campsite locality,' the Porcupine Site (T 1S, R 59E, Section 12) to the southeast (cf. Site Survey) is a light, moderately disturbed lithic scatter concentrated along a series to low deflating dunes trending approximately north-south. The artifact assemblage, while sparse, is significant in that a Great Basin Transverse Point (crescent), a Rose Spring Corner Notched and an Elko Eared projectile point occur along with lithic debitage and biface fragments. This confirms that the crescents recovered from the Campsite locality are not isolated finds and do occur elsewhere, as should be expected, on the dry lake.

The Sand Dunes East Site (T 1S, R 59E, Section 2) to the northwest of Porcupine is another light lithic scatter with drills, bifaces, cores and debitage present. No temporally diagnostic artifacts were recovered although an isolated Elko Eared point was collected in the immediate vicinity. Undoubtedly, the severe deflation, erosion and associated natural processes will expose additional isolated artifacts and site concentrations/localities in the lake basin over the next millenium.

At an elevation of 5000 feet (1524 m) the vegetation in the area corresponds to that present in the Basin Floor/Playa Zone discussed previously. The sediments in the basin are Quarternary alluvium primarily water deposited clays in the blowout areas (former lake bottom) while fine to gravelly alluvium is prevalent elsewhere (cf. Appendix I).

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1 The high winds (30+ mph) present occasionally in the valley have been seen to cause the transport of small (<2.5 cm) fragments of lithic debitage over several tens of feet at a time.

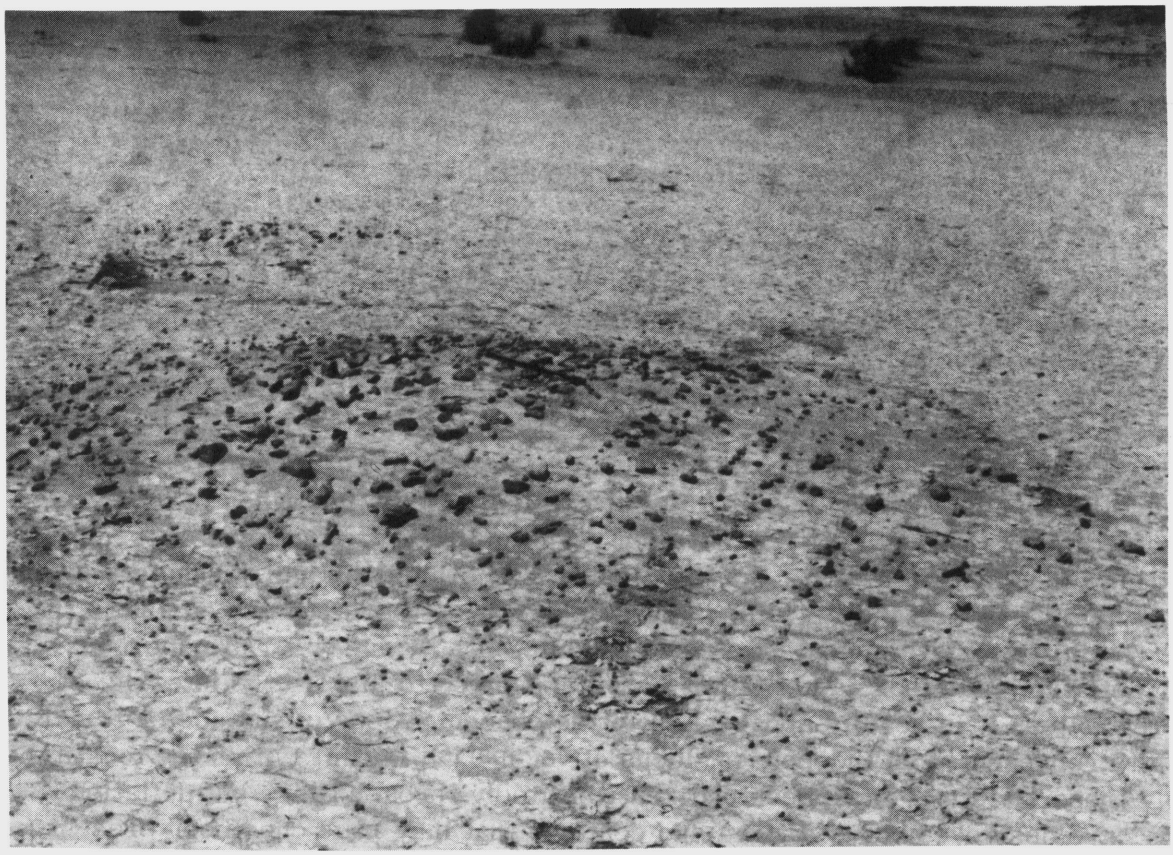


Figure 27: View of discrete lithic scatter mound on former lake bed of Coal Valley Dry Lake. Scale is 12.0 inches (30.5 cm).

Collection Strategy

The Coal Valley Dry Lake locality was subjected to what has commonly been referred to as a 'grab sample' rather than a controlled systematic intensive sampling of the cultural materials present on the surface. The surface collection was made by random walkover transects with special attention focused on the discrete lithic scatters concentrated on the small 'mounds' dotting the area (Fig. 27).[1] The majority of the artifacts came either from these scatters of lithic debitage and ground stone artifact fragments or from their immediate vicinity. Artifact categories emphasized for collection were projectile points (both diagnostic and fragmentary), bifaces, pottery sherds, manos, metates, lithic debitage and miscellaneous ground and chipped stone artifacts. While this method of sampling can be criticized (cf. Mueller 1975, 1974) and quite rightly so, our research strategy was primarily directed towards establishing a preliminary chronology and settlement pattern for an unknown region rather than in delineating activity areas or patterning within or between sites. Both of our aims were satisfied, although in retrospect, at the expense of more sophisticated studies (cf. Downer 1977; Mueller 1974; among many others) that could have been carried out,

given adequate funding and time. However, as Downer (1977) has pointed out, analyses using sophisticated statistical techniques require greater temporal control than may be available for certain surface collections, and systematic, intensive surface collections may not be as useful as had been thought, since they may not provide more information than a faster and less expensive grab sample. In the Coal Valley Dry Lake case, the grab sample was appropriate to satisfy our immediate research goals.

Pottery (Fig. 36a).

A total of 215 sherds and other ceramic artifacts were recovered from the surface localities of the dry lake bed during the reconnaissance survey. All sherds are within the range of variability specified by the published type descriptions or from the type collections on deposit at the Lowie Museum of Anthropology for the Shoshone Ware category (cf. Rudy 1953; Tuohy 1956; 1963; Coale 1963; Baldwin 1950). Tuohy (1963: 62) has noted that whole vessels of this category "generally exhibit a flower pot shape, although bucket shapes and vessels with rounded bottoms occur ... Potsherds characteristically have a dull brown surface finish, obliterated coils and wiping marks." Baldwin (1950) has described a variant ware (Southern Paiute Ware) featuring pointed, bottomed vessel forms and fingernail indentation. Rudy's (1953: 94) formal type description is presented below for Shoshone Ware.

> Construction: Coiled and molded. Firing: Uncontrolled atmosphere (?). Core color: Generally reddish brown, ranging from dark gray through reddish brown to almost black. Temper: Variable, when viewed with a hand lens it appears as quartz sand ranging from fine to coarse, with occasional fragments of a light-opaque angular material and small amounts of mica. The thin section analysis shows the temper to be "crushed granitic rock or subangular sand that has been derived from granitic rock." Texture of core: Coarse, occasionally medium. Surface finish: Poorly smoothed; scraped by a stick; striations common. Surface usually undulating. Occasional sherds well smoothed but not polished. Surface color: Reddish brown or buff, occasionally gray grading into dark brown; some almost black. Vessel walls: Strong to friable -- principally friable. Shapes: No complete specimens were found during the surveys, but sherds indicate 'flower pot' and jars with pointed bases. Ethnographic reports also indicate bowls. Rims: Straight and outcurved. Wall thickness: Average 7 mm; range from 4 to 8.5 mm. Decorative techniques: Occasionally fingernail impressions vertically placed in horizontal bands just below the rims; most sherds plain. Range: Western Utah, southern Idaho and eastern Nevada.

The sherd collection from Coal Valley Dry Lake exhibits considerable variation in wall thickness (Range 5.0 mm - 9.8 mm; Average 6.9 mm) often within a single sherd, kind and amount of temper, hardness and paste composition. Inspection of the sherds indicates coiling is the main construction technique although some paddle-and-anvil construction is also present. Fowler, et.al. (1973: 16) note that a combination of paddle-and-anvil and coiling construction techniques are reported ethnographically for the Southern Ute. Most sherds are a mottled light gray/tan color but range to dark brown and dark gray apparently indicating a rather poorly controlled firing in a reducing atmosphere. Wiping marks, striations and some evidence of smoothing are present on a small number of the sherds.

The six rimsherds recovered indicate the presence of wide mouthed globular jars with recurved rims as well as vertical, wide mouthed vessels with rim diameters ranging from 18.0 - 21.0 cm. Rim forms present are IA3 (1), IB2 (3) and IB3 (2) (rim typed follow Colton's (1952: 14) nomenclature). Vessel decoration was noted on three sherds and is restricted to thumbnail impressions on the exterior surface of the vessels. One pattern only is present and corresponds to that described by Fowler, et. al. (1973: 17) as Pattern 1.

> "The most common design consists of horizontal rows of closely-spaced vertical impressions with no intervening space between the rows. The impressions face right or left, but are consistant for a particular vessel."

The distribution of Shoshonean Tradition pottery has recently been discussed and surveyed by Fowler (1968) and reviewed by Tuohy (1973). Based on this work, the ceramics collected from the Coal Valley Dry Lake localities are well within the expected distribution range of this type. Fowler, et. al. (1973) on the basis of their work at O'Malley and Conway Shelters to the east have indicated a temporal range of ca. A.D. 1000 to post contact times for Shoshonean ceramics in this portion of Nevada.

Other Ceramic Artifacts

Pendant

One edge ground sherd of sub-rectangular Shoshone ware with a biconically drilled hole present in one corner was collected. No incision or other evidence of decoration are present and the specimen is similar to pieces that have been described as 'pendants.' Its length is 78.0 mm, width 49.0 mm, thickness 5.5 mm and weight 34.5 g.

Projectile Points

Seventy-eight chipped stone artifacts were classified either as diagnostic projectile points (36), projectile point fragments (32) or as projectile point preforms

(10) from the Campsite locality. Chert is the preferred raw material (55.1%), with obsidian (42.3%), basalt (1.3%) and chalcedony (1.3%) following. The typological descriptions follow those discussed in Hester and Heizer (1973a).

Great Basin Transverse Points (Table 13, Fig. 28a-c).

Specimens: Complete (3)
Material: Chert (3)
Description: Three Great Basin Transverse projectile points or crescents conforming to Type I as described by Tadlock (1966) or the concavoconvex category of Mitchell, et.al. (1977) were recovered from the former lake bottom of Coal Valley Dry Lake. All are made on chert interior flakes and only one specimen can be described as finished or 'complete'. The remaining two still have their striking platforms present and the flaking is still incomplete on the dorsal and ventral sides. 'Nipples' are present on one specimen and the depth of concavity on the two measureable specimens ranges from 2.0 - 4.0 mm. Wing thickness varies for the right wing from 3.0 - 8.0 mm and for the left wing from 4.0 - 6.0 mm. Tip widths range from 9.8 - 10.1 mm (cf. Mitchell, et. al. 1976 for a discussion of proper measurement techniques).

Humboldt Concave Base (Table 14, Fig. 28d-g).

Specimens: Complete (4)
Material: Chert (2); Obsidian (1); Basalt (1)
Description: These specimens are small to medium elongate triangular projectile points with slight to moderately convex lateral edges. Basal concavities ranging from 0.8 - 2.2 mm in depth are present on all specimens. Maximum width position is at the base. Flaking is percussion, moderately well done and cross sections are biconvex.

Pinto Square Shoulder (Table 14, Fig. 28h-i).

Specimens: Complete (1); Incomplete (1)
Material: Chert (2)
Description: These are medium sized triangular points with convex lateral edges. Notching is asymmetrical and shallow with short, rounded barbs. Stems are parallel sides with slight to deep concavities present on the bases. No basal notching is present. Maximum width position is at the barb ends. Shallow random serration is present on the lateral edges of one specimen in the basal region. Both specimens are made on interior flakes and cortex is still present near the distal portion of one point. Flaking is moderately well done percussion and cross sections are biconvex.

Elko-Eared (Table 14, Fig. 28j-m, 30a-b).

Specimens: Complete (4); Incomplete (2)
Material: Chert (2); Obsidian (4)
Description: These are moderate to large triangular to elongate triangular projectile

points with straight to slightly convex lateral edges. Notching is wide and shallow and at a slight angle to the long axis of the point. Maximum width position is at the basal ends. The stems are generally expanded with deeply indented bases giving an 'eared' or bilobed effect. In cross section 5 points are biconvex and one is plano-convex. Flaking is moderately to well done percussion with two specimens showing percussion and pressure retouch and shallow serration along both lateral edges with a 'needle-like' point.

Elko Side-Notched (Table 14, Fig. 30c).

Specimens: Complete (1)
Material: Obsidian (1)
Descritpion: This is a medium sized triangular projectile point with slightly convex lateral edges. The side notching is uniformly broad and rounded and nearly perpendicular to the long axis of the point. The stem is parallel-sided and the base is convex. Flaking is pressure and the cross section is biconvex. The lateral edges show a crude attempt at serration. For comparable specimens see Heizer, Baumhoff and Clewlow (1968).

Elko Split Stem (Table 14, Fig. 30d-f).

Specimens: Complete (2); Incomplete (1)
Material: Chert (1); Obsidian (2)
Description: These are medium to large sized triangular points ranging in shape from elongate to squat with slightly convex lateral edges. The specimens are side-notched with the tangs straight or very slightly 'drooping'. The stems are parallel sides or slightly expanding and slight basal concavities are present on the bases. The flaking is predominantely percussion with some pressure present on one specimen. The cross sections are biconvex. These projectile points are similar to those illustrated in Aikens (1970: Fig. 20r).

Eastgate Expanding Stem (Table 14, Fig. 29a-c).

Specimens: Complete (1); Incomplete (2)
Material: Chert (2); Obsidian (1)
Description: These are small (44.0 mm maximum length) rather elongate triangular projectile points with straight to slightly convex lateral edges. Lateral concavities give the bases a flared appearance with the 3 specimens showing squared to slightly rounded barb ends. Notching is generally parallel into the basal portion of the lateral edges with the barb bases the maximum width position. One specimen has a very small (1.0 mm) but distinct centralized basal notch. The remaining specimens have a slight basal concavity and a straight base respectively. The specimens are biconvex in cross section and the flaking is mixed with pressure dominant and some precussion present.

Rose Spring Corner Notched (Table 14, Fig. 30g-o).

Specimens: Complete (6); Incomplete (3)
Material: Chert (6); Obsidian (3)
Description: These are small triangular points with straight to slightly convex blade edges. The barb ends are pointed to somewhat rounded with slight to medium protrusion. The notching is generally wide at an angle (ca. 45°) to the long axis of the point and ranges from 1.2 to 4.1 mm in depth. Maximum width positions are at the barb ends, although on more convex sided specimens, it is somewhat above the barb ends. The stems are slightly expanded with straight to slightly concave bases. Transverse cross sections are biconvex and the flaking is mainly pressure with some mixed flaking present.

Rose Spring Contracting Stem (Table 14, Fig. 30p).

Specimens: Complete (1)
Material: Obsidian
Description: This is a small triangular, slightly convex sides point with a contracting stem of 7.00 mm in length. The shoulders are slightly rounded with the maximum width position present just above the junction of the body and stem. The flaking is pressure and the cross section is biconvex.

Desert Side Notched (Table 14, Fig. 29d-g, 31a-b).

Specimens: Complete (2); Incomplete (2)
Material: Chert (3); Obsidian (1)
Description: These are small to medium sized (49.0 mm maximum length) slender triangular to elongate triangular projectile points with straight to slightly convex lateral edges. The bases range from slightly convex to basally notched. Side notches, perpendicular to the long axis of the point, range from 0.4 to 2.9 mm in depth and a basal notch of 2.1 mm depth is present on one specimen. Two specimens each have one of their ears missing and all specimens are finely made. The flaking is pressure and the cross sections are biconvex. As a comment, it appears that 2 types are present. A fine side-notched 'eared' type (Fig. 29e) and a broad notched slightly convex base (Fig. 29f) type are both present. Both of these fall within the range of variation noted for the DSN type (cf. Baumhoff and Byrne 1959; Lanning 1963; and Hester and Heizer 1973a).

Projectile Point Fragments

Thirty-two non-diagnostic projectile point fragments were recovered during the random surface collection in 1975. Chert and obsidian are co-dominant in raw material percentages. Distal fragments make up 53% of this category (Chart 53%, Obsidian 47%) with medial sections (9%) and specimens lacking the base (38%) following. Many of the specimens, especially the smaller, more finely finished pieces are pressure flaked, while the larger cruder fragments are probably soft hammer percussion. Since

the specimens are non-diagnostic no further analysis will be attempted. It should be noted, however, that the fragments are probably portions of the projectile points previously described with the smaller point series (e.g. DSN, RS) dominating.

Projectile Point Preforms (Table 13).

Ten specimens were classified into this category. The term preform is used here (after Crabtree 1972: 83) to designate a stage in the manufacture of an artifact after initial preparation has started but before the piece is completed. The preforms described below are both specific and generalized type preforms. Specific type preforms are morphologically close enough to the finished type of projectile point to be generally identifiable while generalized preforms, on the other hand, cannot be specific since they are not morphologically close enough to the finished artifact to be identified with the 'mental template' of the knapper (cf. Bard, Busby and Kobori n.d., for a discussion of generalized projectile point preforms). Five specific type preforms and five generalized preforms are present in the collections from Coal Valley.

Elko Preforms (Table 13, Fig. 31c-g).

Specimens: Complete (3); Incomplete (2)
Material: Chert (3); Obsidian (1); Quartzite (1)
Description: These are medium to large size triangular to elongate triangular (perhaps narrow lanceolate in one form as reconstructed) preforms with straight to slightly convex lateral edges. The notching is incomplete and shallow and at a slight angle to the long axis of the point. The stems are slightly expanding with straight to slightly convex bases. The flaking is well done percussion and all cross sections are biconvex.
Comments: These are well made on interior flakes and finely thinned specimens. Except for minor flaws in the workmanship, especially in the notching, would be considered complete projectile points. Application of Thomas's (1970, 1976) method of projectile point analysis consistently put these 'points' into the Elko Series, although admittedly his 'taxonomic key' made no provision for a preform category. The workmanship and raw material choice is similar to that exhibited in Biface Category II (Narrow Lanceolate) and it is possible that this artifically constructed biface category is in reality a preform category. Our limited sample of 5 specimens however cannot really confirm this. Two morphological categories are present within this group: a medium size isosoceles triangular form and a narrow lanceolate form. The narrow lanceolate shape (1 specimen) is similar to Biface Category II. A larger, more complete sample would be useful in a typological and technical analysis of this category.

Small Preforms (Table 13, Fig. 34a-e).

Five bifacially flaked, chipped stone artifacts, triangular in form and with the projectile point size ranges were classified as 'generalized' preforms as the final finishing of these pieces had not been completed.
Specimens: Complete (4); Incomplete (1)

Material: Chert (3); Obsidian (2)
Description: These are moderate size, triangular specimens with straight to slightly convex lateral edges. Bases are slightly convex and crude attempts at side and basal notching are present on several specimens. Flaking is primarily percussion with some pressure retouch present. Cross sections are biconvex. From inspection it is probable that the majority of these specimens would fit into the Eastgate-Rose Spring-Cottonwood Desert Side Notched categories. It is also highly possible that several of the specimens may be unfinished Cottonwood Triangular projectile points as the sizes are within the range of other Cottonwood points known from the area.

Discussion

The projectile points recovered from the surface of Coal Valley Dry Lake represent a range in time from ca. 9000 B.C. to post contact times. Seven distinct series of projectile points are known: Desert Side Notched, Rose Spring/Eastgate, Elko, Pinto, Humboldt Series, along with Great Basin Transverse Points.

The DSN, RA/EG, Elko and Humboldt Series has been discussed previously in association with Civa II as representing a time range of 6400 B.C. to post contact times. They will not be discussed any further for the Coal Valley Dry Lake localities. Their presence, as with the other projectile point series, on the now dry lake bed, obviously indicates a continued intermittent use of these sites over time, quite probably when precipitation and run off conditions allowed for standing water and/or other favorable conditions.

The Pinto Series was originally defined by Amsden (Campbell and Campbell 1935: 43-44) based on his projectile point analysis of the Pinto Basin Site in the southwestern part of the Great Basin. Harrington (1957) has divided the series into five varieties of subtypes based on his analysis of the Stahl Site. They are: (1) Shoulderless; (2) Sloping Shoulder; (3) Square Shoulder; (4) Barbed Shoulder; and (5) One Shoulder. Lanning in his report on the Rose Spring Site (1963: 250-251) refers to Pinto series points as the 'Little Lake' series. Both Layton (1970) and O'Connell (1971) have criticized the 'loose' definitions of this series and have proposed other types for their research areas based upon attributes in the original Pinto Series. Thus O'Connell (1971: 68) has defined the 'Bare Creek' series with 'sloping shoulder,' 'square shoulder,' and 'barbed' varieties for Surprise Valley in northeastern California, while Layton (1970) has proposed the name "Silent Snake Bifurcate Base" (Pinto Barbed) type for the High Rock area of northwestern Nevada.

Based on the radiocarbon dates given in Hester and Heizer (1973), the Pinto Series appears to have a chronological distribution of between ca. 3000 B.C. - 700 B.C. Hester and Heizer further suggest an earlier beginning, based on material from Hidden Cave (western Nevada) and from Weston Canyon Rockshelter in Idaho (1973: 4-5). Judging from the discussion and few radiocarbon dates presented, it is obvious additional dates are needed to clarify the temporal range of this series and its typological affinities.

Coal Valley Dry Lake - Projectile Point Data

UCLMA #	Type	Status	L	W	T	Wt.	CS	Material	BN	SN/CN	Provenience
2-58618	GBTP - I	Comp.	43.0	12.0	4.0	2.3	-	Chert	-	-	Surface
2-58619	GBTP - I	Comp.	45.0	18.0	8.0	4.7	-	Chert	-	-	Surface
2-58556	GBTP - I	Comp.	49.0	19.0	10.0	7.9	-	Chert	-	-	Surface
2-58562	Elko Preforms	Comp.	52.0	24.1	5.1	6.3	BC	Chert	-	1.0	Surface
2-58567	EP	Comp.	45.0	21.9	4.1	5.2	BC	Obsidian	-	1.5	Surface
2-58613	EP	Comp.	48.1	27.2	3.9	4.9	BC	Chert	-	3.2	Surface
2-58614	EP	Comp.	50.4	28.0	4.5	6.8	BC	Chert	-	3.0	Surface
2-58607	EP	Frag.	-	25.3	3.9	4.6+	BC	Quartzite	-	3.0	Surface
2-58555	Small Preforms	Comp.	38.0	26.0	3.2	3.1	BC	Chert	-	-	Surface
2-58593	SP	Comp.	33.0	25.1	3.3	2.9	BC	Obsidian	-	-	Surface
2-58632	SP	Comp.	35.8	28.7	4.8	3.9	BC	Chert	-	-	Surface
2-58639	SP	Comp.	30.0	24.0	3.9	2.4	BC	Obsidian	-	-	Surface
2-58771	SP	Frag.	-	26.0	5.3	4.6+	BC	Chert	-	-	Surface

(All measurements in mm and grams)

BN - Basal notch depth
SN/CN - Side notch/Corner notch depth
CS - Cross section (plano-convex, biconvex)

Table 13

Table 14

Coal Valley Dry Lake - Projectile Point Data

UCLMA#	Type	Status	L	W	T	Wt.	CS	Material	BN	SN/CN	Provenience
2-58557	DSN	Comp.	49.0	23.0	9.0	2.9	BC	Chert	-	3.0	Surface
2-58604	DSN	Comp.	20.0	12.0	8.0	0.8	BC	Obsidian	2.1	3.8	Surface
2-58642	DSN	Comp.	33.0	20.0	7.0	2.2	BC	Chert	-	4.2	Surface
2-58768	DSN	Comp.	21.0	11.0	7.0	0.4	BC	Chert	-	2.0	Surface
2-58563	RSCN	Comp.	25.0	18.0	8.0	1.1	BC	Obsidian	-	1.2	Surface
2-58594	RSCN	Frag.	33.0+	12.0	4.0	0.9+	BC	Chert	-	4.0	Surface
2-58600	RSCN	Comp.	27.0	17.0	5.0	1.4	BC	Chert	-	2.2	Surface
2-58633	RSCN	Comp.	27.5	20.0	5.0	1.8	BC	Chert	-	3.8	Surface
2-58647	RSCN	Frag.	-	18.5	3.5	-	BC	Chert	-	2.0	Surface
2-58650	RSCN	Comp.	36.1	10.0	3.2	1.3	BC	Obsidian	-	2.0	Surface
2-58666	RSCS	Comp.	36.5	13.6	4.7	2.0	BC	Obsidian	-	-	Surface
2-58712	RSCN	Frag.	-	-	5.0	-	BC	Chert	-	4.1	Surface
2-58720	RSCN	Comp.	24.5	16.6	5.0	1.9	BC	Chert	-	2.0	Surface
2-58721	RS?	Frag.	-	16.0	5.0	-	BC	Obsidian	-	-	Surface
2-58608	EGES	Frag.	34.0+	25.0	4.7	2.1+	BC	Chert	2.8	-	Surface
2-58617	EGES	Comp.	44.0	26.0	3.1	2.2	BC	Obsidian	3.1	-	Surface
2-58634	EGES	Frag.	35.0+	20.8	3.7	2.7+	BC	Chert	3.7	-	Surface
2-58561	ESS	Frag.	29.0+	21.8	5.0	3.7+	BC	Obsidian	-	-	Surface
2-58568	ESS	Frag.	31.0+	29.7	4.8	3.6+	BC	Obsidian	-	-	Surface
2-58592	ESS	Frag.	49.0+	28.0	9.1	10.8+	BC	Chert	-	-	Surface
Uncat.	ESN	Frag.	21.5+	23.0	3.2	2.9+	BC	Obsidian	-	-	Surface
2-58564	EE	Comp.	56.0	25.0	5.0	5.1	PC	Obsidian	2.9	2.2	Surface
2-58565	EE	Comp.	37.0	19.0	4.8	3.2	BC	Obsidian	2.3	3.8	Surface
2-58566	EE	Frag.	31.0+	23.5	4.5	3.9+	BC	Chert	-	3.1	Surface
2-58569	EE	Frag.	41.0+	22.5	4.9	5.0+	BC	Obsidian	-	1.2	Surface
2-58615	EE	Comp.	45.0	26.0	4.7	5.5	BC	Chert	3.0	2.0	Surface
2-58612	EE	Comp.	47.0	20.0	4.9	4.3	BC	Obsidian	2.5	2.4	Surface
2-58603	PSS	Comp.	40.5	18.5	5.6	4.1	BC	Chert	1.2	1.3	Surface
2-58715	PSS	Frag.	23.0+	20.8	4.8	2.8+	BC	Chert	2.3	3.0	Surface
2-58602	HCB	Comp.	33.0	10.7	4.0	1.7	BC	Obsidian	-	-	Surface
2-58616	HCB	Frag.	38.0+	14.6	5.0	4.4+	BC	Chert	2.2	-	Surface
2-58640	HCB	Comp.	31.7	14.9	4.9	3.1	BC	Obsidian	1.2	-	Surface
2-58746	HCB	Frag.	23.5+	10.5	3.5	1.9+	BC	Chert	0.8	-	Surface

BN - Basal notch depth
SN/CN - Side notch/Corner notch depth
CS - Cross section (planoconvex, biconvex)

(All measurements in mm and grams)

Coal Valley Dry Lake Sites

Selected Projectile Point Metric Attribute Ranges

Type	Length	Width	Thickness	Weight
DSN	20.0 - 49.0	11.0 - 23.0	7.0 - 9.0	0.4 - 2.9
RSCN	24.5 - 36.5	13.6 - 20.0	3.2 - 8.0	1.3 - 1.9
EGES	34.0 - 44.0	20.8 - 26.0	3.1 - 4.0	2.1 - 2.7
ESS	29.0 - 49.0	21.8 - 29.7	4.8 - 9.1	3.7+ - 10.8
EE	37.0 - 56.0	19.0 - 25.0	4.7 - 5.0	3.2 - 5.1
PSS	? - 40.5	18.5 - 20.8	4.8 - 5.6	? - 4.1
HCB	? – 14.7	10.5 - 14.9	3.5 - 4.9	3.1 - ?
Elko Series Preform	45.0 - 52.0	21.9 - 28.0	3.9 - 5.1	4.9 - 6.3
Small Preform	30.0 - 38.0	24.0 - 28.7	3.2 - 5.3	2.4 - ?

(All measurements in mm and grams)

DSN	Desert Side Notched
RSCN	Rose Spring Corner Notched
EGES	Eastgate Expanding Stem
ESS	Elko Split Stem
EE	Elko Eared
PSS	Pinto Square Shoulder
HCB	Humboldt Concave Base

Table 15

Great Basin Transverse Points or 'crescents' are one of the distinctive traits of the Western Pluvial Lakes Tradition (Tadlock 1966; Browman and Munsell 1969; Hester 1973; Clewlow 1968). The Western Pluvial Lakes Tradition (WPLT) was defined by Bedwell (1970: 231) to refer to "a general way of life directed towards the ... exploitation of a lake environment." Crescents and by implication the WPLT are assumed to Anathermal in age (Clewlow 1968). Hester (1973) has assigned a chronological range of ca. 9000 B.C. - 6000 B.C. for this lacustrine oriented tradition (cf. Hester 1973: 62-69, for a discussion and site distribution of the WPLT).

Great Basin Transverse Points in the eastern Great Basin are known from Long and Spring Valleys (Tadlock 1966) to the north of Coal Valley, the Escalante Valley (Keller and Hunt 1967) to the east and from Danger Cave (Tadlock 1966: Jennings 1957) to the northeast. Clewlow (1968) and Tadlock (1966) both suggest their use as transversely mounted projectile points used in the hunting of waterfowl, although Butler (1970) and Mitchell, et. al. (1977) suggest other alternatives. Experiments conducted at the University of California, Berkeley, show that specimens, hafted as transverse points, could have served as projectile tips (cf. Hester and Heizer 1973a).

Undoubtedly other dry lakes in the region will yield other specimens of this distinctive projectile point once careful archaeological surveys have been conducted in these now unknown areas. However we may have to wait for centuries, in some cases, for deflation to bring these early sediment-covered materials into view.

In brief, the projectile point time markers from Coal Valley Dry Lake indicate an occuption range of 9000 B.C. to post contact time for this locality.

Bifaces

As noted in the Civa II section, the specimens assigned to this category are pieces that show evidence of extensive bifacial flaking with at least one lateral edge capable of being utilized for a cutting action. These artifacts are probably multipurpose in function and range in form from a crudely worked flake or blade to a carefully flaked piece suitable for hafting.

Sixty-eight specimens (10 complete, 58 fragmentary) were recovered during the random surface collection of the "Campsite Locality" and subjected to various metrical measurements (Table 16). Chert is the predominant raw material (76.5%), no doubt due to its availability in the near vicinity, with obsidian (16.2%), basalt (2.9%), chalcedony (2.9%) and quartzite (1.5%) following. Cross sections range from plano-convex (17.7%) to biconvex (82.3%). Morphologically the specimens range from various ovate forms to lanceolate, triangular and limande in form. Percussion flaking is dominant although a combination of percussion/pressure flaking is present on certain of the specimens. The edges of many of the specimens show evidence of minor crushing, nibbling and polish. No edge wear analysis was conducted on the collected specimens, although such a study would definitely be of value in determining the function of these

'bifaces.' In addition to the edge damage present, over 95% of the fragmentary specimens have snap fractures present, probably indicating breakage during use rather than in manufacture as the majority of these pieces appear to have passed through the final stages of finishing. Distal fragments comprise over 38% of the total assemblage tending to support the hypothesis of breakage through use.

Edge angles range from 25° - 45° with a mean of 34° for 127 determinations. The angles of this range are steep enough to hold an edge yet are low enough for a reasonable sharp cutting edge (cf. Semenov 1964).

Type I - Ovate (Table 16, Fig. 31h-j).

Specimens: Complete (3)
Material: Chert (2); Basalt (1)
Description: These specimens are ovate in form with convex to slightly convex bases. The lateral edges are convex and converge to form a blunt point at the distal end. Cross sections are biconvex.
Measurements: Length: 44.0 - 52.0 mm
Width: 33.0 - 47.0 mm
Thickness: 14.0 - 18.0 mm
Edge Angle: 40° - 45° (chert); 36° - 37° (basalt)

Type Ia - Pointed Ovate (Table 16, Fig. 31k-l, 32a).

Specimens: Complete (3)
Material: Chert (2)
Description: These are similar to Type I except that the lateral edges converge to a distinct point at the distal end.
Measurements: Length: 44.0 - 63.0 mm
Width: 30.0 - 41.0 mm
Thickness: 12.0 - 17.0 mm
Edge Angle: 34° - 42°

Type Ib - Long Ovate (Table 16, Fig. 32b-d).

Specimens: Incomplete (3)
Material: Chert (1); Obsidian (1); Basalt (1)
Description: These basal fragments are elongate ovate in form and are similar to Type I except for an overall greater size (width, thickness, length). The cross sections are biconvex and it must be pointed out that this category is subject to further revision, due to the nature of the sample available for analysis.
Measurements: Length: 30.0 - 45.0 mm
Width: 38.0 - 40.0 mm
Thickness: 8.0 - 15.0 mm
Edge Angle: 34° - 39°

Type II - Narrow Lanceolate (Table 1b, Fig. 33a-c, 34f-h).

Specimens: Incomplete (6)
Material: Chert (6)
Description: These bifaces are narrow lanceolate in form with the slightly convergent lateral edges converging to a sharp point at the distal end. The cross sections are thin and biconvex with the majority of the specimens being finely worked. This category is subject to revision due to the small size of the collected sample and category determination based on specimens lacking the basal portions.
Measurements: Length: 90.5 - 34.0 mm
Width: 20.0 - 28.5 mm
Thickness: 4.0 - 6.0 mm
Edge Angle: 27° - 36°

Type III - Large Elongate Triangular (Table 16, Fig. 32e).

Specimens: Complete (1)
Material: Chert
Description: This specimen is elongate triangular in form with a convex base. The lateral edges converge to a sharp point at the distal end. The cross section is biconvex and the flaking is percussion.
Measurements: Length: 86.0 mm
Width: 38.5 mm
Thickness: 6.0 mm
Edge Angle: 30° - 34°

Type IIIa - Small Elongate Triangular (Table 16, 34d).

Specimens: Complete (1)
Material: Chert
Description: This specimen is elongate triangular in form and is similar to Type III except for an overall reduction in size. The base is convex and the lateral edges converge to a blunt point at the distal end. The cross section is biconvex.
Measurements: Length: 40.0 mm
Width: 25.0 mm
Thickness: 6.0 mm
Edge Angle: 28° - 30°

Type IV - Sub-Triangular (Table 16, Fig. 32f-i).

Specimens: Complete (3); Incomplete (1)
Material: Chert (1); Obsidian (3)
Description: These specimens are sub-triangular in form with slightly convex to convex bases. The lateral edges converge to form blunt to sharp points at the distal end. The cross sections are plano-convex.

COAL VALLEY DRY LAKE SITES: BIFACE TYPE DATA

UCLMA#	Provenience	Status	Material	Flaking Type	Rt. Edge Angle	Lf. Edge Angle	Length	Width	Thickness	Weight	Cross-Section
TYPE I - OVATE											
2-58573	Surface	Comp.	Chert	0	45°	39°	52.0	47.0	14.0	30.6	BC
2-58622	"	Comp.	Basalt	0	36°	37°	47.0	33.0	18.0	19.0	BC
2-58732	"	Comp.	Chert	0	40°	43°	44.0	35.0	15.0	15.7	BC
TYPE Ia - POINTED OVATE											
2-58591	Surface	Comp.	Chert	0	34°	37°	44.0	35.0	15.0	10.2	BC
2-58735	"	Comp.	Chert	0	38°	39°	43.0	30.0	12.0	12.1	BC
2-58764	"	Comp.	Chert	0	40°	42°	63.0	41.0	17.0	33.4	BC
TYPE Ib - LONG OVATE											
2-58551	Surface	Frag.	Chert	0	37°	36°	45.0+	40.0	15.0	18.2+	BC
2-58745	"	Frag.	Basalt	0	35°	36°	30.0+	38.0	11.0	11.8+	BC
2-58759	"	Frag.	Obsidian	0	39°	34°	31.0+	38.0	8.0	11.2+	BC
TYPE II - NARROW LANCEOLATE											
2-58536	Surface	Frag.	Chert	0	28°	31°	57.5+	28.5	6.0	7.9+	BC
2-58546	"	Frag.	Chert	0/1	34°	36°	39.0+	22.0	4.5	3.9+	BC
2-58549	"	Frag.	Chert	0	32°	32°	90.5+	25.0	5.5	12.2+	BC
2-58577	"	Frag.	Chert	0	28°	27°	50.0+	20.0	4.0	3.7+	BC
2-58584	"	Frag.	Chert	0	32°	31°	34.0+	20.5	5.0	3.7+	BC
2-58609	"	Frag.	Chert	0	28°	29°	46.0+	23.5	4.5	5.3+	BC
TYPE III - LARGE ELONGATE TRIANGULAR											
Uncat.	Surface	Comp.	Chert	0	30°	34°	86.0	38.5	6.0	12.3	BC
TYPE IIIa - SMALL ELONGATE TRIANGULAR											
Uncat.	Surface	Comp.	Chert	0	28°	30°	40.0	25.0	6.0	6.2	BC
TYPE IV - SUB-TRIANGULAR											
2-58541	Surface	Comp.	Obsidian	0	36°	38°	35.0	24.0	9.0	3.9	BC
2-58552	"	Frag.	Obsidian	0	32°	34°	33.0+	32.0	8.0	2.3+	BC
2-58621	"	Comp.	Chert	0	32°	34°	49.0	28.0	5.0	5.2	BC
2-58757	"	Comp.	Obsidian	0	33°	34°	26.0	15.0	6.0	1.1	BC
TYPE V - SMALL ELONGATE LIMANDE											
2-58620	Surface	Comp.	Quartzite	0	39°	40°	69.0	20.0	13.0	12.5	BC
TYPE VI - UNDEFINED - TYPE I											
2-58538	Surface	Frag.	Chert	0	40°	42°	43.0+	33.0	10.0	13.2+	BC
2-58586	"	Frag.	Chert	0	39°	42°	49.0+	29.0	8.0	14.2+	BC
2-58620	"	Frag.	Chert	0	38°	40°	52.0+	43.0	10.0	24.2+	BC
2-58767	"	Frag.	Chert	0	40°	35°	27.0+	25.0	9.0	3.5+	BC

Cross-section (Bi-convex)
Flaking Type: 0 = Percussion
1 = Pressure

(All measurements in mm and grams)

Table 16

COAL VALLEY DRY LAKE SITES: BIFACE FRAGMENT DATA

UCLMA#	Provenience	Status	Material	Flaking Type	Rt. Edge Angle	Lf. Edge Angle	Length	Width	Thickness	Weight	Cross-Section
TIP FRAGMENTS											
2-58545	Surface	Frag	Chert	0	32°	30°	25.0	--	4.1	--	BC
2-58550	"	Frag	Obsidian	0	29°	33°	31.5	--	5.0	--	PC
2-58576	"	Frag	Obsidian	0/1	34°	34°	29.0	--	6.0	--	BC
2-58583	"	Frag	Obsidian	0/1	32°	35°	36.0	--	4.5	--	PC
2-58585	"	Frag	Chert	0	44°	40°	21.0	--	8.0	--	BC
2-58589	"	Frag	Chert	0/1	30°	34°	43.0	--	6.0	--	BC
2-58595	"	Frag	Chert	0	36°	33°	33.0	--	6.0	--	BC
2-58627	"	Frag	Chert	0	38°	36°	25.0	--	5.0	--	BC
2-58628	"	Frag	Chert	0	-	38°	-	--	6.5	--	BC
2-58629	"	Frag	Chert	0	43°	38°	45.0	--	9.0	--	BC
2-58645	"	Frag	Chert	0	35°	34°	49.0	--	8.5	--	BC
2-58646	"	Frag	Chert	0	33°	31°	45.0	--	4.5	--	BC
2-58660	"	Frag	Chert	0	32°	35°	25.0	--	8.0	--	BC
2-58662	"	Frag	Chert	0	-	30°	37.0	--	8.0	--	PC
2-58675	"	Frag	Chert	0	36°	-	33.0	--	7.5	--	BC
2-58690	"	Frag	Chert	0	34°	33°	36.0	--	8.0	--	PC
2-58692	"	Frag	Chert	0	35°	32°	39.0	--	10.5	--	BC
2-58694	"	Frag	Chalcedony	0	29°	33°	37.0	--	7.5	--	BC
2-58698	"	Frag	Chalcedony	0	33°	31°	32.0	--	5.8	--	BC
2-58700	"	Frag	Chert	0	35°	30°	37.0	--	7.8	--	BC
2-58709	"	Frag	Chert	0	35°	35°	34.0	--	11.0	--	BC
2-58725	"	Frag	Chert	0	35°	36°	37.5	--	6.6	--	BC
2-58733	"	Frag	Chert	0	38°	34°	27.5	--	6.3	--	BC
2-58770	"	Frag	Chert	0	38°	32°	6.8	--	5.4	--	BC
2-58772	"	Frag	Chert	0	33°	34°	22.8	--	7.5	--	PC
2-58773	"	Frag	Chert	0	30°	32°	25.0	--	6.0	--	BC
MEDIAL FRAGMENTS											
2-58534	"	Frag	Chert	0	-	-	-	--	7.5	--	--
2-58537	"	Frag	Chert	0	29°	35°	-	--	6.0	--	BC
2-58539	"	Frag	Obsidian	0/1	28°	-	-	--	5.0	--	PC
2-58572	"	Frag	Obsidian	0	-	-	-	--	10.0	--	BC
2-58574	"	Frag	Chert	0	-	31°	-	--	5.0	--	PC
2-58590	"	Frag	Chert	0	40°	43°	-	20.0	11.5	--	BC
2-58598	"	Frag	Chert	0	29°	32°	-	21.0	5.5	--	BC
2-58652	"	Frag	Chert	0	29°	-	-	--	6.0	--	PC
2-58689	"	Frag	Chert	0	30°	32°	-	--	6.0	--	BC
2-58691	"	Frag	Chert	0	-	30°	39.5	--	5.0	--	PC
BASE FRAGMENTS											
2-58547	"	Frag	Chert	0	-	27°	-	31.0	5.0	--	PC
2-58658	"	Frag	Obsidian	0	25°	25°	-	27.0	5.0	--	PC
2-58688	"	Frag	Chert	0	-	-	-	--	13.0	--	BC
2-58693	"	Frag	Chert	0	33°	-	-	38.0	9.0	--	BC
2-58696	"	Frag	Chert	0	31°	34°	-	46.0	11.0	--	BC
2-58710	"	Frag	Chert	0	28°	26°	-	22.0	6.0	--	BC
2-58719	"	Frag	Chert	0	36°	35°	-	29.0	9.0	--	BC
2-58754	"	Frag	Obsidian	0	-	-	-	25.0	5.0	--	BC

Cross-section (Plano-convex, Bi-convex)
Flaking Type: 0 = Percussion
1 = Pressure

(All measurements in mm and grams)

Table 16

Measurements: Length: 35.0 - 49.0 mm
Width: 24.0 - 28.0 mm
Thickness: 5.0 - 9.0 mm
Edge Angle: 32° - 38°

Type V - Small Elongate Limande (Table 16, Fig. 33e).

Specimens: Complete (1)
Material: Quartzite
Description: This specimen is a small elongate limande in form and has a convex base. The slightly convex lateral edges converge to form a blunt point at the distal end. The cross section is biconvex.
Measurements: Length: 69.0 mm
Width: 20.0 mm
Thickness: 13.0 mm
Edge Angle: 39° - 40°

Type VI - Undefined - Type I (Table 16, Fig. 33f).

Specimens: In complete (4)
Material: Chert (4)
Description: These basal fragments form a distinct type but cannot be clearly defined because of the lack of complete specimens. The bases are flat to slightly convex with parallel to very slightly convex lateral edges. The specimens are biconvex in cross section and if reconstructed, would be moderately large.
Measurements: Length: 27.0 - 52.0+ mm
Width: 25.0 - 43.0 mm
Thickness: 8.0 - 10.0 mm
Edge Angle: 35° - 42°

Crude Bifaces

Specimens: Incomplete (2)
Material: Chert (2)
Description: These are crude basal fragments with straight to slightly convex lateral edges and slightly convex bases. Both specimens are made by hard hammer percussion. Width measurements range from 50.0 - 53.0 mm, with thickness measurements of 20.0 - 22.0 mm.
Discussion/Comment: The bifaces from the Campsite Locality are similar to those from the excavated and surveyed sites.

Artifacts

The surface collection yielded a total of 24 chipped and ground stone artifacts. Bifaces, ceramics and projectile points are not included in the above total and have been

discussed. As presented previously, these artifacts have been categorized into a descriptive typology for ease of presentation and discussion.

Drills/Perforators

Two specimens were collected from Coal Valley Dry Lake and are assumed to have been used in drilling and perforating activities. The two complete drills fall into two distinct types discussed previously for Civa II.

Type 3 (Fig. 36b).

Specimens: Complete (1)
Material: Chert
Description: Similar to Type 3 for Civa II.
Measurements: Length: 50.0 mm
Width (base): 20.0 mm
Thickness: 4.2 mm
Width (bit): 1.5 - 8.5 mm

Type 4 (Fig. 36e).

Specimens: Complete (1)
Material: Chert
Description: This is a bifacially worked interior flake with a large sub-rectangular base from which a short drill bit gradually tapers. The end of the bit shows evidence of crushing and grinding as well as several flake scars undoubtedly caused by use. The specimen's size and thickness appear to suggest a 'heavy-duty' tool.
Measurements: Length: 54.0 mm
Width (base): 37.1 mm
Thickness: 10.0 mm
Width (bit): 7.2 - 13.2 mm

Scrapers

Naturally Backed Single Convex Side Scraper (Fig. 35a).

Specimens: Complete (1)
Material: Chert
Description: This specimen is unifacially retouched with soft hammer percussion on the dorsal surface of an interior, end struck flake. Retouch is located along one slightly convex lateral edge with the other edge being naturally backed. The striking platform is crushed on this tool.
Measurements: Length: 64.0 mm
Width: 25.5 mm
Thickness: 10.1 mm
Edge Angle: 57°

Steep Scraper (Fig. 35b).

Specimens: Complete (1)
Material: Chalcedony
Description: This is a split nodule of chalcedony with unifacial percussion retouch around the circumference.
Measurements: Length: 49.5 mm
Width: 45.0 mm
Thickness: 15.0 - 22.0 mm
Edge Angle: 49° - 82°
Weight: 53.1 grams

Composite Tools

Double Convex Side Scraper/Endscraper

Type I (Fig. 37c).

Specimens: Complete (2)
Material: Chert (2)
Description: These specimens are unifacially retouched with soft hammer percussion on the dorsal surface of an interior, end struck flake. Retouch is located on the convex end opposite the striking platform and on both lateral edges. The striking platform on one specimen is crushed while the other is still intact.
Measurements: Length: 50.0 mm
Width: 36.0 - 38.0 mm
Thickness: 10.0 - 15.0 mm
Edge Angle: 57° - 70°
Weight: 21.0 - 30.5 grams

Type II (Fig. 37d).

Specimens: Complete (1)
Material: Basalt
Description: This specimen is unifacially retouched with soft hammer percussion on the dorsal surface of an interior side struck flake. Retouch is located on the convex end opposite the striking platform and on both lateral edges. The striking platform is still intact.
Measurements: Length: 34.8 mm
Width: 56.2 mm
Thickness: 12.0 mm
Edge Angle: 58° - 60°
Weight: 29.6 grams

Miscellaneous Chipped Stone Artifacts

Handaxe

Specimens: 1
Material: Silicified rhyolite
Description: This specimen is a small handaxe, triangular in form, with a convex butt. The lateral edges are straight and converge to a blunt point. Flaking is percussion and the piece is crudely made.
Measurements: Length: 94.0 mm
Width: 69.0 mm
Thickness: 24.5 mm
Edge Angle: 58° - 62°

Chopper

Specimens: 1
Material: Chert
Description: This is a small chert core which has been bifacially worked on one leading edge of the nodule. Slight edge damage is present on the working edge and it is probable that the piece was utilized in a chopping/cutting action.

Ground Stone

Only a limited sample of ground stone was collected during the random surface reconnaissance of the Campsite Locality on Coal Valley Dry Lake. Scattered, small (<5.0 cm in length) ground stone fragments were a prime component of the discrete site localities and were the chief indicator, along with lithic debitage, of cultural activity. Basalt, rhyolite and ignimbrite were the main raw materials due to their easy availability in the surrounding mountain ranges. Only a few fragments of a well sorted, consolidated sand stone along with several fragments of granite were noted.

Metates

While numerous gound stone fragments attributed as belonging to this category were noted, only one complete specimen and 3 fragmentary artifacts were collected. All are within the morphological attributes of the Slab type metate discussed previously. The specimens appear to have ranged from rectangular-ovate to elongate ovate in form and all have slight to marked grinding depressions (0.1 - 1.2 cm depth) in the central portions of the pieces. No specimens show grinding or abrasion on more than one surface. All fragments indicate deliberate shaping by the presence of grinding and battering/pecking marks on the lateral edges. The complete specimen is 36.5 cm in length, 18.0 cm wide and 3.5 cm thick. The other fragments range in thickness from 3.5 cm to 4.5 cm. Materials are basalt (3) and granite (1).

Manos

Two manos were recovered in the Campsite locality vicinity. Numerous fragments were noted but not collected during the surface survey. The two specimens can be placed into previously described categories.

Ia: Shaped, Rectangular in Cross Section, Abraded On One Side (Fig. 36c).

One fragmentary specimen made on a flat tabular piece of basalt. Length 9.0+ cm, 6.5 cm in width and 3.0 cm thick. The working surface has been ground smooth by use. Pecking and grinding mark traces present on the lateral edges.

II: Unshaped, Broad Oval, Abraded On One Side

One complete specimen of basalt. Length 9.8 cm, width 7.9 cm, thickness 5.4 cm. One end exhibits severe battering and may have possibly been used as a pestle/mano combination.

Atlatl Weight (Fig. 35c).

This artifact is a long, thin tapering ground and polished piece of quartz-muscovite-chlorite phyllite (schist) with a semi-elliptical cross section. One lateral edge has been ground flat, presumably for mating with the atlatl body and the other lateral edge tapers to a semi-curve. Both the proximal and distal ends have been ground flat and a number of shallow scratches and striations (perhaps resulting from manufacture or use) can be seen. This specimen is contained within the Type II category of Butler and Osborne (1959) classification for the Northwest and a similar piece is illustrated in Hester, Mildner and Spencer (1974: Fig. 11b). From a review of Hester, et.al. (1974), this appears to be the only atlatl weight known from southeastern Nevada.

Measurements:
Length: 134.0 mm
Diameter (x axis): 15.9 mm (base)
10.0 mm (tip)
Diameter (y axis): 12.9 mm (base)
10.6 mm (tip)
Weight: 51.7 grams

Edge Damaged/Utilized Flakes

As previously discussed in the Civa II presentation, 'utilized' or 'edge damaged' flakes are presented here for information only and will not be considered as a formal artifact category in the sense of deliberate manufacture and use.

Specimens: 16
Material: Chert (15); Chalcedony (1)

Measurements: Twelve of the specimens are interior flake fragments or complete flakes while four are primary cortex trim flakes.

Cores

Bifacial

Specimens: 6
Material: Chert (5); Quartize (1)
Description: These cores are generally small to medium chunks (up to fist size), nodules or split nodules, amorphous in shape, which have been bifacially flaked from more than one striking platform in order to produce usable flakes of various sizes.
Measurements: Length: 7.1 - 9.9 cm (Mean = 8.5 cm)
Width: 5.2 - 7.4 cm (Mean = 6.1 cm)
Thickness: 2.8 - 5.3 cm (Mean = 4.0 cm)

Utilized Cores

Specimens: 2
Material: Quartzite (1); Basalt (1)
Description: These are cores that have been utilized for some other purpose after being discarded. One specimen is a tabular piece of basalt that has been bifacially worked to remove several flakes of various sizes. Slight crushing and battering are present on the edges. The other specimen is a large fine grain quartzite nodule with several flake removals present. Severe crushing and battering are evident on the distal and proximal ends of the core.
Measurements: Length: 91.5 - 108.1 mm
Width: 63.9 - 68.0 mm
Thickness: 25.9 - 41.0 mm

Lithic Debitage

A total of 574 pieces of lithic debitage 2587.0 grams were randomly collected from the scattered site localities on the dry lake bed during the surface reconnaissance. It is probable that this sample of debitage is biased due it is also generally representative of the debitage present at the Coal Valley Dry Lake localities.

The debitage was not subjected to an intensive lithic analysis as it was not collected from any controlled contexts. In terms of raw material, chert is predominant comprising 72.3% of the total sample, with obsidian (27.2%) and basalt (0.5%) following. This is comparable to the data recorded at the two excavated rockshelter/cave sites and other lithic scatters within the study area. The predominance of chert is probably due to its availability in the nearby alluvial fans and mountain ranges.

From our inspection of the collected sample, it is readily apparent from the numerous primary and secondary cortex trim flakes, interior trim and biface

thinning flakes (cf. Hester 1971; Shafer 1969; and Epstein 1969 for a discussion of these terms) that the dry lake was the focus of primary, secondary and tertiary manufacturing activities. Secondary cortex and interior trim flakes, along with biface thinning flakes, are the most numerous, leading to the tentative conclusion that nodules of the raw material were decortified elsewhere (probably at a nearby quarry site) and the material transported to the temporary occupation sites for further processing. The interior trim and biface thinning flakes suggest completion of various tools on site. The surface reconnaissance also noted discrete workshop or 'activity' areas within the various localities. That is, it was apparent that some portions of a 'site' had a higher proportion of primary or secondary cortex trim flakes to interior or biface thinning flakes than would be expected in the breakup of a core or cores during manufacture.

Conversely, some areas of a site had a high proportion of interior and biface thinning flakes compared to primary or secondary cortex trim flakes. These observations (although not confirmed by quantitative data) argue for 'specialized' manufacturing or activity areas for primary and secondary decortification and the final finishing process involved in tool manufacture or maintenance. As well, several sites were observed where obsidian was the dominant raw material compared to chert.

A controlled surface collection sample and intensive/extensive lithic analysis would have determined if these observations were correct as well as provide valuable data on the technological processes present. Time and financial constraints precluded any in-depth study at this surface scatter.

Radiocarbon Dates

Two round hearths exposed by deflation, 12" in diameter and 4" deep and filled with carbonized wood (probably sage or greasewood), were noted at one of the 'campsites' located along a dune edge north of the main concentration of sites. The surface collection from the area in the immediate vicinity of the hearths yielded several Slab metate fragments, a hammerstone (?), five projectile point or biface fragments (1 distal, 2 lateral, 2 proximal) and lithic debitage of chert and obsidian. One of the chert proximal projectile point fragments is a Rose Spring Corner Notched type. A charcoal sample from one of the hearths yielded a date of 1475± 80 radiocarbon years: A.D. 475 (I-9796). This date is in agreement (A.D. 410 - A.D. 600 corrected, Ralph, Michael and Han 1973) with the chronological range postulated for the associated Rose Spring series projectile point (cf. Hester and Heizer 1973a).

Summary/Interpretations

The artifact assemblage recovered from the Coal Valley Dry Lake localities indicates an intermittent, seasonal occupation/use from ca. 9000 B.C. to historic times (A.D. 1850). The former lake appears to have been a main locus of occupation for the study area based on the numerous discrete 'campsites', the quantity of cultural material, and the time depth as indicated by the temporally diagnostic artifacts and ceramics present.

The initial occupation of the now dry lake bed was by peoples of the Western Pluvial Lakes Tradition with the presence of Great Basin Transverse projectile points being diagnostic of this tradition (Tadlock 1966; Browman and Munsell 1969; Hester 1973; Clewlow 1968). The Western Pluvial Lakes Tradition (WPLT) was defined by Bedwell (1970: 231) to refer to "a general way of life directed towards the ... exploitation of a lake environment" and Hester (1973) has assigned a chronological range of ca. 9000-6000 B.C. for this lacustrine oriented tradition (cf. Hester 1973; 62-69 for a discussion and review of the WPLT). The distribution of other sites yielding crescents has been discussed previously.

Desert Archaic groups intermittently occupied the lake bed from ca. 6000 B.C. (?) to historic times and the area was probably shared by both Shoshone and Southern Paiute groups, although Kelly (1934) has included it in Southern Paiute territory.

Undoubtedly the sites were probably utilized when favorable climatic conditions (e.g., precipitation and temperature, cf. Synder and Langbein 1962; Weide 1976) allowed for the formation of standing water due to runoff and evaporation conditions. Resource exploitation was undoubtedly oriented towards the utilization of these 'transient' lacustrine conditions coupled with the use of easily available raw stone material from the alluvial sediments for manufacturing purposes. Hunting and gathering in the surrounding desert areas was also probably conducted to supplement the lacustrine resources available from the lake.

In brief, the Coal Valley Dry Lake sites and their artifact assemblages support the conclusion of temporary campsites utilized from ca. 9000 B.C. to historic times. It is probable that the sites were utilized only when favorable climatic conditions allowed for the formation of standing water and associated lacustrine conditions. The presence of two resource zones, lacustrine and the surrounding desert, undoubtedly made these sites a favored seasonal occupation locus for aboriginal groups from the nearby valleys.

Key To Figures

Figure 28

a, b, c. Great Basin Transverse Points (2-58556, 2-58618, 2-58619); d, e, f, g. Humboldt Concave Base (2-58602, 2-58746, 2-58616, 2-58640); h, i. Pinto Square Shoulder (2-58715, 2-58603); j, k, l, m. Elko Eared (2-58612, 2-58565, 2-58566).

Figure 29

a-c. Eastgate Series Projectile Points (2-58634, 2-58617, 2-58608); d-g. Desert Side Notched Projectile Points (2-58604, 2-58768, 2-58557, 2-58642).

Figure 30

a, b. Elko Eared (2-58564, 2-58569); c. Elko Side Notched (2-58738); d, e, f. Elko Split Stem (2-58592, 2-58568, 2-58561); g-o. Rose Spring Corner Notched (2-58647, 2-58721, 1-58720, 2-58712, 2-58633, 2-58650, 2-58563, 2-58594, 2-58600); p. Rose Spring Contracting Stem (2-58666).

Figure 31

a, b. Desert Side Notched (2-58641, 2-58636); c, d, e, f. Elko Preform (2-58613, 2-58567, 2-58614, 2-58562); g. Elko Preform (?) - Type II - (2-58607); h, i, j. Ovate Biface (2-58573, 2-58732, 2-58622); k, l. Pointed Ovate Biface (2-58591, 2-58735).

Figure 32

a. Pointed Ovate Biface (2-58764); b, c, d. Long Ovate Biface (2-58759, 2-58745, 2-58551); e. Long Elongate Triangular Biface (2-58558); f-i. Sub-Triangular Biface (2-58541, 2-58552, 2-58757, 2-58621).

Figure 33

a-c. Type II Biface: Narrow Lanceolate (2-58577, 2-58546, 2-58536); d. Type IIIa Biface: Small Elongate Triangular (2-58597); e. Type V Biface: Elongate Limande (2-58506); f. Type VI Biface (2-58620).

Figure 34

a-e. Preforms (2-58555, 2-58639, 2-58632, 2058771, 2-58593); f-h. Type II Biface: Narrow Lanceolate (2-58549, 2-58609, 2-58584).

Figure 35

a. Naturally Backed Single Convex Side Scraper (2-58533); b. Steep Scraper (2-58722); c, d. Double Convex Side Scraper/Endscraper - Type I: Uncatalogued; Type II (2-58673); e. Atlatl Weight - Uncatalogued.

Figure 36

a. Shoshone Vessel Fragment - Uncatalogued; b. Type 3 Drill/Perforator (2-58624); c. Type 4 Drill/Perforator (2-58623); d. Mano, Type Ia (2-58707).

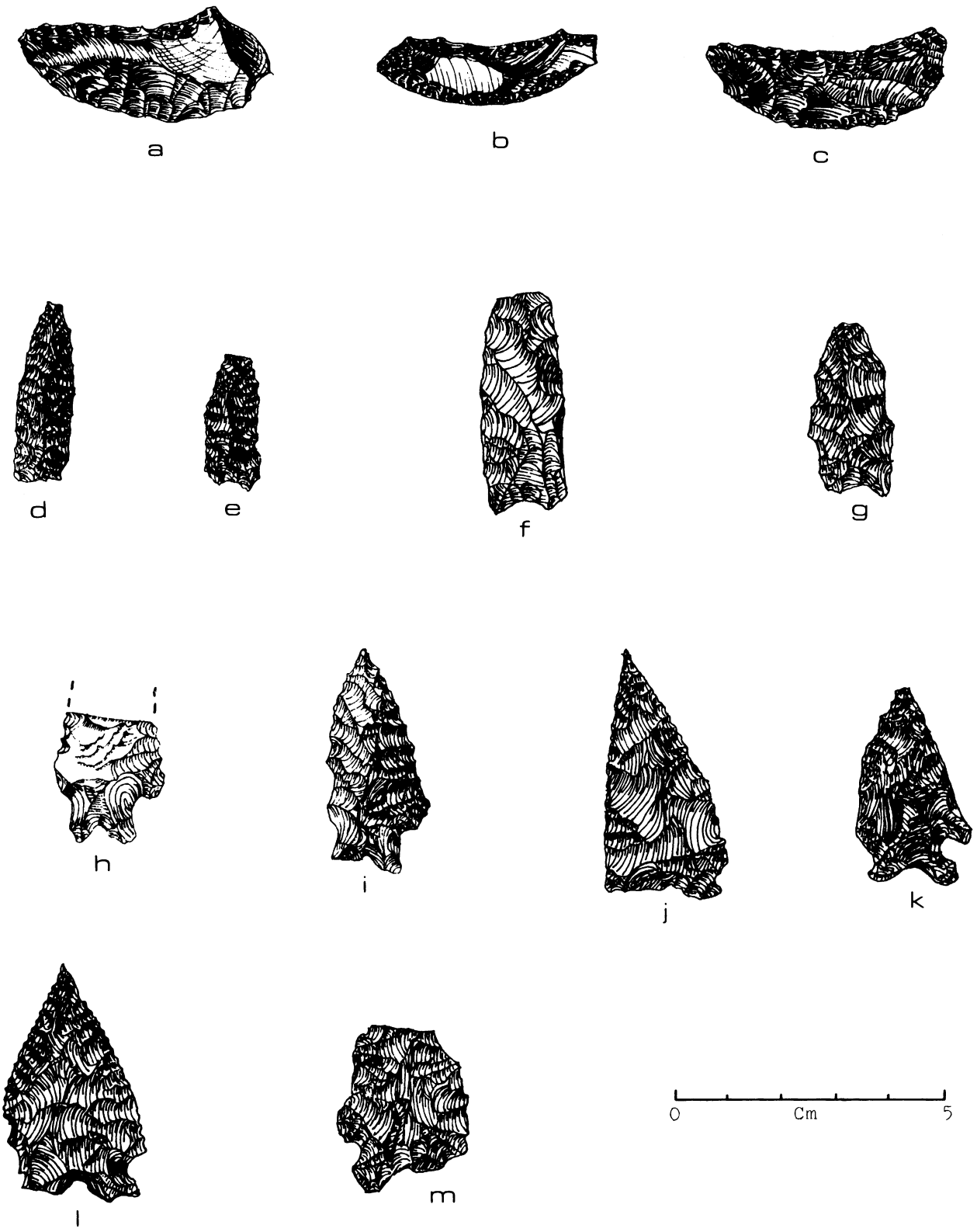
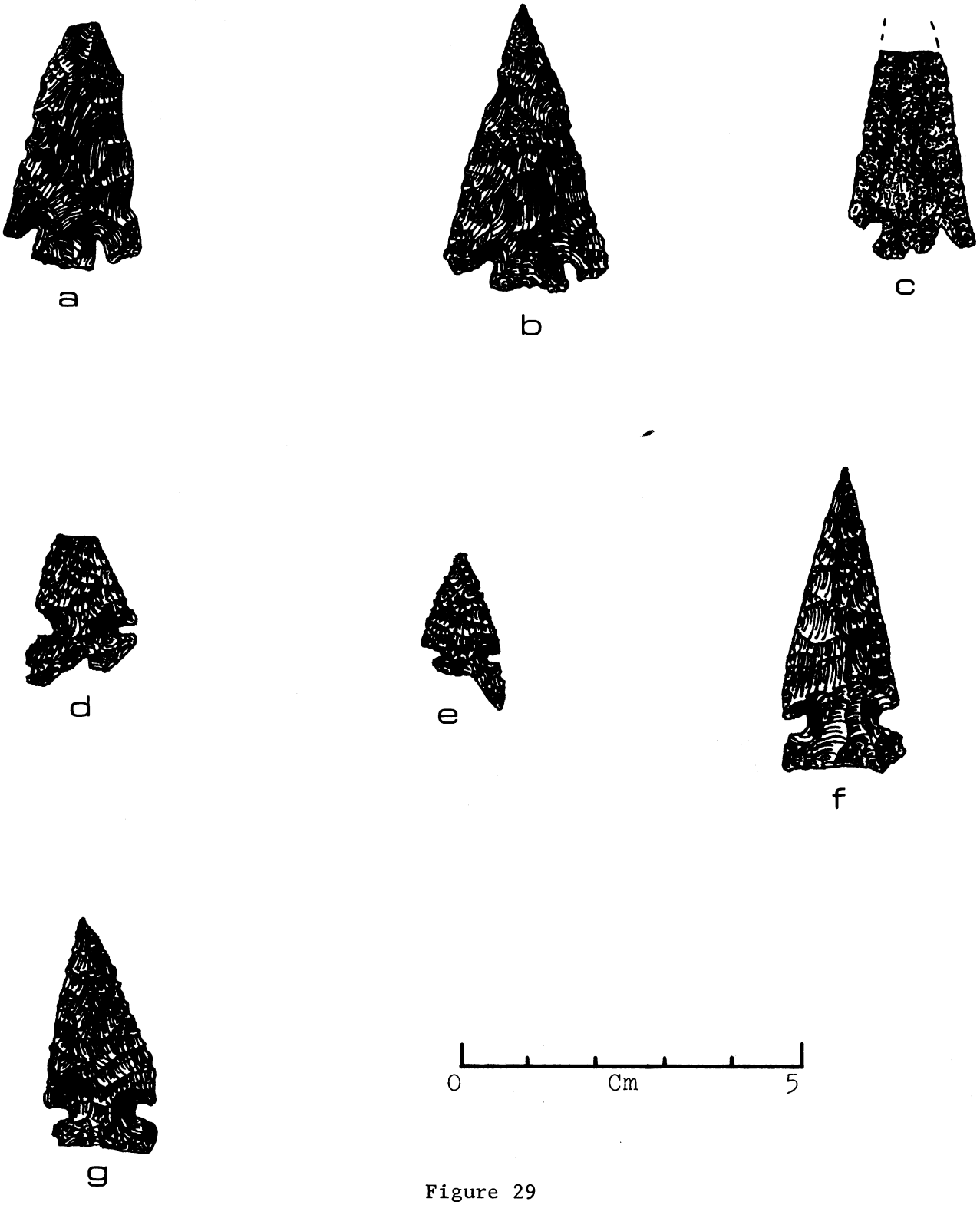


Figure 28



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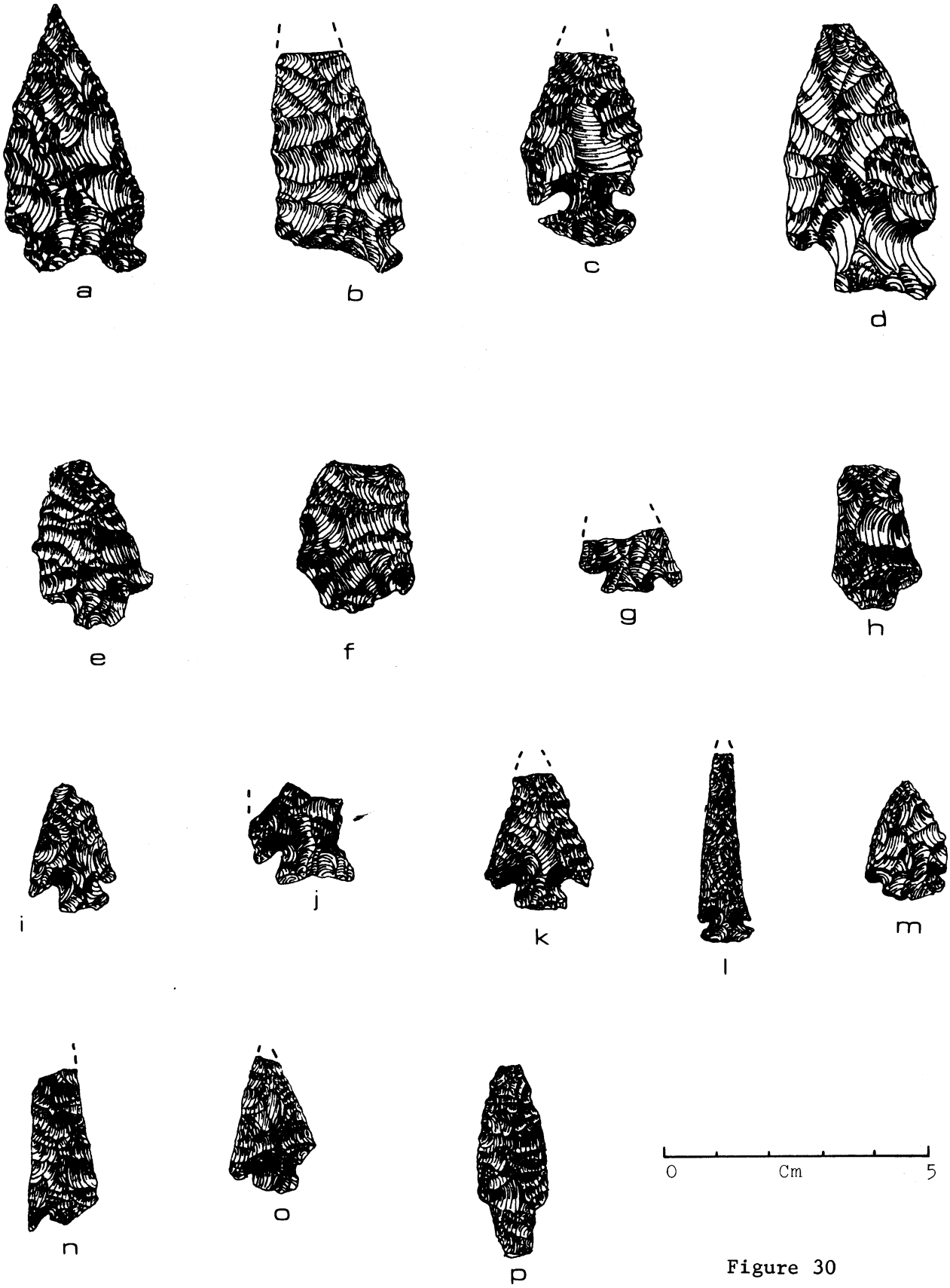


Figure 30

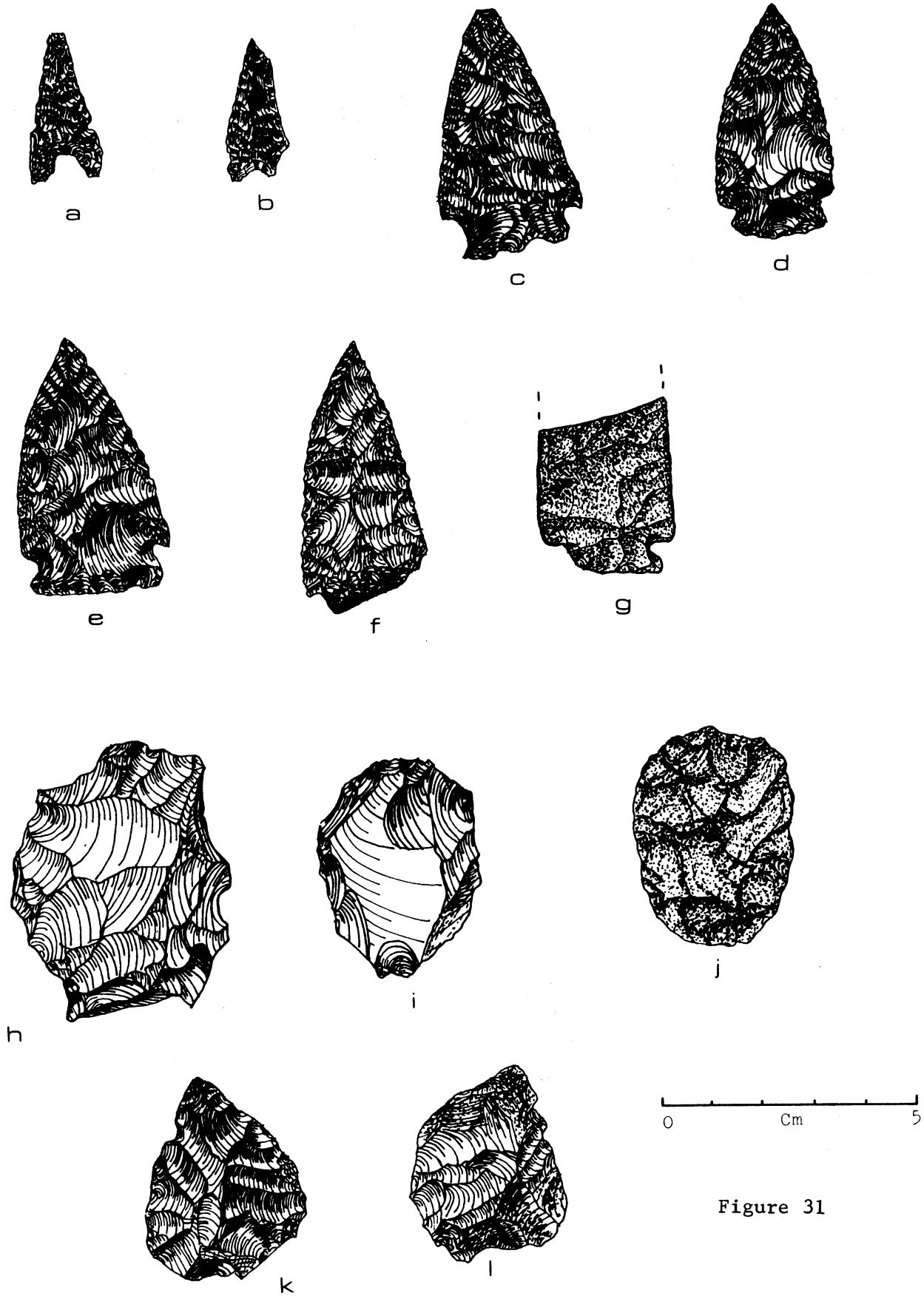


Figure 31

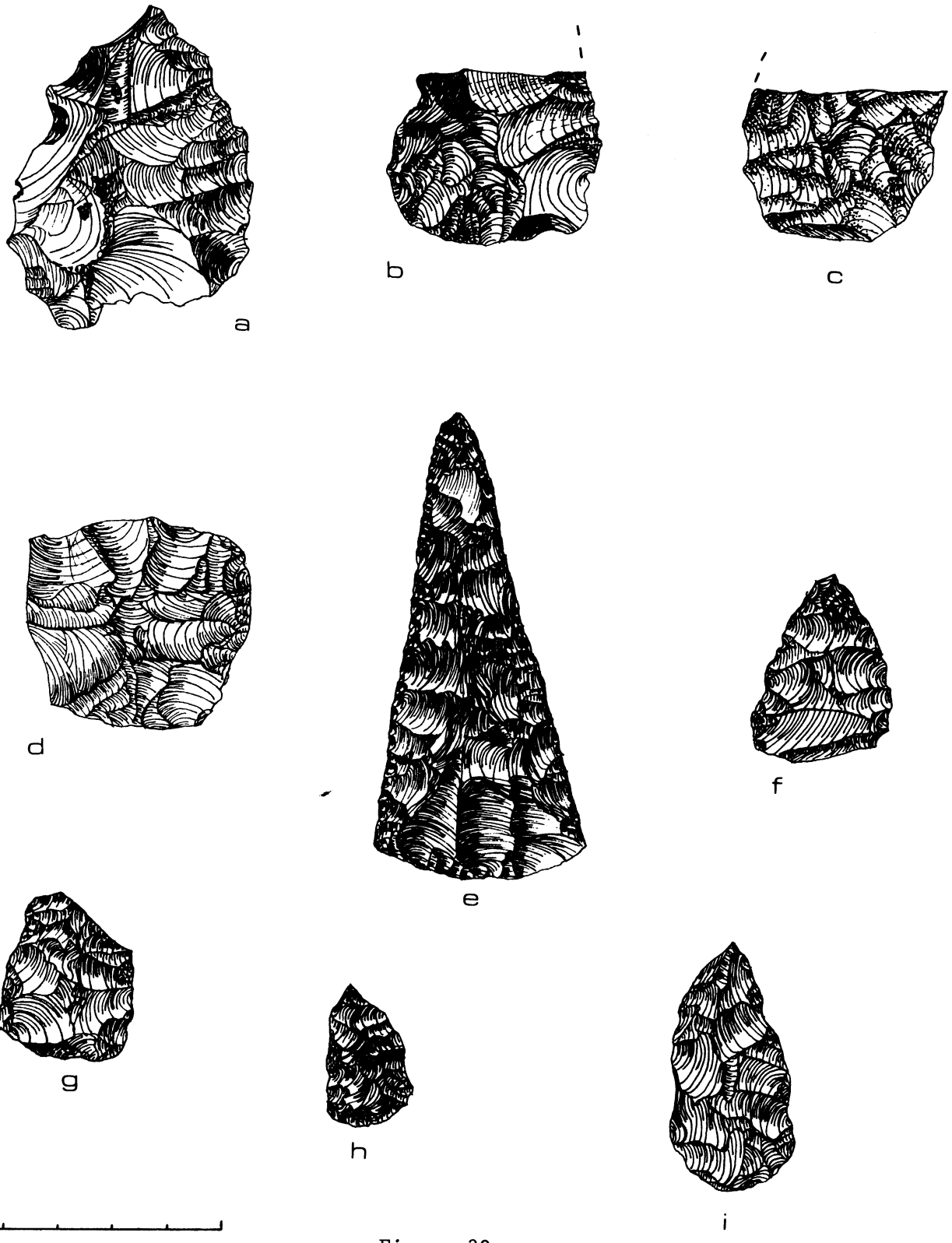
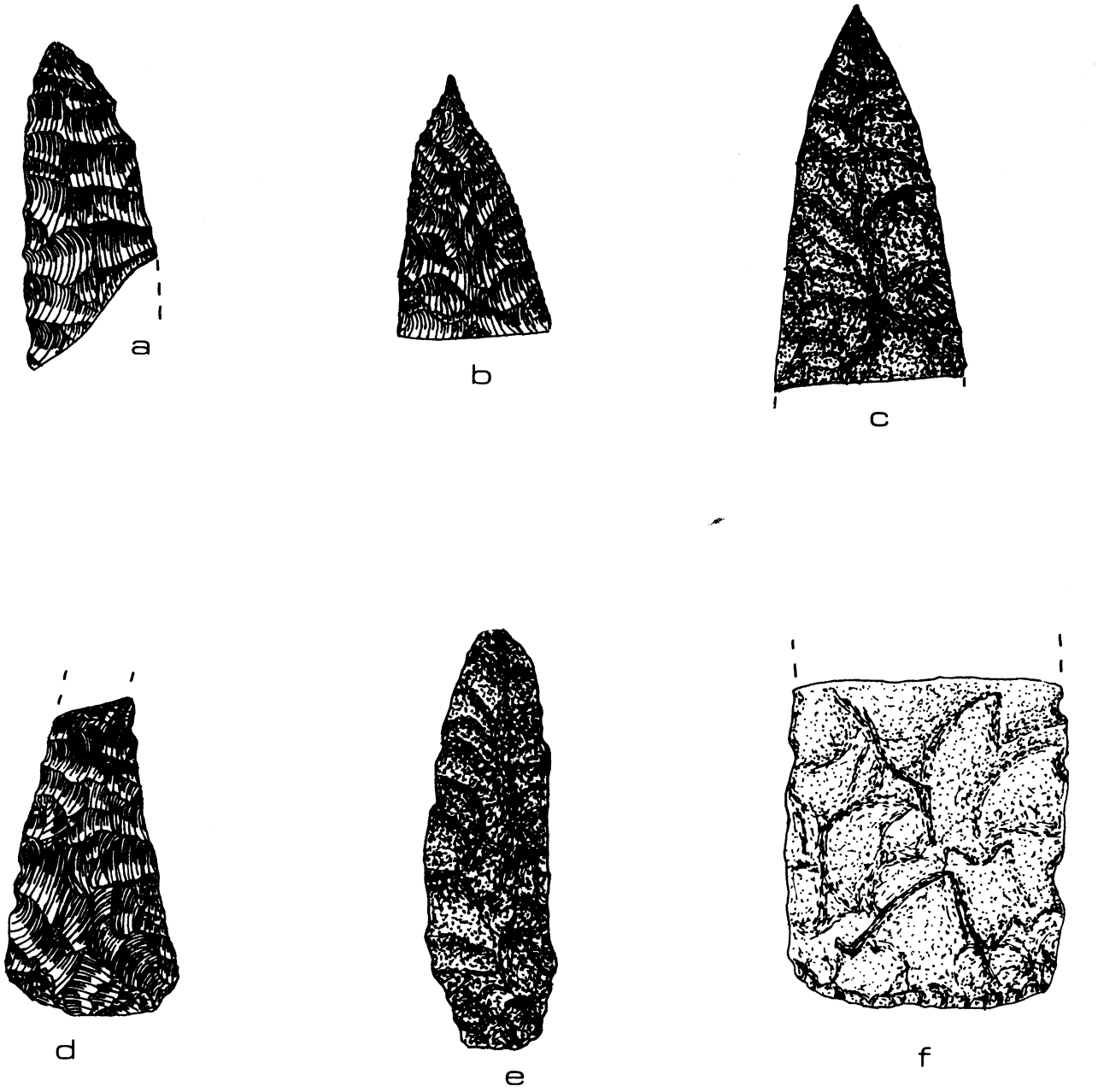


Figure 32



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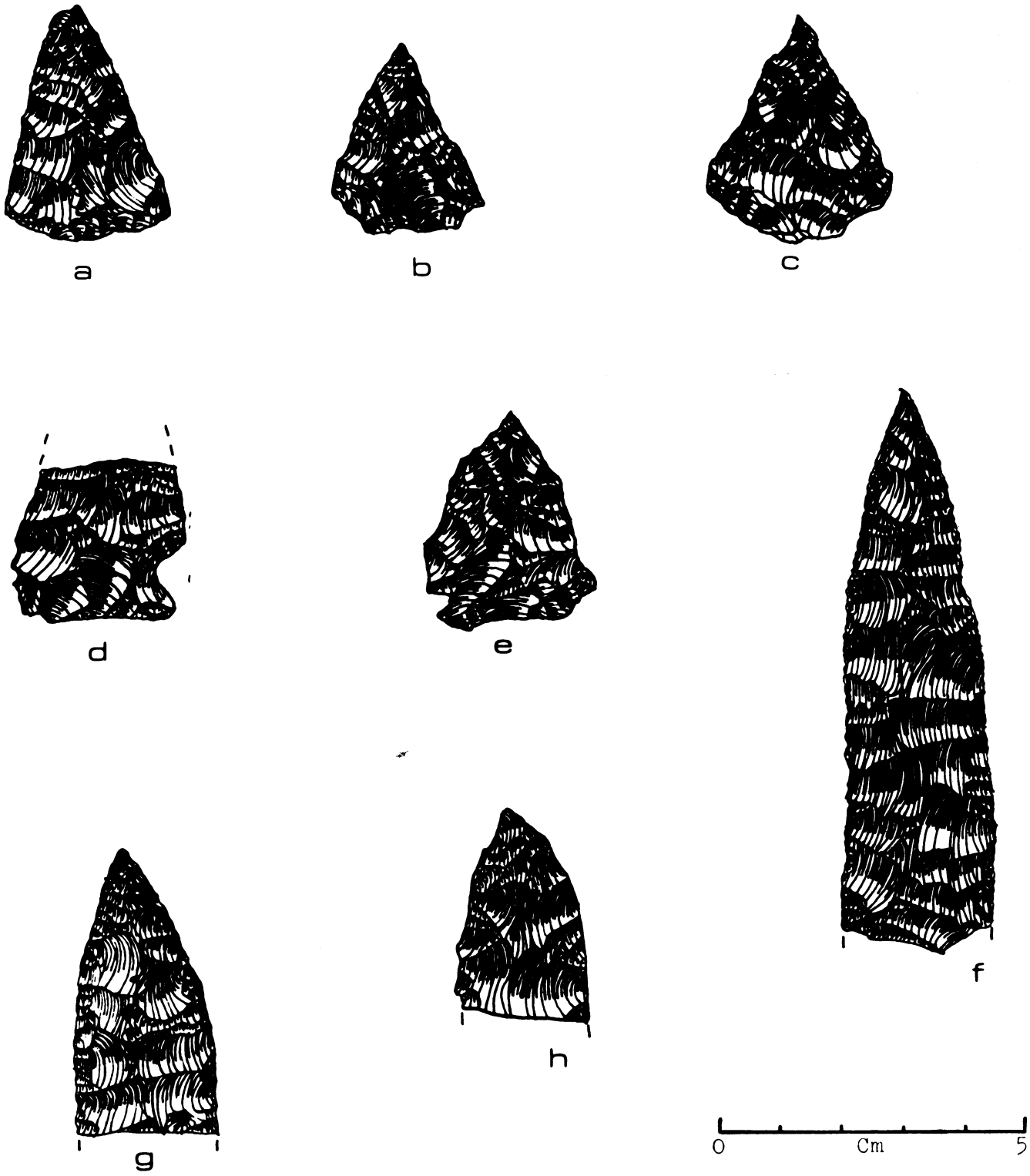


Figure 34

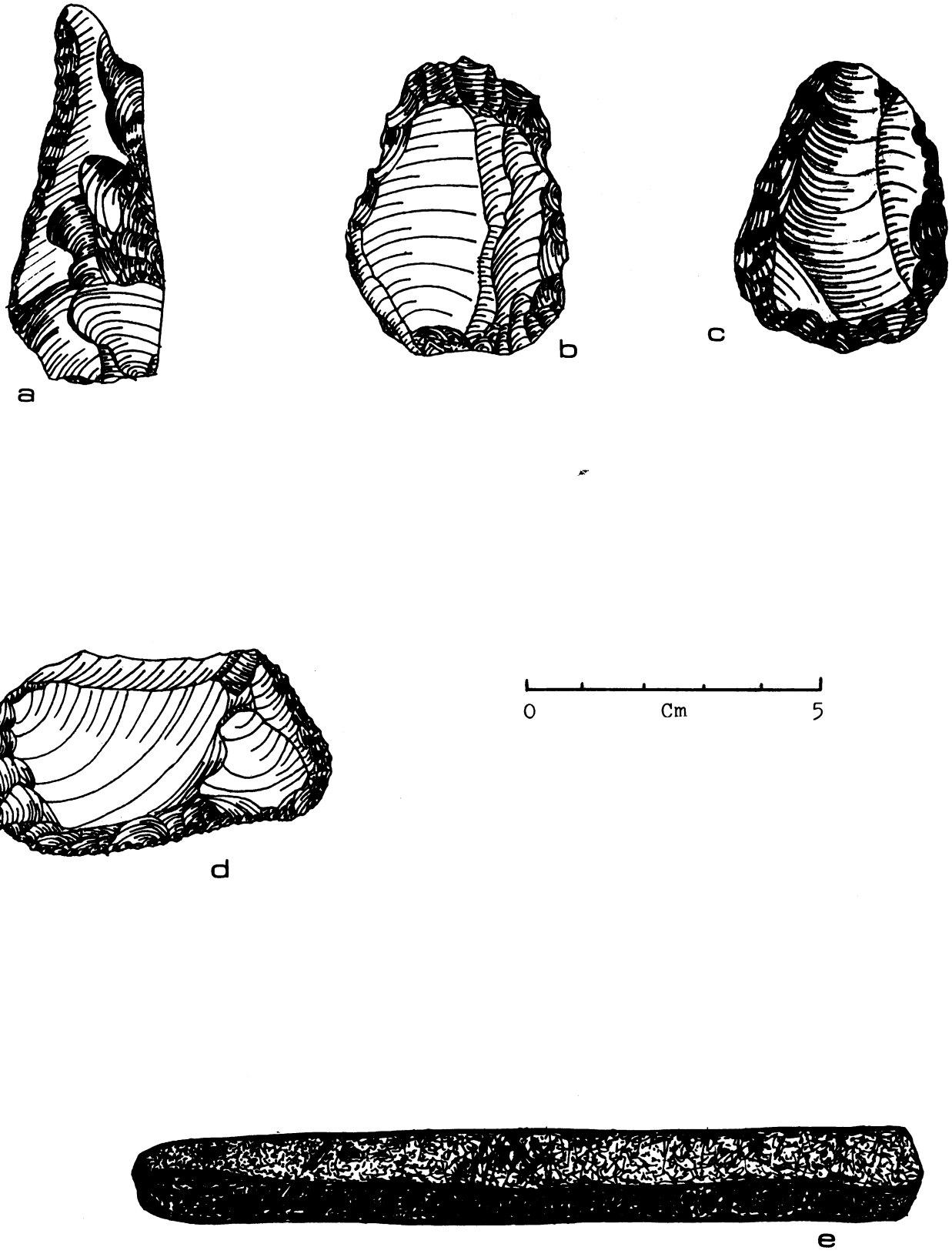


Figure 35

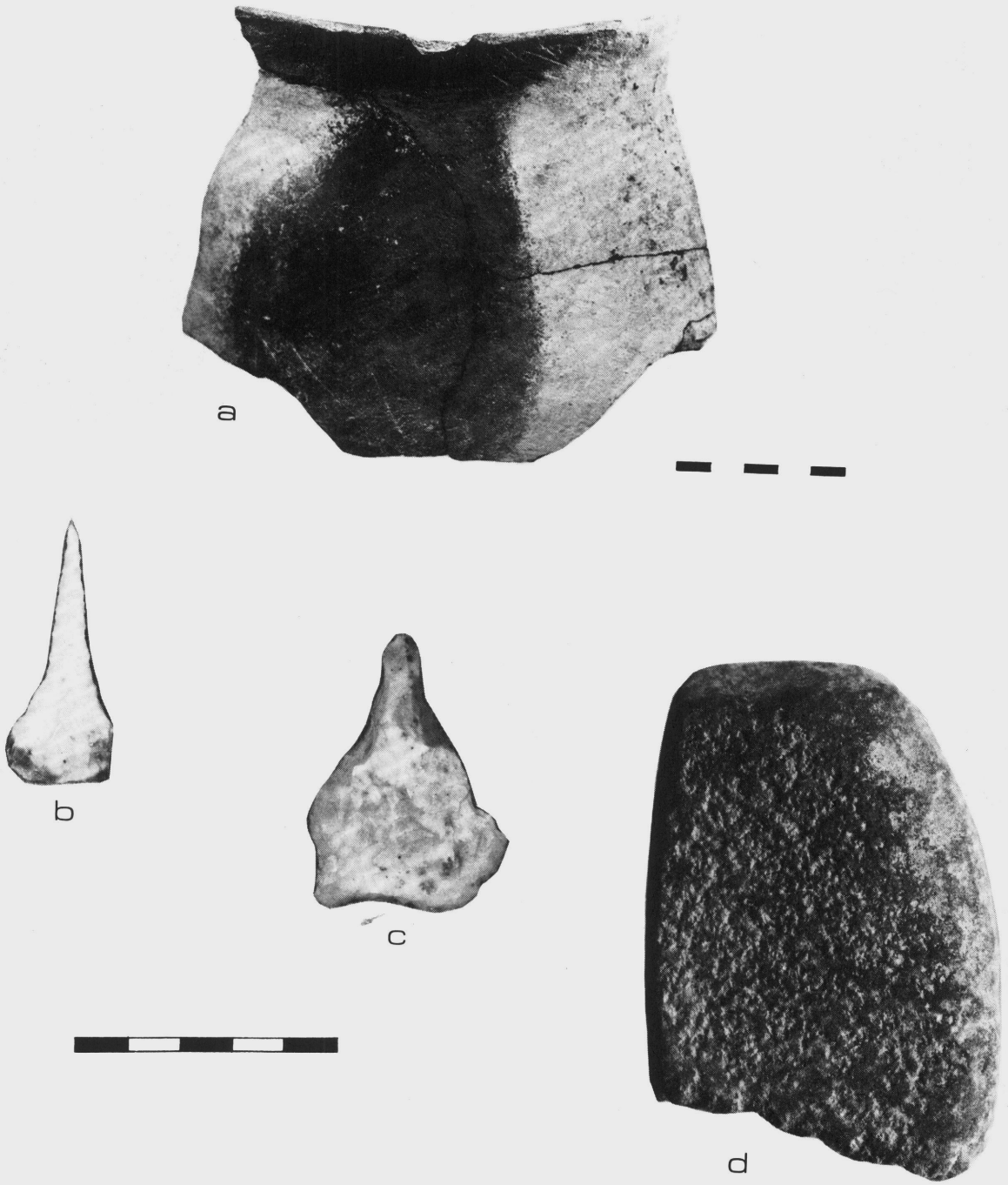


Figure 36

Chapter VI

Slivovitz Shelter

Slivovitz Shelter, located approximately 5 miles southwest of Adaven, was first noted in the summer of 1975 by a small field party from the University of California, Berkeley, engaged in a petroglyph survey of the region.

The site is a medium sized rockshelter formed by the mechanical weathering of the Tertiary Age Shingle Pass Tuff Formation (Kleinhampl and Ziony 1967) in the northeastern portion of the Quinn Canyon Range, Nye County, Nevada (T 3N, R 56E, Section 14). The shelter is within the boundaries of the Quinn Canyon District of the Humboldt National Forest and is designated as Ny-1272 in the files of the Nevada State Museum. Facing to the south, the site is at an elevation of ca. 7200 feet (2194 meters) and overlooks Pine Creek, an ephemeral stream draining into Garden Valley (Fig. 37).

Slivovitz Shelter is irregular in plan measuring ca. 30.0 meters east-west and 2.0 - 6.0 meters in depth. The floor is reasonably level inside the dripline with a slight rise and undulating surface occurring outside. The height of the shelter roof ranges from a mimimum of 50 - 60 cm near dripline overhang to approximately 1.0 meter in the central portion where roof fall has created several voids in the roof. When excavated to bedrock, the shelter had a height of ca. 1.5 - 2.0 meters from floor to ceiling allowing the excavation crew to stand comfortably in the shelter. A small apron is present in front of the site and a moderate to sharp slope leads from the edge downwards to the banks of Pine Creek.

At an elevation of 7200 feet, the site falls within the elevational boundaries of the Lower Slope Zone (6000 - 10,000 feet, 1829 - 3098 meters) as discussed previously in the Natural Setting section. Artemisia tridentata (sage), Pinus monophylla (pinyon pine), Juniperus osteosperma (juniper), Purshia tridentata (bitterbrush), Chrysothamnus naucsesous (rabbitbrush), Populus sp. (aspen), and various grasses and shrubs all occur either at the site or in its immediate vicinity.

Jackrabbit (Lepus californicus), cottontail (Sylvilagus sp.) and deer (Odocoileus hemonious) were the only mammalian fauna species noted at the shelter although traces of small rodents were seen.

Excavation Strategy

The decision to excavate at Slivovitz was made in the final week of the 1977 field season primarily to gather additional data for comparison with the lower elevation Civa II site and the site survey material. Consequently, the initial excavations at Slivovitz were conducted in the form of test pits to determine if the site warranted any further study or excavation.

The excavation was organized according to a north-south grid oriented on magnetic north and based on a datum stake set on the slope in front of the shelter mouth (Fig. 38). Initially three test units (N3E0, N5E0, N5E2) were selected for excavation in 20 cm arbitrary levels because of their position in the central, easily accessible portion of the shelter. That is, based on our assessment of the most suitable areas for aboriginal occupation and use of the site. An additional unit (N6W7) was chosen to check the depth of the deposit at the western edge of the site. Twenty cm arbitrary levels were chosen in light of the time and funds available for excavation and because they would still provide reasonable horizontal and vertical control of the recovered data for analysis. Based on the artifact yield and field analysis of the faunal materials indicating a temporary hunting/gathering camp of some importance, the decision was made to return to the shelter in early Fall to continue the careful excavation of the central portion of the site. A small field party returned and excavated 4 additional units in early October. Ten cm arbitrary levels were used in this instance to complete the nearly total excavation of the central occupation area.

In both cases, arbitrary levels were used because of the unstratified nature and natural disturbance of the deposits. The excavated fill was passed through on-quarter inch mesh and standard excavation records were kept. All units were completely excavated to bedrock and it is estimated that 40% of the surface area of the shelter was excavated.

The Deposits - General

The deposits of Slivovitz Shelter, like those of Civa II, are the result of elemental accumulation (wind-blown dust, rockfall), and organic remains mixed with varying quantities of faunal remains, lithic debitage and artifacts.

Evidence of small rodent nests and burrows was found throughout the deposit (cf. Fig. 39). An extensive hearth was noted in N3E0, N5E0 and extended into several surrounding units. Apparently this hearth area was utilized for several different occupations of the shelter (see Firehearths for a description). This hearth area was associated with many of the recovered artifacts.

The deposits were excavated from the surface down to a maximum depth of 120 cm before encountering the decomposing bedrock floor of the site. While dry for the upper 20-40 cm, the deposits were damp and became progressively moister with increasing depth, probably due to water seepage through natural fractures in the parent material of the shelter.

No clear natural stratigraphy was discernible during excavation but from the wall profiles of the units, several stratigraphic layers were recognized based primarily on their color and composition. The stratigraphy of the various units is discussed below.

Figure 37: Artist's View of Slivovitz Shelter.

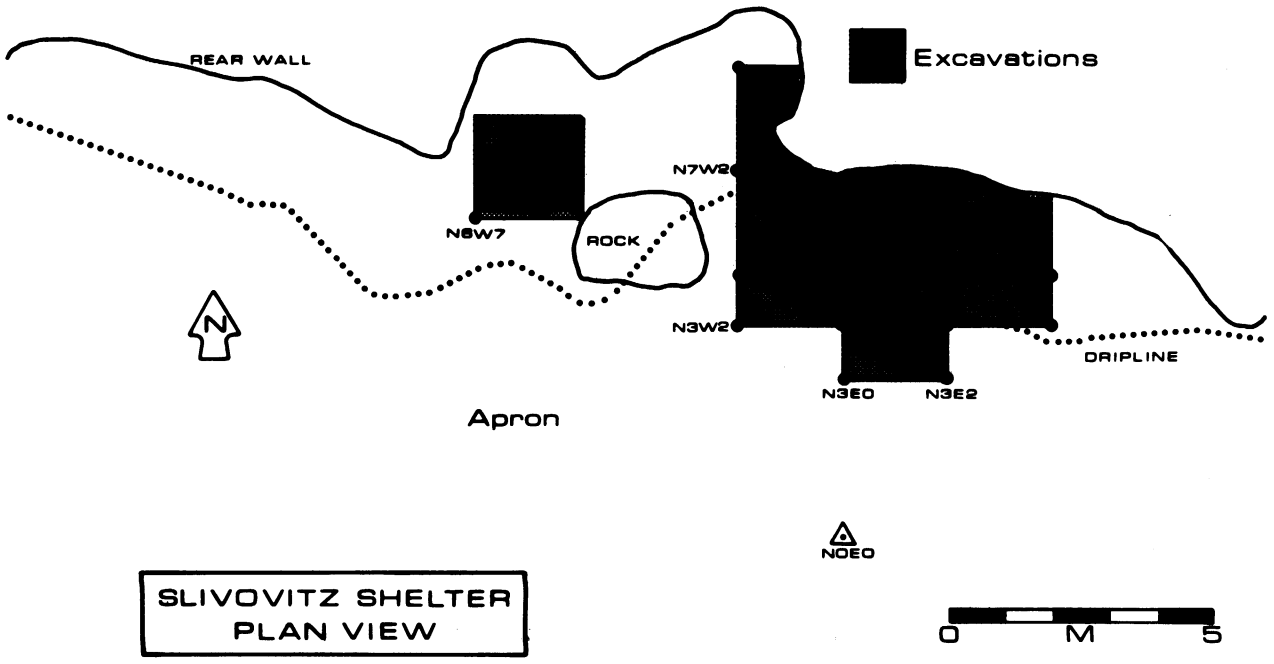


Figure 38: Plan View of Slivovitz Shelter.

Stratigraphic Unit Description (Figs. 39-41).

Soil samples from each stratigraphic layer were submitted to the Soils Laboratory, Department of Soils and Plant Nutrition, University of California, Berkeley, for standard soils tests. The technical data, courtesy of Mr. Jon Sandor, Department of Soils and Plant Nutrition, are incorporated into the below description. Appendix I should be consulted for the complete soils data. Terminology used is from the USDA Soil Survey Manual (1951).

Stratum A: This is a dark gray brown (10YR4/2 - dry; 10YR2/2 - moist) gravelly loam with varying quantities of vegetal material, rodent feces and angular roof fall material present. Pinyon nuts and hulls were present throughout this deposit. Unit N5E0 (east wall) incorporates 2 lenses of decomposing rat guano into the stratum. It is likely these are the remains of several nests. One ashy hearth is present in the north wall of N5E0. Rodent burrows and disturbance (cultural or natural) are found in both profiles of N5E0. Boundaries are clear and smooth with the underlying strata except in N5W2 where the boundary between A and C is gradual and smooth.

Stratum B: This is a silt loam, pale brown in color (10YR6/3 - dry; 10YR3/3 - moist) of possibly aeolian origin. It occurs in discontinuous patches in the excavated units and is compacted to some degree. Small amounts of faunal remains, artifacts, and lithic debitage are present. An apparently intrusive hearth is present in N5E0 (north wall) and a rodent hole is evident in the east wall.

Unit N5W2 is something of an anomaly. A thin B layer is present within Stratum A and another B unit is present below Stratum C. No explanation can be offered for this occurrence. Boundaries with the over and underlying units are abrupt to clear and smooth.

Stratum C: This very gravelly loam is dark gray to black in color (10YR4/1 - dry; 10YR2/1 - moist). It appears to be essentially burned soil mixed with charcoal and ash. Boundaries are abrupt and smooth to wavy except in N5W2 (see Stratum B).

Stratum D: This is almost totally decomposed bedrock and roof fall mixed with a few charcoal fragments and some lithic debitage. It is present only in N5W2 of the excavated units. Boundaries are abrupt and smooth.

Comment: Cultural materials were found throughout the deposit.

Firehearths

The excavations at Slivovitz Shelter exposed several distinct firehearths and 'ashy' concentrations that continued intermittently downwards to the base of the site. Several discrete hearths were noted but the majority of the ash and charcoal concentrations were indistinct (i.e., had no definite boundaries or significant depth) probably

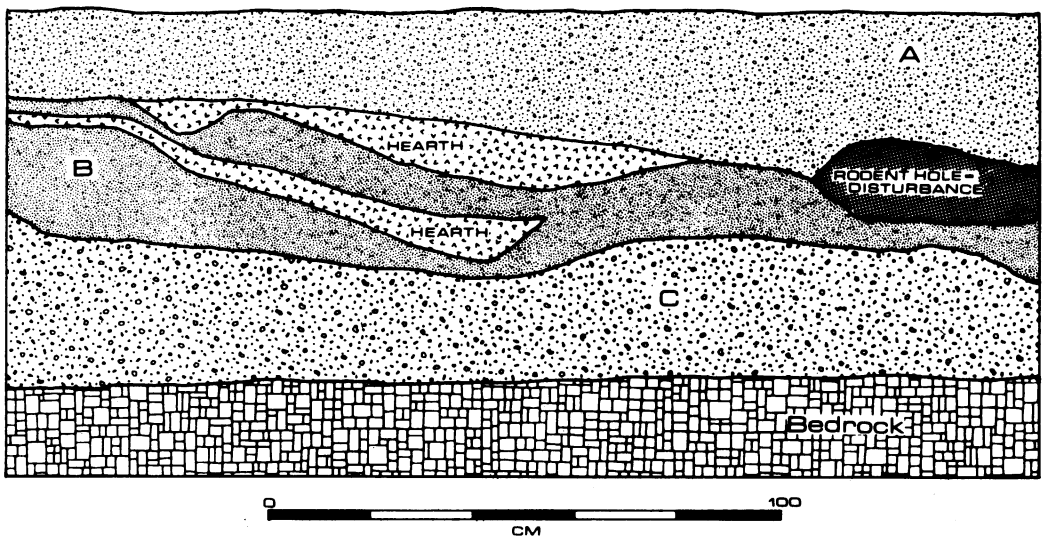


Figure 39: Slivovitz Shelter - North Wall Profile, N5E0.

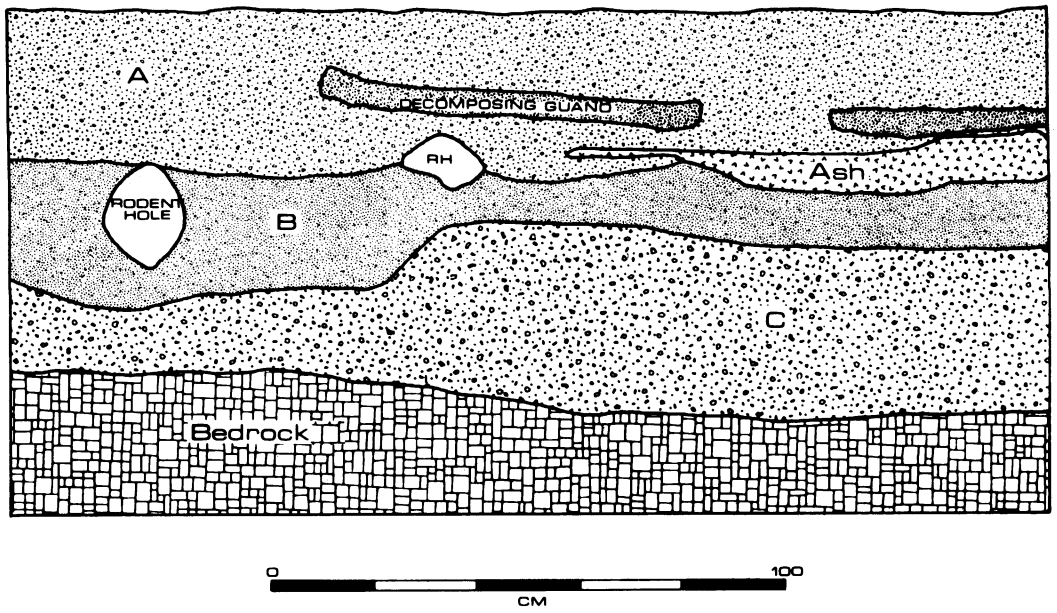


Figure 40: Slivovitz Shelter - East Wall Profile, N5E0.

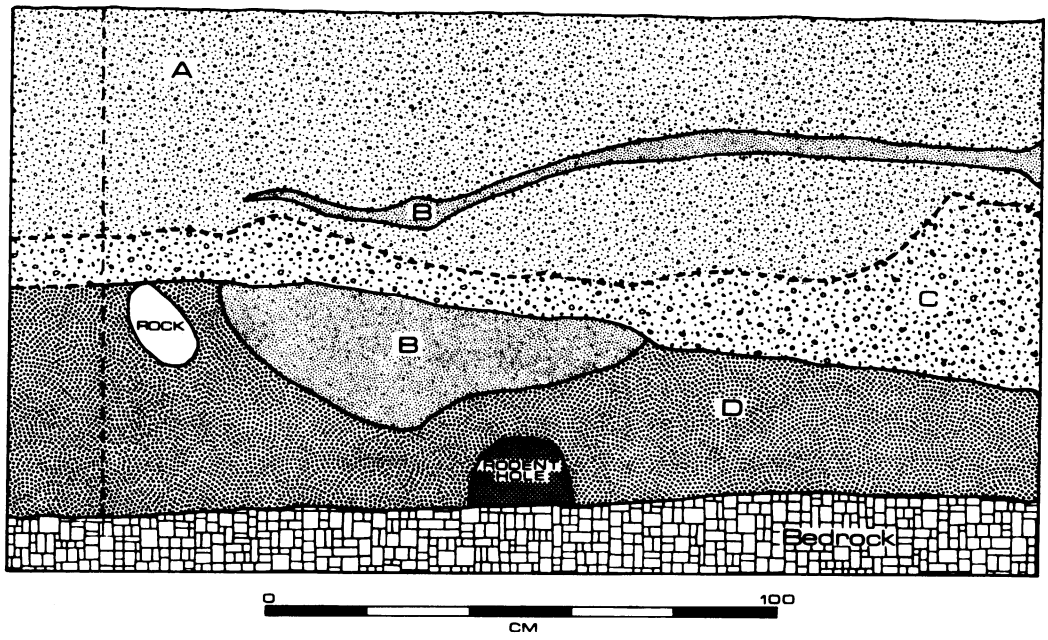


Figure 41: Slivovitz Shelter - North Wall Profile, N5W2.

due to slight mixing of the deposit by rodents and other natural/cultural means. Fire cracked rocks were noted throughout the fill and one hearth in N5E0, 80-100 cm below surface, with an inside diameter of 34-50 cm, had a ring of fire cracked rock encircling it. Another hearth in N3E2/E1/2, 20-30 cm below surface, with an elliptical form 60 cm x 43 cm had a similar ring of rocks present. A major hearth, denoted primarily by ash and charcoal fragments, was present in units N3E0 and N5E0 (Fig. 39). Its maximum concentration, based on the amount of ash present, appears to be between 20-40 cm and 80-100 cm below surface. This was probably a multiple-use hearth (i.e., used again and again over time) situated in the central portion of the shelter. Scattered ash and charcoal, quite probably from this hearth, was found in adjoining units at approximately the same depth. Another hearth, 75-100 cm in diameter was noted for the 0-20 cm level in N6W7.

Examination of some of the charcoal with a binocular microscope indicates that sagebrush, juniper and pinyon, all available in the area, were used as fuel sources. Many of the artifacts, pottery sherds, lithic debitage and faunal remains were found in the immediate or close vicinity of these hearth areas, especially the major hearth in N3E0 and N5E0.

In summary, scattered ash and charcoal long with several discrete hearths were noted during the excavation of Slivovitz Shelter with the majority of the recovered cultural materials coming from the hearth areas of N3E0 and N5E0.

Ceramics

A total of 524 sherds and 8 ceramic artifacts were recovered from Slivovitz Shelter. Of these, 92.9% are Shoshonean Tradition pottery and 7.1% are Fremont ceramic types. All are within the ranges of variability noted in the published descriptions for these wares (see Civa II ceramics section).

Fremont Pottery

The 37 sherds belonging to the Fremont tradition have been typed as Snake Valley Grey Ware (15), Snake Valley Black-on-Grey (13) and Snake Valley Corrugated (9). Snake Valley Grey and Snake Valley Black-on-Grey are typical of the Summit and Paragonah Phases (A.D. 900-1200) of the Parowan Fremont subarea (Marwitt 1970; Madsen 1977). Snake Valley Corrugated Ware is also typical of this area but has been placed within a more restricted time span (A.D. 1100-1200, Paragonah Phase, Madsen 1977).

A fugitive red wash is present on the exterior surfaces of the Gray and Black-on-Grey wares. Wall thicknesses average: Snake Valley Grey (4.4 mm); Snake Valley Black-on-Grey (4.7 mm); and Snake Valley Corrugated (5.9 mm). Four rim sherds of Snake Valley Black-on-Grey ware were recovered. They suggest bowls (rim types IA3 and IA4, 2 of each, using Colton 1952 nomenclature) of ca. 26-35 cm in diameter. The low luster black designs on the interior surfaces of the Black-on-Grey sherds are in the Sosi style and consist of lines, angles and spirals. The Fremont sherds are distributed throughout the deposits.

Shoshonean Tradition Pottery

The 487 sherds of Shoshonean ceramics are within the ranges of variation known for Shoshone ware. The sherds are present in all levels of the deposit, although there are fewer at the lower levels. Wall thicknesses vary, ranging from 3.4 mm to 7.7 mm and averaging 5.7 mm. The sherds are primarily dark grey in color and crude in construction. Wiping marks and evidence of both coiling and paddle-and-anvil construction are present. A reconstructed portion of a 'flowerpot' vessel (IA4, 33-36 cm diameter) was recovered (N3E0, 0-20, 20-40 cm). The 40 rim sherds from Slivovitz are mostly (31) of the straight walled 'flowerpot' variety: IA1 (2); IA2 (1); IA3 (11); IA4 (9); IA5 (2); IA6 (4); IA7 (1); and IA11 (1). Diameters for these vessels range from 7.0 - 35.0 cm. The remaining 9 rim sherds have been typed as: IB3 (4); diameters range from 10.0 - 30.0 cm; IB4 (1); 15.0 - 30.0 cm diameter; IC7 (1); 8.0 - 15.0 cm diameter; and 3 sherds which are too fragmentary to effectively describe.

Ceramic Artifacts

Pendant (Fig. 43a).

One rim sherd from a Snake Valley Black-on-Grey bowl has been edgeground

around the circumference and a hole has been biconically drilled in the upper left corner (4.0 cm wide). The surface design is in the Sosi Style and features a spiral. The piece is roughly rectangular (58.4 mm x 50.8 mm). The outer surface shows a grease stain, probably from having been worn next to the body. Provenience is N5E2, 40-60 cm.

Formed Pottery Sherds (Fig. 43d).

One slightly curved Shoshone sherd has been worked into an ovate shape (65.2 mm x 33.3 mm). It is similar to the description given by Marwitt (1970: 63-66) for his category. The function of this specimen is unknown. Provenience is N5W2, 57 cm.

Miscellaneous Ground Sherds (Fig. 43b).

Four sherds have been assigned to this category. One Snake Valley Black-on-Grey sherd, featuring a linear Sosi Style design, has been ground into a rectangular shape. Three sides show edge grinding but the fourth side, which was probably also ground, is broken. The piece measures 35.8 mm in width. Provenience is N3E0, 60-80 cm.

Three Shoshone sherds, each having one ground edge, are also present. Due to their fragmentary nature, their shapes or functions cannot be determined. One piece shows some surface smoothing and may have been used as a pottery scraper (N7W2, 67 cm). Proveniences of the other two specimens are N3E2, 30-40 cm and N5W2, 50-60 cm.

Drilled Sherd

One Shoshone fragment has broken on a hole which had been biconically drilled through the sherd. The hole had a diameter of 3.8 mm. This specimen is probably a fragment from a mended vessel. Provenience is N3E0, 0-10 cm.

Ochre Grinder (Fig. 43c).

A large irregularly shaped sherd of Snake Valley Black-on-Grey ware has ochre stains present on 3 of its edges. In addition, both surfaces of the sherd have faint ochre fingerprints present. The specimen measures 70.6 mm x 62.5 mm at its widest points. The sherd was probably utilized either to grind or apply ochre. Provenience is N5E2, 20-30 cm.

Discussion

Shoshonean groups were frequent occupants of Slivovitz Shelter as evidenced by the percentage of Shoshonean Tradition pottery present. Shoshonean ceramics in southeastern Nevada have tentatively been assigned a time range of ca. A.D. 1000 to

postcontact times (Fowler, et.al. 1973). Trade ware or temporary use of the shelter by people of the Parowan Fremont subarea is indicated by the small amount of Fremont ceramics present. Chronologically the Fremont wares date from A.D. 900-1200 for the Snake Valley Grey and Black-on-Grey and A.D. 1000-1200 for the Snake Valley Corrugated type (Madsen 1977). D. Madsen and Lindsay (1977) suggest that Snake Valley Corrugated may be dated earlier than A.D. 1100, but unfortunately Slivovitz cannot provide any evidence to substantiate this. Both Fremont and Shoshone ceramics were found in association throughout the deposit. This contemporaneity is also present at Civa II and Avocado Shelter as well as at several of the open sites in the region. An occupation date of A.D. 900 to postcontact times is suggested for Slivovitz. This is in agreement with the known time ranges for the recovered projectile points.

Projectile Points

One hundred and twenty-eight chipped stone artifacts were classified as typable projectile points or projectile point fragments. Type classification follows the standard typologies established and in use for the Great Basin (cf. Hester and Heizer 1973a for a discussion).

Desert Side Notched (Table 17, Fig. 42a-i).

Specimens: Complete (11); Incomplete (10)
Material: Chert (12); Obsidian (9)
Description: These are generally small, slender triangular points with slightly convex sides. Fine side notches range from 1.0 - 2.9 mm in depth and basal notches or concavities, ranging from 0.9 - 4.3 mm in depth, are present on five specimens. The flaking is fine pressure and very well done in general. Cross sections are plano-convex (6) and biconvex (14).

Cottonwood Triangular (Tables 17, 18, Fig. 42j-p).

Specimens: Complete (10); Incomplete (31)
Material: Chert (22); Obsidian (18); Rhyolite (1)
Description: These points are triangular to elongate triangular in outline with slightly convex to straight blade edges. The bases are straight to slightly concave with depths ranging from 1.7 - 3.4 mm. The flaking is pressure, moderately well done, and the cross sections are plano-convex (10) and biconvex (30).

Rose Spring Corner Notched (Tables 18-21, Fig. 42s-bb, dd).

Specimens: Complete (15); Incomplete (33)
Material: Chert (38); Obsidian (10)
Description: These are generally small slender (occasionally elongate) triangular points with slightly convex to straight blade edges. The barbs are pointed to somewhat rounded with slight to medium protrusion. The notching is generally wide at ca. 45^{o}

to the long axis of the point and ranges from 0.8 - 7.1 mm in depth. The stems have a slight expansion with slightly concave bases. The flaking is pressure and well done on the majority of the specimens. Cross sections are planoconvex (8) and biconvex (39) and biplano (1).

Eastgate Series (Table 18, Fig. 42q-r).

Specimens: Complete (1); Incomplete (8)
Material: Chert (7); Obsidian (1)
Description: These are small, somewhat elongate triangular projectile points with straight to slightly convex sides. The barb ends are squared with the notching (2.0 - 4.3 mm in depth) generally parallel to the basal portion of the lateral edge. The barb bases are the maximum width position and only one of the specimens has the distinct centralized basal notch of the Split Stem variety. The stems are slightly expanding to straight. The pressure flaking is well done. Cross sections are plano-convex (5) and biconvex (4). As at Civa II, these specimens intergrade into the Rose Spring Corner Notched type.

Elko Corner Notched (Table 20, Fig. 42ee).

Specimens: Incomplete (2)
Material: Chert (1); Obsidian (1)
Description: These are similar to the point recovered from Civa II in that they are medium sized, triangular projectile points with straight to slightly convex sides. The barbs are slightly rounded and moderately projecting. The notching appears to be at an angle to the lateral edge and the proximal barb area is the maximum width position. The stems are expanding and the cross sections biconvex.

Elko Eared (Table 20, Fig. 42ff).

Specimens: Incomplete (1)
Material: Chert
Description: This is a basal fragment of an Elko Eared point similar to the specimens from Civa II. The flaking is moderately well done and the cross section is biconvex.

Humboldt Concave Base A (Table 20, Fig. 44f).

Specimens: Incomplete (1)
Material: Obsidian
Description: This is a basal fragment of a HCB-A point. The widest point is at the base and the basal concavity has a depth of 3.1 mm. The flaking is moderately well done and the cross section biconvex.

Rose Spring Contracting Stem Preform (?) (Table 20, Fig. 44h).

Specimens: Incomplete (1)

Material: Obsidian
Description: This is a medium sized projectile point with a contracting stem. The specimen has been both percussion and pressure flaked and is obviously unfinished. In general outline, the piece resembles a RSCS projectile point and it is possible that this point can be classified as a specific type preform. The cross section is biconvex and the stem measures 5.0 mm in length and 11.9 mm in width. A large portion of the tip and a lateral edge are missing.

Discussion/Comments

The projectile point sequence from Slivovitz Shelter represents a temporal range from 6400 B.C. to postcontact times. Six distinct series of projectile points are known: Desert Side Notched, Cottonwood, Rose Spring/Eastgate, Elko and Humboldt Series. These have been discussed previously for both Civa Shelter II and the Coal Valley Dry Lake localities.

The majority of the projectile points fall into the DSN, CT and RS/EG series, leading to the conclusion that the shelter is a late occupation site, A.D. 600 to post-contact times, with the presence of the earlier point types probably due either to reuse/collection by later occupants or their possible continuance into later times (cf. Civa II and Coal Valley Dry Lake discussion sections on the chronological ranges of the Elko and Humboldt Series). This proposed late occupation is consistent with the known range of dates for the Fremont and Shoshone ceramics found throughout the deposit.

Stratigraphically the majority of the points are found between 20-80 cm in depth. This correlates with both the biface and projectile point fragment distributions for the site. The concentration of points in several of the excavation units is similar to the pattern present for both the biface and projectile point fragment categories. This suggests perhaps that a specialized activity area may be present at the site (cf. Biface and Projectile Point fragments for a discussion).

The large number of complete and fragmentary projectile points present, compared to Civa II, suggests and argues for a temporary hunting/gathering camp (with emphasis on the hunting of bighorn) of some duration intermittently occupied over an unknown period of time.

Projectile Point Fragments

Ninety non-diagnostic projectile point fragments were recovered from the site. Chert is the preferred raw material choice (74.4%) with obsidian (24.4%) and rhyolite (1.2%) following. Distal fragments comprise 57.8% of this category (chert 73.1%, obsidian 25.0%, rhyolite 1.9%) with medial sections (17.8%), lateral fragments (23.3%) and proximal specimens (1.1%) following.

The majority of the fragments are pressure flaked and biconvex or plano-convex in cross section.

PROJECTILE POINT DATA

UCLMA#	Type	Status	L	W	T	Wt.	CS	Material	BN	SN/CN	Provenience
2-60651	DSN	Frag.	18.2	-	2.7	-	PC	Obsidian	4.3	2.9	N5E0 - 20-40
2-60667	DSN	Frag.	-	-	2.8	-	BC	Chert	-	-	N5E0 - 40-60
2-60669	DSN	Frag.	-	14.5	3.0	-	PC	Obsidian	-	2.8	N5E0 - 40-60
2-60674	DSN	Comp.	22.2	10.2	3.0	0.5	BC	Chert	1.5	1.2	N5E0 - 60-80
2-60682	DSN	Frag.	-	11.0	2.9	-	BC	Obsidian	-	-	N5E0 - 60-80
2-60684	DSN	Comp.	10.6	10.2	2.3	0.1	PC	Obsidian	-	1.2	N5E0 - 60-80
2-60690	DSN	Comp.	26.3	13.0	3.8	0.8	PC	Chert	3.0	2.4	N5E0 - Sidewall
2-60732	DSN	Comp.	18.2	10.6	2.2	0.5	BC	Obsidian	2.0	1.4	N3E0 - 0-10
2-60738	DSN	Frag.	-	-	4.0	-	BC	Chert	-	2.0	N3E0 - 20-40
2-60886	DSN	Frag.	-	-	2.5	-	BC	Obsidian	-	2.0	N3E0 - 80-100
2-60904	DSN	Comp.	15.8	8.9	1.9	0.5	PC	Chert	-	1.0	N5E2 - 0-10
2-60918	DSN	Frag.	-	-	2.9	-	PC	Chert	-	1.0	N5E2 - 20-40
2-60924	DSN	Frag.	23.4	-	2.9	-	BC	Chert	-	2.3	N5E2 - 40-60
2-60925	DSN	Frag.	-	12.7	1.9	-	-	Chert	-	-	N5E2 - 40-60
2-60952	DSN	Comp.	18.3	12.0	2.9	0.5	BC	Chert	-	1.8	N5E2 - 60-80
2-60963	DSN	Comp.	35.1	13.4	4.6	1.7	BC	Chert	-	2.9	N5E2 - 60-80
2-61193	DSN	Comp.	33.9	12.8	3.0	1.1	BC	Chert	-	1.0	N5W2 - 47
2-61343	DSN	Comp.	34.7	11.9	3.2	0.9	BC	Obsidian	-	1.0	N3E2 - 65
2-61414	DSN	Comp.	20.5	19.0	2.5	0.6	BC	Chert	-	1.5	N7W2 - 10-20
2-61417	DSN	Comp.	17.5	9.0	2.7	0.5	BC	Obsidian	0.9	0.9	N7W2 - 10-20
2-61436	DSN	Frag.	-	10.9	2.7	-	BC	Obsidian	-	2.1	N7W2 - 30-40
2-60638	CT	Frag.	-	15.0	3.1	-	BC	Obsidian	-	-	N5E0 - 0-20
2-60647	CT	Frag.	-	20.0	4.2	-	BC	Chert	-	-	N5E0 - 20-40
2-60648	CT	Frag.	-	17.0	3.8	-	PC	Chert	-	-	N5E0 - 20-40
2-60666	CT	Frag.	-	16.8	3.5	-	BC	Obsidian	-	-	N5E0 - 40-60
2-60676	CT	Comp.	13.0	10.0	2.0	0.5	PC	Chert	-	-	N5E0 - 60-80
2-60677	CT	Frag.	-	14.5	3.0	-	BC	Obsidian	-	-	N5E0 - 60-80
2-60688	CT	Frag.	-	19.5	3.1	-	PC	Obsidian	-	-	N5E0 - Sidewall
2-60691	CT	Comp.	24.1	10.8	2.5	0.7	PC	Obsidian	-	-	N5E0 - Sidewall
2-60700	CT	Frag.	-	15.0	4.2	-	PC	Chert	-	-	N5E0 - 80-100
2-60704	CT	Frag.	-	22.8	5.6	-	BC	Chert	-	-	N5E0 - 80-100
2-60710	CT	Frag.	-	17.4	3.5	-	BC	Chert	-	-	N6W7 - 0-20
2-60737	CT	Comp.	16.1	12.5	3.2	0.5	BC	Chert	1.7	-	N3E0 - 20-40
2-60741	CT	Comp.	18.1	10.0	3.0	0.5	BC	Chert	2.0	-	N3E0 - 20-40
2-60749	CT	Frag.	25.1	-	4.6	-	BC	Chert	-	-	N3E0 - 20-40
2-60765	CT	Comp.	24.1	14.0	3.1	0.7	BC	Obsidian	3.4	-	N3E0 - 40-60
2-60772	CT	Frag.	-	19.1	5.5	-	PC	Obsidian	-	-	N3E0 - 60-80

BN - Basal Notch Depth
SN/CN - Side/Corner Notch Depth
CS - Cross section (Plano-convex, Biconvex)

(All measurements in mm and grams)

Table 17

Table 18

PROJECTILE POINT DATA

UCLMA#	Type	Status	L	W	T	Wt.	CS	Material	BN	SN/CN	Provenience
2-60782	CT	Frag.	-	16.3	3.5	-	BC	Rhyolite	-	-	N3E0 - 60-80
2-60885	CT	Frag.	-	17.2	4.5	-	BC	Chert	-	-	N3E0 - 80-100
2-60895	CT	Comp.	25.7	11.1	3.0	0.8	BC	Obsidian	-	-	N3E0 - 100-120
2-60902	CT	Frag.	-	17.8	3.7	-	BC	Chert	-	-	N5E2 - 0-20
2-60914	CT	Frag.	-	-	4.0	-	BC	Obsidian	-	-	N5E2 - 20-40
2-60927	CT	Frag.	-	-	3.0	-	PC	Obsidian	-	-	N5E2 - 40-60
2-60933	CT	Frag.	-	10.5	2.5	-	PC	Chert	-	-	N5E2 - 40-60
2-60945	CT	Frag.	-	17.5	4.0	-	BC	Chert	-	-	N5E2 - 60-80
2-60958	CT	Comp.	17.0	10.8	2.2	0.4	BC	Obsidian	-	-	N5E2 - 60-80
2-60962	CT	Frag.	-	12.0	4.1	-	BC	Chert	-	-	N5E2 - 60-80
2-61166	CT	Frag.	-	14.1	4.0	-	BC	Obsidian	-	-	N5W2 - 20-30
2-61185	CT	Frag.	-	12.5	3.0	-	BC	Chert	-	-	N5W2 - 30-40
2-61199	CT	Comp.	34.3	14.9	3.8	1.4	BC	Chert	-	-	N5W2 - 49
2-61200	CT	Frag.	-	18.0	3.5	-	BC	Obsidian	-	-	N5W2 - 40-50
2-61201	CT	Comp.	22.0	14.3	3.1	0.7	BC	Obsidian	-	-	N5W2 - 40-50
2-61225	CT	Frag.	-	-	3.8	-	BC	Chert	-	-	N5W2 - 50-60
2-61229	CT	Frag.	22.0	-	2.6	-	BC	Obsidian	-	-	N5W2 - 40-50
2-61239	CT	Frag.	24.0	-	4.0	-	BC	Chert	-	-	N5W2 - 60-70
2-61246	CT	Comp.	18.5	11.2	3.0	1.0	BC	Obsidian	-	-	N5W2 - 60-70
2-61288	CT	Frag.	15.8	-	1.7	-	PC	Obsidian	-	-	N3E2 - 0-10
2-61295	CT	Frag.	-	16.0	2.5	-	PC	Chert	-	-	N3E2 - 10-20
2-61364	CT	Frag.	22.0	-	-	-	-	Chert	-	-	N3W2 - 0-10
2-61445	CT	Frag.	24.6	-	4.6	-	BC	Chert	-	-	N7W2 - 40-50
2-61469	CT	Frag.	-	11.8	3.2	-	BC	Chert	-	-	N5E0 - 40-60
2-61481	CT	Frag.	19.0	-	2.1	-	BC	Obsidian	-	-	N3E2 - 50-60
2-60725	EES	Frag.	-	18.2	3.4	-	BC	Obsidian	2.0	-	N3E0 - 0-20
2-60892	EES	Frag.	-	17.9	3.2	-	BC	Chert	3.0	-	N3E0 - 100-120
2-60919	EES	Frag.	-	20.0	3.0	-	PC	Chert	2.6	-	N5E2 - 20-40
2-60955	EES	Frag.	-	20.8	2.1	-	PC	Obsidian	3.4	-	N5E2 - 60-80
2-60956	EES	Frag.	-	15.3	3.1	-	PC	Chert	3.7	-	N5E2 - 60-80
2-61210	EES	Frag.	27.3	-	3.2	-	BC	Chert	4.3	-	N5W2 - 40-50
2-61272	EES	Frag.	31.3	16.7	3.4	-	BC	Chert	3.4	-	N5W2 - 90
2-61331	EES	Comp.	28.2	17.6	4.6	2.4	PC	Chert	-	1.2	N3E2 - 53
2-61407	ESS	Frag.	-	17.3	4.0	-	PC	Chert	3.9	-	N7W2 - 10
2-60664	RSCN	Comp.	29.4	14.3	2.0	1.2	PC	Obsidian	-	3.0	N5E0 - 40-60
2-60683	RSCN	Frag.	-	17.5	2.8	-	BC	Chert	-	5.7	N5E0 - 60-80
2-60685	RSCN	Frag.	-	15.8	2.7	-	BC	Chert	-	4.1	N5E0 - 60-80

BN - Basal Notch Depth
SN/CN - Side/Corner Notch Depth
CS - Cross section (Plano-convex, Biconvex)

(All measurements in mm and grams)

PROJECTILE POINT DATA

UCLMA#	Type	Status	L	W	T	Wt.	CS	Material	BN	SN/CN	Provenience
2-60692	RSCN	Frag.	-	11.8	3.4	-	BC	Chert	-	-	N5E0 - Sidewall
2-60719	RSCN	Frag.	-	-	3.7	-	PC	Obsidian	-	-	N6W7 - 0-20
2-60742	RSCN	Frag.	-	13.7	2.4	-	BC	Obsidian	-	3.6	N3E0 - 20-40
2-60773	RSCN	Comp.	23.3	15.5	2.5	1.1	BP	Chert	-	3.4	N3E0 - 60-80
2-60783	RSCN	Frag.	-	21.9	3.0	-	PC	Chert	-	-	N3E0 - 60-80
2-60785	RSCN	Frag.	-	18.7	2.9	-	BC	Chert	-	2.9	N3E0 - 60-80
2-60878	RSCN	Frag.	-	12.2	3.7	-	BC	Chert	-	-	N3E0 - 80-100
2-60881	RSCN	Frag.	-	13.0	2.6	-	BC	Chert	-	4.5	N3E0 - 80-100
2-60882	RSCN	Frag.	-	17.3	4.1	-	BC	Chert	-	7.1	N3E0 - 80-100
2-60884	RSCN	Frag.	-	17.0	3.7	-	BC	Chert	-	-	N3E0 - 80-100
2-60906	RSCN	Comp.	31.2	10.9	2.3	1.2	PC	Chert	-	3.8	N5E2 - 0-20
2-60931	RSCN	Frag.	-	16.2	3.7	-	BC	Chert	-	3.8	N5E2 - 40-60
2-60947	RSCN	Comp.	19.8	10.3	1.7	0.6	BC	Obsidian	-	1.0	N5E2 - 60-80
2-60949	RSCN	Comp.	25.5	12.5	3.4	1.2	BC	Chert	-	3.4	N5E2 - 60-80
2-60954	RSCN	Frag.	-	13.7	3.4	-	BC	Chert	-	4.8	N5E2 - 60-80
2-61182	RSCN	Frag.	-	16.8	3.9	-	BC	Chert	-	-	N5W2 - 30-40
2-61184	RSCN	Frag.	-	-	3.0	-	PC	Chert	-	4.4	N5W2 - 30-40
2-61231	RSCN	Comp.	30.2	13.1	3.2	1.2	BC	Chert	-	4.7	N5W2 - 50-60
2-61240	RSCN	Comp.	28.7	16.2	2.9	1.3	PC	Obsidian	-	4.3	N5W2 - 60-70
2-61262	RSCN	Comp.	25.0	12.9	2.4	0.9	BC	Chert	-	1.8	N5W2 - 74
2-61263	RSCN	Frag.	-	13.2	2.9	-	BC	Chert	-	-	N5W2 - 70-80
2-61273	RSCN	Comp.	36.7	22.8	3.4	2.8	BC	Obsidian	-	3.6	N5W2 - 86
2-61275	RSCN	Frag.	-	19.9	3.6	-	BC	Chert	-	-	N5W2 - 80-90
2-61286	RSCN	Frag.	-	15.8	3.8	-	BC	Chert	-	3.4	N3E2 - 0-10
2-61293	RSCN	Frag.	-	-	3.5	-	BC	Chert	-	3.7	N3E2 - 10-20
2-61315	RSCN	Frag.	-	-	2.7	-	BC	Chert	-	-	N3E2 - 30-40
2-61324	RSCN	Comp.	26.7	16.4	2.8	1.2	BC	Obsidian	-	3.3	N3E2 - 40
2-61330	RSCN	Comp.	30.6	15.5	3.9	1.5	BC	Chert	-	2.7	N3E2 - 56
2-61335	RSCN	Comp.	32.0	12.0	3.6	1.8	BC	Chert	-	4.1	N3E2 - 54
2-61336	RSCN	Comp.	23.5	13.9	3.7	1.2	PC	Chert	-	0.8	N3E2 - 50-60
2-61391	RSCN	Frag.	-	-	3.0	-	BC	Obsidian	-	2.9	N3W2 - 40-50
2-61387	RSCN	Frag.	-	15.0	4.1	-	BC	Chert	-	2.8	N3W2 - 30-40
2-61406	RSCN	Comp.	32.3	18.2	4.0	1.8	BC	Obsidian	-	4.0	N7W2 - 0-10
2-61409	RSCN	Frag.	-	19.1	3.9	-	BC	Chert	-	4.6	N7W2 - 0-10

BN - Basal Notch Depth
SN/CN - Side/Corner Notch Depth
CS - Cross section (Plano-convex, Biconvex, Biplano)

(All measurements in mm and grams)

Table 19

PROJECTILE POINT DATA

UCLMA#	Type	Status	L	W	T	Wt.	CS	Material	BN	SN/CN	Provenience
2-61410	RSCN	Comp.	20.5	13.3	4.0	1.2	BC	Chert	-	3.5.	N7W2 - 0-10
2-61418	RSCN	Frag.	-	12.1	3.5	-	BC	Chert	-	2.7	N7W2 - 10-20
2-61429	RSCN	Frag.	-	-	2.8	-	-	Chert	-	-	N7W2 - 30-40
2-61432	RSCN	Frag.	25.6	14.9	2.0	1.0	BC	Obsidian	-	2.7	N7W2 - 30-40
2-61435	RSCN	Frag.	-	-	2.6	-	BC	Chert	-	3.4	N7W2 - 30-40
2-61442	RSCN	Frag.	-	15.3	3.1	-	BC	Chert	-	3.7	N7W2 - 40-50
2-61449	RSCN	Frag.	-	16.6	3.3	-	BC	Chert	-	2.4	N7W2 - 50-60
2-61454	RSCN	Frag.	-	-	3.0	-	PC	Chert	-	5.4	N7W2 - 50-60
2-61457	RSCN	Frag.	-	18.7	3.6	-	BC	Chert	-	4.0	N7W2 - 60-70
2-61470	RSCN	Frag.	-	-	2.9	-	BC	Chert	-	2.6	N5E0 - 40-60
2-61492	RSCN	Frag.	-	-	2.1	-	BC	Obsidian	-	2.5	N5W2 - 20-30
2-60939	RSCS	Comp.	30.7	11.6	2.9	1.2	PC	Obsidian	-	1.8	N5E2 - 40-60
2-60727	Elko Series	Frag.	-	22.0	4.0	-	BC	Chert	-	-	N3E0 - 0-20
2-61444	"	Frag.	-	-	3.1	-	PC	Chert	-	-	N7W2 - 40-50
2-60951	ElkoCN	Frag.	-	24.0	4.8	-	BC	Obsidian	-	-	N5E2 - 60-80
2-61219	ElkoCN	Frag.	-	25.2	4.4	-	BC	Chert	-	-	N5W2 - 58
2-61421	ElkoE	Frag.	-	29.0	4.0	-	BC	Chert	-	-	N7W2 - 20
2-61311	HCB	Frag.	-	20.1	5.7	-	BC	Obsidian	3.1	-	N3E2 - 33
2-61202	RSCS(?)	Frag.	39.6	29.2	8.0	-	BC	Obsidian	-	-	N3E2 - 33

BN - Basal Notch Depth
SN/CN - Side/Corner Notch Depth
CS - Cross section (Plano-convex, Biconvex)

(All measurements in mm and grams)

Table 20

Since the specimens are non-diagnostic (i.e., cannot be identified as to a known type), no further analysis will be attempted. It should be noted, however, that the fragments are probably portions of previously described projectile point series, especially the small triangular points.

Discussion

Stratigraphically the majority of the fragments are distributed between 20-80 cm. This correlates with both the biface fragment and typable projectile point distributions. Overall, the bifaces, projectile points and projectile point fragments are concentrated in units N3E0, N5E0, N5E2, and N5W2 (Fig. 38).

Units N5E0 and N5E2 both have a high proportion of projectile point distal fragments present. This, coupled with the large amount of faunal remains present (see Faunal Remains) in the units suggests perhaps a bone discardal or specialized activity area during the butchering process. The number of complete projectile points, biface fragments and projectile point fragments would appear to support this hypothesis, since, if butchering of game animals (Ovis canadensis) was carried out at the site, the projectile points (and fragments) used in hunting and the tools used in the butchering process (e.g., bifaces, choppers, etc. would be concentrated in one or more areas. This appears to be the case at Slivovitz).

Bifaces (Table 22).

Five bifacially chipped stone specimens were recovered that could be assigned to the biface typology discussed previously for the Garden/Coal Valley Region.

Type I - Ovate (Fig. 44a).

A single percussion flaked chert specimen with one damaged lateral edge was recovered. Provenience is N6W7 - 0-20 cm.

Type IIIa - Elongate Triangular (Fig. 44b-c).

Two chert specimens, all with their distal ends missing, are included in this category. A combination of percussion and pressure flaking is found on all of the specimens. These bifaces have been thinned and it is possible that they could be included in a general preform category. Proveniences are N3E0, 60-80 cm and N5W2, 79 cm.

Type Va - Limande (Fig. 44d).

One small chert biface of this type was recovered. The distal portion has been snapped off and the flaking type is percussion. Provenience is N7W2 - 9 cm.

Table 21

Projectile Point Metric Attributes

Category	L	W	T	Wt.	Total #
Desert Side Notched (DSN)	10.6 - 35.1	8.9 - 19.0	1.9 - 4.6	0.1 - 1.7	21
Cottonwood Triangular (CT)	13.0 - 34.3	10.0 - 22.8	1.7 - 5.6	0.4 - 1.4	41
Eastgate Expanding Stem (EES)	31.3+	15.3 - 20.8	2.1 - 4.6	2.4+	8
Eastgate Split Stem (ESS)	-	17.3	4.0	-	1
Rose Spring Corner Notched (RSCN)	19.8 - 32.3	11.8 - 22.8	1.7 - 4.6	0.9 - 2.8	48
Rose Spring Contracting Stem (RSCS)	30.7	11.6	2.9	1.2	1
Elko Series (unidentified, Corner Notched and Eared)	-	22.0 - 29.0	3.1 - 4.8	-	5
Humboldt Concave Base (HCB)	-	20.1	5.7	-	1

(All measurements in mm and grams)

Discussion/Comments

The low number of complete specimens (5) recovered compared to the large number of biface fragments (152) apparently indicates an extremely high breakage rate, quite possibly during use or manufacture, although the concentration of fragments with the faunal remains appears to suggest the former.

The typable bifaces are similar to those from Civa II, the Coal Valley Dry Lake localities and from surface collections in the study area. These artifacts quite probably represent cutting, scraping or sawing tools. The thinning and degree of finish on several of the specimens (esp. Type IIIa) suggests an intermediate stage of manufacture. These could possibly be 'preforms' that could have been further modified into projectile points or other bifacial artifacts.

Biface Fragments

One hundred and fifty-two non-diagnostic biface fragments were recovered from the deposits of Slivovitz Shelter. Chert is the dominant raw material choice (99.3%) with obsidian use almost nonexistant (0.7%). Distal fragments make up 25.7% of this category with medial sections (19.1%), lateral fragments (28.3%) and proximal specimens (26.9%) following.

The majority of the fragments are percussion flaked and biconvex or plano-convex in cross section. Several specimens have a combination of pressure and percussion flaking present. Since the specimens are non-diagnostic (i.e., cannot be classified into the regional typology), no further attribute analysis will be attempted.

Discussion/Comments

Statigraphically the majority of the fragments are distributed between 20-80 cm. This correlates with both the projectile point fragments and typable projectile point distributions. As stated previously, the biface fratments, projectile points and fragments are concentrated primarily in units N3E0, N5E0, N5E2, and N5W2 (Fig. 38). Individual concentrations of biface fragments are present in N3E2 and N7W2. This distribution in the vicinity of the units with a large amount of faunal remains present suggests the use and breakage of bifaces in the butchering and/or processing of the meat. While no edge grinding traces were noted on the proximal fragment lateral edges, it is possible that some of these specimens may have been hafted. The majority of these fragments were probably used for cutting and/or scraping, a contention that only edge wear analysis could prove.

Chipped Stone Artifacts

Drills or Perforators

Six specimens can be included in this category of chipped stone tools. All

of the drills or drill fragments are made of chert. Based on Marwitt (1970: 79), four of the specimens can be placed into two distinct types. The other specimen is unique and has been assigned its own type.

Type 1 (Fig. 44i, j).

Drills of this type are produced by the reworking of Eastgate Series projectile points (similar to the Parowan Basal-Notched points described by Marwitt). Two specimens from Slivovitz fit into this category but both are fragmentary. Provenience is N3E0, 20-40 cm.

Type 2 (Fig. 45i, k).

Two complete examples of this type were recovered. Both specimens have long thin cylindrical bits and short wide bases. Drills of this type are not known to have been made by the reworking of projectile points. Lengths range from 38.0 mm to 43.3 mm; widest bit width, 11.7 mm to 13.3 mm; narrowest bit width 4.9 to 8.3 mm; and base width from 24.0 to 27.9 mm. Provenience of the two specimens is N5W2, 41 cm and N7W2, 24 cm.

Type 6 - Retouched Flake Perforator (Fig. 45h).

This specimen is on an interior flake of which one lateral edge has been bifacially retouched into a drill-like tip. The drill bit comes off at a slight angle to the long axis of the flake. Total length is 31.9 mm with a bit length of 14.9 mm, a maximum bit width of 7.8 mm, a minimum bit width of 2.9 mm and a base width of 21.1 mm. Provenience is N5E2, 20-40 cm.

Unclassifiable Drill/Perforator Fragments

One drill tip fragment (chert) was recovered from N5E0, 40-60 cm.

Scrapers

All Round Scraper (Fig. 44g).

A snapped chert interior flake fragment with a steep unifacial retouch present on the circumference comprises this category. Provenience is N3E0, 40-60 cm.

Choppers (Fig. 43i-j).

Two complete specimens comprise this category and can be classified as heavy duty implements. The two choppers are manufactured on medium-sized cobbles and have been bifacially flaked over most of their surface to form a bifacial cutting edge around the circumference. Their forms range from ovate to discoidal. Some cortex is

Table 22

Typable Biface Data

UCLMA #	Type	Status	Material	Rt. Edge Angle	Lf. Edge Angle	L	W	T	Wt.	CS	Provenience
Ovate											
2-60633	I	Frag.	Chert	-	30°	49.5	31.1	9.0	14.6+	PC	N6W7 - 0-20
Elongate Triangular											
2-60777	IIIa	Frag.	Chert	34°	33°	34.9+	26.0	4.5	3.6+	BC	N3E0 - 60-80
2-61266	IIIa	Frag.	Chert	38°	37°	25.5+	26.1	4.2	3.3+	BC	N5W2 - 79
Limande											
2-61439	Va	Frag.	Chert	35°	36°	29.0+	20.0	5.2	3.8+	BC	N7W2 - 48
Assymetrical Limande											
2-61408	Vb	Comp.	Chert	38°	31°	62.0	39.0	7.1	23.7	BC	N7W2 - 9

(All measurements in mm and grams)

CS - Cross section
PC - Plano-convex
BC - Biconvex

present on one specimen. The working edges of both choppers show evidence of battering and removals of step flakes. Length ranges from 70.0 - 85.5 mm, width from 58.5 mm to 61.0 mm and thickness from 29.0 mm to 40.8 mm. Materials are chalcedony and chert. Proveniences are N7W2, 30-40 cm and N5W2, 47 cm.

Retouched Flakes

Fourteen unifacially retouched flakes, flake fragments and angular waste (8 chert, 6 obsidian) were recovered from Slivovitz. Retouch, present on one or more of the lateral edges, varies from light nibbling to heavy retouch.

The flake types are primarily interior flakes ranging from 2.0 cm to 6.0 cm in length. The function of these flakes cannot be precisely determined, although it is highly probable that they were multi-use in function if they were utilized at all. The flakes were randomly distributed throughout the deposit.

Edge Damaged/Utilized Flakes

Four complete interior flakes (2 chert, 2 obsidian) fall into this category. Very slight nibbling is present on one or more lateral edges of each flake (See Civa II for a discussion of edge damage). Proveniences are N5E2 - 40-60 cm (2), 60-80 cm; N5W2 - 60-70 cm.

Exhausted Cores

Two specimens comprise this category. These are the nuclei of cores, e.g., the amorphous chunks of raw material which are a residual byproduct of flaking cores. Presumably these 'cores' were to small for further flake production and were discarded. Both specimens are of chert and range in length from 21.7 - 32.5 mm, width 35.5 - 37.5 mm and thickness is 17.0 mm. Proveniences are N3E0, 20-40 cm and N5E2, 60-80 cm.

Discussion/Comments

Considering the amount of lithic debitage present (cf. Lithic Debitage section) at Slivovitz, the lack of any large number of cores is somewhat surprising. However, the lithic analysis appears to indicate secondary and tertiary manufacturing (e.g., the finishing of preforms and maintenance activities) and this could account for the lack of cores, usually utilized in primary manufacturing (i.e., the production of flakes for 'blanks', etc.).

Raw Material

Large angular chunks of chert (3) and limestone (1) that could have possibly been used as primary manufacturing raw material are included in this category. No

modification of this material has occurred except that these stones could only have been transported to the shelter from elsewhere. Provenience is N5E2 - 40-60 cm; N5W2 - 50, 52, 77 cm.

Lithic Debitage (Table 23).

An analysis of the lithic debitage for Slivovitz Shelter was carried out for reasons similar to those outlined for Civa II as well as to provide a comparison with the other site. Chert is the dominant raw material, as it is at Civa II, of the 7640 pieces of recovered debitage. Chert makes up 87.2% of the total number and 74.5% by weight. Overall, the amount of chert debitage ranges from 81.1% to 92.1% in number by unit and from 55.5% to 84.1% in weight by unit. Obsidian is a poor second (number 8.8%, weight 6.9%) with basalt/other (number 4.0%, weight 18.6%) following. Undoubtedly chert is the primary raw material choice due to its easy availability in the area.

An examination of the whole and partial flakes indicates a very high percentage of interior and biface thinning flakes with only a few primary and secondary cortex flakes present (cf. Epstein 1969; Shafer 1969; and Hester 1971 for a definition of these categories). This would appear to suggest that the primary stage of lithic manufacture (e.g., decortification of the raw material, especially chert nodules) was carried out at some location other than the shelter. Surface reconnaissance in the immediate vicinity of the shelter failed to locate any primary processing area or quarry.

The lithic debitage argues for a pattern similar to that postulated for Civa Shelter II. That is, little primary processing of raw material with emphasis instead placed on the production of interior flakes and the thinning and finishing of preforms, projectile points and bifaces. As well, maintenance acitivties (e.g., resharpening of damaged/broken bifaces, projectile points, etc.) were also probably carried out. Small pressure flakes of chert and obsidian were observed falling through the one-quarter inch mesh screen used.

In brief, the debitage pattern for Slivovitz is similar to that noted for Civa II -- a heavy use of chert in conjunction with secondary and tertiary manufacturing activities.

Table 23

Lithic Debitage

Unit	Debitage #	Weight
N3E0	1218	1772.6
N3E2	712	803.4
N3W2	341	486.3
N5E0	862	837.3

Unit	Debitage #	Weight	
N5E2	1902	1655.7	
N5W2	1471	1384.8	
N6W7	441	337.8	
N7W2	693	680.6	
Total	7640	7958.0	grams

Ochre

Red and yellow ochre fragments were found throughout the deposit, but much of it was uncollectable due to partial decomposition. There were 5 pieces collected. In addition, ochre staining was observed on some of the recovered artifacts and unmodified faunal remains. The distribution was random throughout the deposit.

Ground Stone Artifacts

Metates (Table 24).

Twenty-four complete or identifiable specimens and nine fragments comprise this class of artifacts. Of the identifiable specimens, 24 fall into the Block/Chunk and Slab categories described previously for Civa II.

I. Block/Chunk Metates

Ten specimens, 3 complete and 7 fragmentary, were noted at Slivovitz Shelter. The specimens are crudely shaped and exhibit evidence of smoothing and grinding, the depressions ranging from rectangular to ovate in form ($<$ 0.1 cm deep), on one surface. The three complete specimens, all of granite, range in length from 31.0 cm to 35.0 cm, width 18.0 to 23.0 cm and thickness 7.5 cm to 12.0 cm. The fragmentary specimens range in thickness from 5.5 cm to 12.5 cm. Materials are granite (4), rhyolite (3), basalt (2) and limestone (1).

II. Slab Metates

Fourteen fragmentary pieces comprise this category. The specimens appear to have ranged fron oval to rectangular in completed form and all have slight ($<$0.1 cm deep) grinding depressions present. Two specimens show grinding or abrasion on more than one surface. Several fragments indicate deliberate shaping by grinding and battering. Two specimens have traces of an unknown residue present on the grinding surface. The 14 fragments vary from 2.0 cm to 4.1 cm in thickness. Materials are rhyolite (6), sandstone (3), limestone (3), basalt (1) and granite (1).

Metate Fragments

Nine granite and rhyolite metate fragments were recovered. All show evidence of grinding/smoothing on one or more plane surfaces. All of the fragments appear to be from Block/Chunk metates. Thicknesses range from 0.5 cm to 4.5 cm. Materials are granite (6) and rhyolite (3).

Manos (Table 24).

Three complete or nearly complete specimens were recovered. No fragments were noted. Several categories are recognizable based on the amount/degree of modification noted on the specimen. All have been previously described for Civa II.

I. Shaped, Rectangular in Cross Section, Abraded on Two Sides (Fig. 43h).

One complete specimen made on a well sorted laminated sandstone, 13.0 cm long, 8.5 cm wide and 4.6 cm thick, along with one other fragment, was recovered. This mano has been carefully shaped into an almost rectangular outline and has traces of an unknown residue present on both grinding surfaces. The fragment, made on vesicular basalt, is similar to the complete specimen. It is 4.1 cm thick and 7.7 cm wide.

IIa. Shaped, Broad Ovals, Abraded on Two Sides

This category is represented by only one fragmentary specimen. This mano, made on a granite cobble, has been shaped by pecking around its circumference. Both sides show clear evidence of grinding/smoothing with one surface being smoother than the other. It is 5.1 cm thick and 8.8 cm wide.

Battered Stone (Table 24).

This category has been previously described at Civa II. The two specimens from Slivovitz fall into Category II.

II. Tabular Cross Sections

These two specimens have essentially tabular cross sections and range in form from sub-rectangular to elongate ovate. Slight to marked battering/abrasion marks are present on either one end of a specimen or on one lateral edge. The pieces range from 9.9 cm to 12.2 cm in length, 6.5 to 7.9 cm in width and 3.3 cm to 5.3 cm in thickness. Materials are granite and sandstone.

Pestles (Fig. 43g).

Two pestle fragments, probably complementary pieces, were recovered from

adjoining units N5E2 and N3E0 at depths of 20-40 cm and 40-60 cm respectively. One specimen is a distal fragment and the other a medial section. Both have been split longitudinally. No other pestle fragments were recovered from the shelter. Although the surfaces still show evidence of the pecking/abrasion shaping process, both have a high degree of polish present, implying some use. The two fragments are 5.0 cm and 5.8 cm at the widest points and 2.7 cm at the narrowest point.

Miscellaneous Ground Stone

Grinding/Pigment Slabs (Table 24).

Three specimens comprise this category. They are distinguished from the mano/metate categories by their small completed size and/or the presence of red or yellow pigment on the grinding surface. The specimens can be divided into 3 categories based on their gross morphology.

I. Unshaped, Tabular Cross Section, Abrasion on One Surface

This specimen is made on a small tabular fragment of ignimbrite. Abrasion is present on one side only and faint traces of a red pigment can be seen. The slab is 10.0 cm in length, 6.2 cm wide and 3.5 cm thick.

II. Shaped, Ovate in Form, Abrasion on One Surface (Fig. 43f).

This specimen is pointed ovate in form and is made on a carefully shaped section of an extremely vesicular basalt. No traces of pigment are present on the slight grinding depression. The piece is 11.2 cm in length, 9.3 cm wide and 2.8 cm thick.

III. Utilized Flake (Fig. 43e).

In this case, the ventral surface of an unmodified primary cortex flake has been used for grinding red and yellow ochre. The flake is 10.8 cm long, 7.1 cm wide and 2.1 cm thick. The material is basalt.

Table 24

Ground Stone Distribution

Category	#	Provenience
Block/Chunk Metate	10	N3E0 - Surface (2) N3W2 - 0-10 N5E0 - 40-60 60-80 N5W2 - 20-30 30-40

Category	#	Provenience
		N5W2 - 40-50
		60-70
		Surface
Slab	13	N3E0 - 20-40
		60-80
		80-100 (2)
		N5E0 - 20-40
		N5E2 - Sur-20
		20-40 (2)
		N5W2 - 0-10
		60-70 (2)
		70-80
		N7W2 - 50-60
Fragments	9	N3E0 - 40-60 (2)
		80-100
		N5E0 - 20-40 (2)
		40-60
		N5E2 - 20-40
		N5W2 - 50-60
Manos - I	2	N5E2 - 60-80
		N5W2 - 70-80
IIa	1	N7W2 - 0-10
Battered Stones - II	2	N3E0 - 40-60
		N5E0 - 20-40
Pestles	2	N3E0 - 40-60
		N5E2 - 20-40
Grinding Slabs		
Type I	1	N3W2 - 40-50
Type II	1	N5W2 - 70-80
Type III	1	N5W2 - 20-30

Bone Artifacts

Bone Awls

Eight complete or fragmentary bone awls were recovered from the deposits of the shelter. Four of the specimens can be identified, using the descriptive types of

Marwitt (1970: 106-113) as adapted from Kidder (1932: 211-213) and Ambler (1966: 55-56).

Type B: Head of Bone Unaltered Except by Original Splitting (Fig. 46a-b).

Two examples of this type were recovered. Both are made on the split metapodials of a bighorn (Ovis canadensis). One specimen has a gradually tapering tip and is complete except for the top point. The other has been cut off midway down the shaft and such that only the proximal end remains. On this specimen the tip taper cannot be determined. The length of the complete awl is 11.9 cm. Proveniences are N5W2, 62 cm and 89 cm.

Type C: Head of Bone Partly Worked Down (Fig. 46c).

One complete specimen with a gradually tapering tip was recovered. The split bighorn metapodial used to fashion this awl exhibits rodent gnawing marks on the proximal end. This end has been trimmed and ground smooth. Overall the specimen has been well ground and polished and the tip is extremely sharp. Its length is 10.9 cm. Provenience is N5E0, 60-80 cm.

Type D: Head of Bone Wholly Removed (Fig. 46d).

The one specimen of this type is much like the Type C except that the articular surface has been entirely removed. The awl is made on the upper portion of a split bighorn metapodial. The upper surface of the specimen is highly polished and the tip is extremely sharp. The under surface of the awl has not been extensively worked. Length of the specimen is 7.7 cm. Provenience is N7W2, 30 cm.

Unclassified Fragments (Fig. 46e).

The four fragments identified as belonging to the awl category include one tip fragment with a gradually tapering tip, one midsection fragment and two miscellaneous splinters or midsection pieces. The large midsection fragment is made on a split metapodial of a bighorn. It has a highly polished surface and a distinctive series of short parallel incised lines on the lateral edges. Proveniences are N5W2 - 40 cm, 30-40 cm, 50-60 cm; and N5E2 - 60-80 cm.

Miscellaneous Bone Artifacts

Ochre Stained Bones

Two long bone fragments of an unidentifiable large mammal stained with ochre were recovered from N5E2, 60-80 cm. It is unknown if this represents either accidental or purposeful staining.

Tubular Bones or Bone Beads (Fig. 45b-d).

Eight specimens (7 complete, 1 fragmentary) comprise this category. They are hollow sections of small to medium mammals (mostly Lepus sp.) with both ends having various degrees of cutting and smoothing present. The specimens in general show a slight surface polish possibly resulting from use or intentional polishing. No surface decoration is present on any of the specimens. The pieces range in length from 1.3 cm to 3.3 cm and from 0.4 cm to 1.3 cm in diameter. The identification of these specimens as bone beads is somewhat problematical but there is no doubt that they could have been strung for this purpose. Proveniences random throughout the deposit.

Bone Beads (Fig. 45f).

One complete specimen of a definite bone bead was recovered at Slivovitz. The bead is similar to Marwitt's (1970: 105, Fig. 70s) Type B bead.

The bead is a short tubular length of long bone with an oval cross section. Both ends have been smoothed and the exterior surface polished either by wear or deliberately during manufacture. The interior has likewise been polished. The length of the specimen is 6.5 mm and its diameter is 10.0 mm. Provenience is N6W7, 0-20 cm.

Bone Flaker (Fig. 45a).

This specimen, a thick long bone splinter from a large mammal, has a dull rounded, recurved tip present on one end. Pitting, scarring and wear striations are evident on the tip and no other apparent modification is present on the specimen. Its use as a pressure flaking tool is suggested as similar specimens have been described from sites in the Fremont subarea with this ascribed function (cf. Marwitt 1970: 117). Its provenience is N5W2, 50-60 cm.

Worked/Utilized Bone

This category consists of 3 articular ends and 3 long bone midsection fragments of small to medium size mammals that show either evidence of slight polishing or cutting.

Three of the specimens are left proximal tibias (2) and a proximal phalange of Lepus sp. All have been cut around the circumference of the shaft near the articular end. It is probable that these represent the waste products of bone bead manufacture with the medial portions of the shaft being utilized for long, tubular beads.

The three long bone midsection specimens have slight traces of polish present on either the lateral edges or shaft. They are too fragmentary for any identification. Proveniences are N5E2 - 40-60 cm (2), 60-80 cm; N5W2 - 60-70 cm (2); and N7W2 - 20-30 cm.

Gaming Counter (Fig. 45e).

One bone artifact can be assigned to this category based on the descriptions given in Marwitt 1968 and 1970. The specimen is made on a flat tabular large bone fragment. Its outline is roughly elongate triangular and both lateral edges have a series of short incisions or serrations present. The butt still shows evidence of cutting while the tip shows a slight ground bevel present. Both sides have slight traces of polish and wear/grinding striations. One side has a crude punctate 'S' design present. Traces of a red ochre wash are present on both sides. The length is 25.5 mm, width 12.5 mm and thickness 3.0 mm. Provenience is N6W7, 0-20 cm.

Shell Artifacts

Beads (Fig. 45g).

Two shell beads, one complete and one fragmentary, were recovered. One specimen is a shaped fragment, probably the basal portion, of an abalone pendant (?) and the other a Type la Olivella biplicata bead (Bennyhoff and Heizer 1958).

The presence of these two beads appears to indicate contact (either direct or indirect) with the Southwest or tribes to the west. Shell items are known from several Fremont sites to the east (cf. Marwitt 1970) and from ethnographic areas of the Shoshone (Steward 1941). Similar items are known from Civa II.

Faunal Analysis (cf. Appendix III).

The faunal analysis demonstrates the exploitation of Ovis canadensis (bighorn sheep) as the main source of hunted food. Various small species such as cottontail and squirrel, among others, appear to have been secondary food sources. Bobcat (Lynx rufus) was apparently hunted as well. Isolated beaver remains (Castor canandensis) were also recovered, although they are not present in the study area today. Many of the recovered faunal remains had been gnawed by rodents and laboratory analysis suggests that Neotoma sp. and Citellus sp. were responsible. The faunal assemblage is characterized by either a solitary hunter or a small group. Despite the relatively few identified species, the site's fauna is most clearly similar to the deer-sheep-cottontail faunal complex. This particular complex may represent the hunted food remains of a small socio-political group and the size of the shelter supports the conclusion that only 1 or 2 nuclear families were utilizing the site at any one time.

Summary/Interpretations

Slivovitz Shelter was a seasonally utilized, temporary occupation campsite probably used by both Shoshone and Southern Paiute groups (cf. Steward 1938; Kelly 1934; Stewart 1966). The recovered projectile points and ceramics suggest a relative date of A.D. 600/700 to historic times (A.D. 1850) with a probable emphasis from

A.D. 900 onwards. A similar assemblage of projectile points and ceramics is known from Civa Shelter II to the east in Garden Valley.

Shoshone Tradition pottery dominates the ceramic assemblage offering further evidence for the identity of the groups and time range of shelter use (post A.D. 1000; cf. Fowler, Madsen and Hattori 1973). A small amount (7%) of Fremont ceramics from the Parowan subarea was recovered throughout the cultural deposit and appears to indicate either early or contemporaneous use of the shelter with Shoshone groups by Fremont groups or trade/contact by Shoshone peoples with the Fremont groups in the Meadow Valley Wash area to the southeast. Similar conclusions have been proposed by Civa Shelter II.

It is probable that the site was utilized as a hunting/gathering base camp because of its clear view of the canyon, the protection it offered from the elements and its near vicinity to a perennial stream and spring. This inference of a base camp is strengthened by the many manos and metates present at the site; and the large amount of faunal remains in association with numerous fragmentary and complete bifaces/ projectile points implying the butchering and processing of large hunted game.

The moderate quantity of artifacts and lithic debitage argues for a lack of primary manufacture quite possibly due to the briefness of occupation (i.e., short term seasonal use) on their location/occurrence elsewhere away from the site.

The faunal remains indicate bighorn sheep (Ovis canadensis) was the favored game species. Various small mammal species such as cottontail (Sylvilagus sp.) and squirrel (Citellus sp.) among others were secondary food sources. The geography of the area (canyon and mountains) and the high number of distal projectile point fragments and bifaces found in association with concentrated areas of faunal remains suggests the possibility of a bighorn kill site or sites in the immediate vicinity of the shelter with the animals being transported back for further processing. The faunal assemblage is characterized by species which can be most efficiently hunted by either a solitary hunter or a small group. The size of the shelter's main occupation area suggests the conclusion that only one to two nuclear families were using the site at any one time.

The lithic debitage present in the deposit indicates that secondary and tertiary manufacturing processes were dominant but some primary processing of locally available raw material was also carried out. The quantity of manos and metates present, both on the surface and in the deposit, indicates the presence of plant gathering and related processing activities. It is probable that pinyon nuts were the prime local plant resource as the hillsides surrounding Slivovitz are covered with pinyon pine.

Seasonal occupation of the site is suggested as sometime in late September to early October. The pinyon nuts are ready for harvest at this time (cf. Thomas 1971a) and Geist (1971) notes that the bighorn would be migrating to the lower elevation winter pastures as well. Contact and/or trade with groups to the south is indicated by the

presence of shell beads and ornaments, similar to the material recovered from Civa Shelter II.

A brief survey of the surrounding ridges noted the presence of several light lithic scatters and a small rockshelter with only surface material present.

In summary, Slivovitz Shelter and its artifact assemblage support the conclusion of a temporary base camp, probably the focus of occupation in the canyon, of a fairly late date intermittently occupied by various Fremont/Shoshone/Southern Paiute groups from ca. A.D. 600/700 to historic times. Resource exploitation was concerned with the seasonal gathering of pinyon nuts and the hunting of bighorn sheep in contrast to Civa Shelter II's concern with seed gathering and the hunting of jackrabbit.

Key To Figures

Figure 42

a-i. Desert Side Notched Projectile Points (2-60963, 2-60732, 2-61343, 2-61414, 2-60690, 2-60592, 2-60674, 2-61193, 2-61436), j-p. Cottonwood Triangular Projectile Points (2-60737, 2-60741, 2-61229, 2-60895, 2-61200, 2-60666, 2-60688); q-r. Eastgate Series Projectile Points (2-60919, 2-61272); s-bb. Rose Spring Corner Notched Projectile Points (2-60664, 2-60683, 2-61240, 2-60949, 2-61409, 2-61324, 2-61273, 2-60785, 2-61231); cc. Rose Spring Contracting Stem (2-60939); dd. Rose Spring Corner Notched Projectile Point (2-60882); ee-ff. Elko Series Projectile Points (2-60951, 2-61421).

Figure 43

a-b. Snake Valley Black-on-Grey Ware Pendants (2-60936, 2-60778); c. Snake Valley Black-on-Gray Ochre Grinder (2-61488); d. Shoshone Ware Formed Pottery Sherd (2-61223); e. Grinding/Pigment Slab, Type III (2-61167); f. Grinding/Pigment Slab, Type II (2-61268); g. Pestle Fragment (2-60913); h. Mano, Type I (2-60960); i-j. Choppers (2-61438, 2-61205).

Figure 44

a. Type I Biface, Ovate (2-60633); b-c. Type IIIa Biface, Small Elongate Triangular (2-61266, 2-60777); d. Type Va Biface, Limande (2-61439); e. Type Vb Biface, Asymetrical Limande (2-61408); f. Humboldt Concave Base Projectile Point (2-61311); g. All Round Scraper (2-60759); h. Rose Spring Contracting Stem Preform (?) (2-61282); i. Type I Drill/Perforater (2-59787).

Figure 45

a. Bone Flaking Tool (2-61226); b-d. Tubular Bones or Bone Beads (2-61243, 2-61416, 2-61433); e. Gaming Counter (2-60713); f. Type B Bone Bead (2-60715); g. Type Ia Olivella biplicata Shell Bead (2-60916); h. Type 6 Drill/Perforator (2-60917); i. Type 2 Drill/Perforator (2-61419); j. Type 1 Drill/Perforator (2-60748); k. Type 2 Drill/Perforator (2-61179).

Figure 46

a-b. Type B Bone Awls (2-61224, 2-61276); c. Type C Bone Awl (2-60675); d. Type D Bone Awl (2-61434); e. Unclassified Bone Awl Fragment (2-61435).

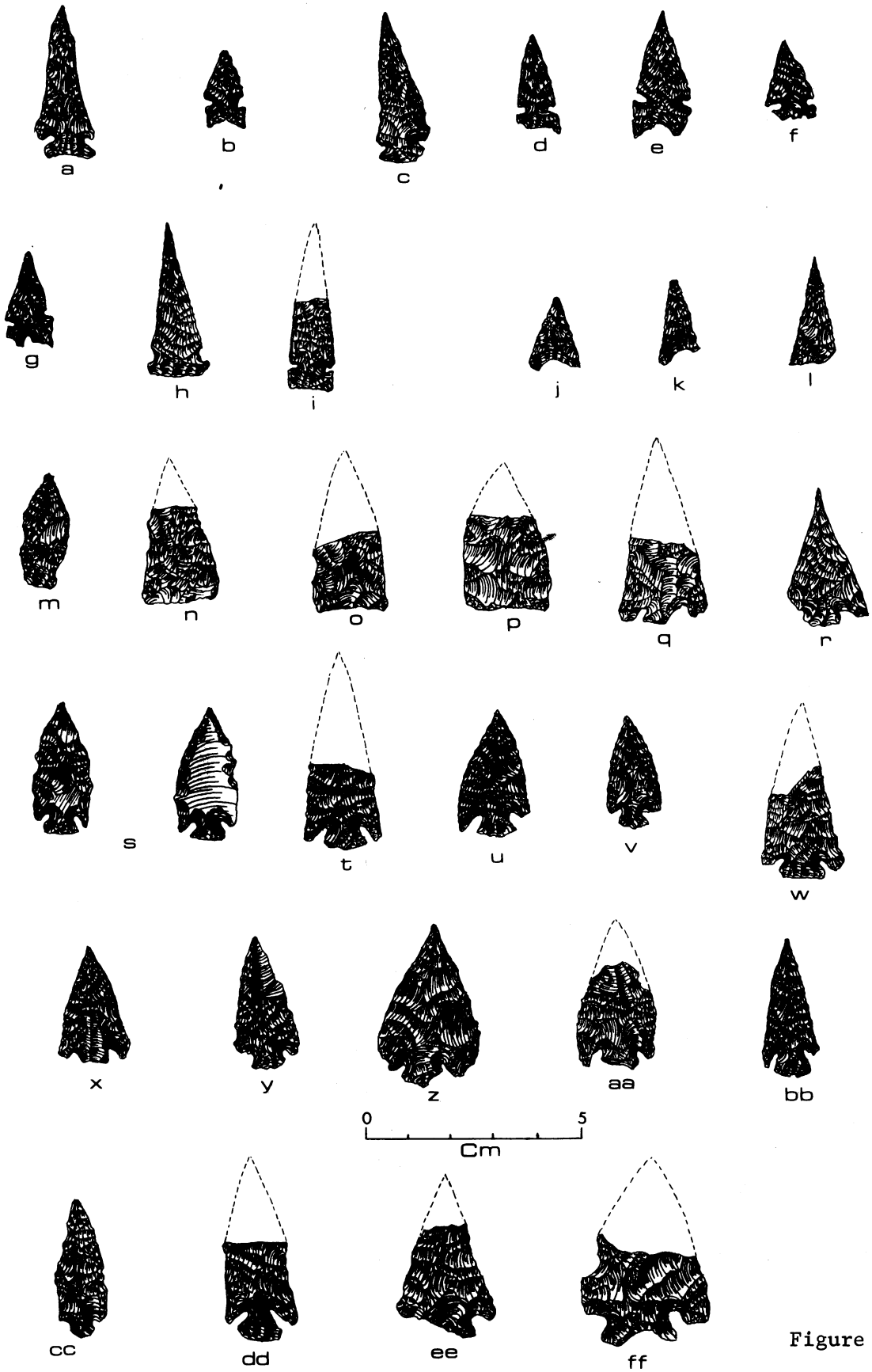


Figure 42

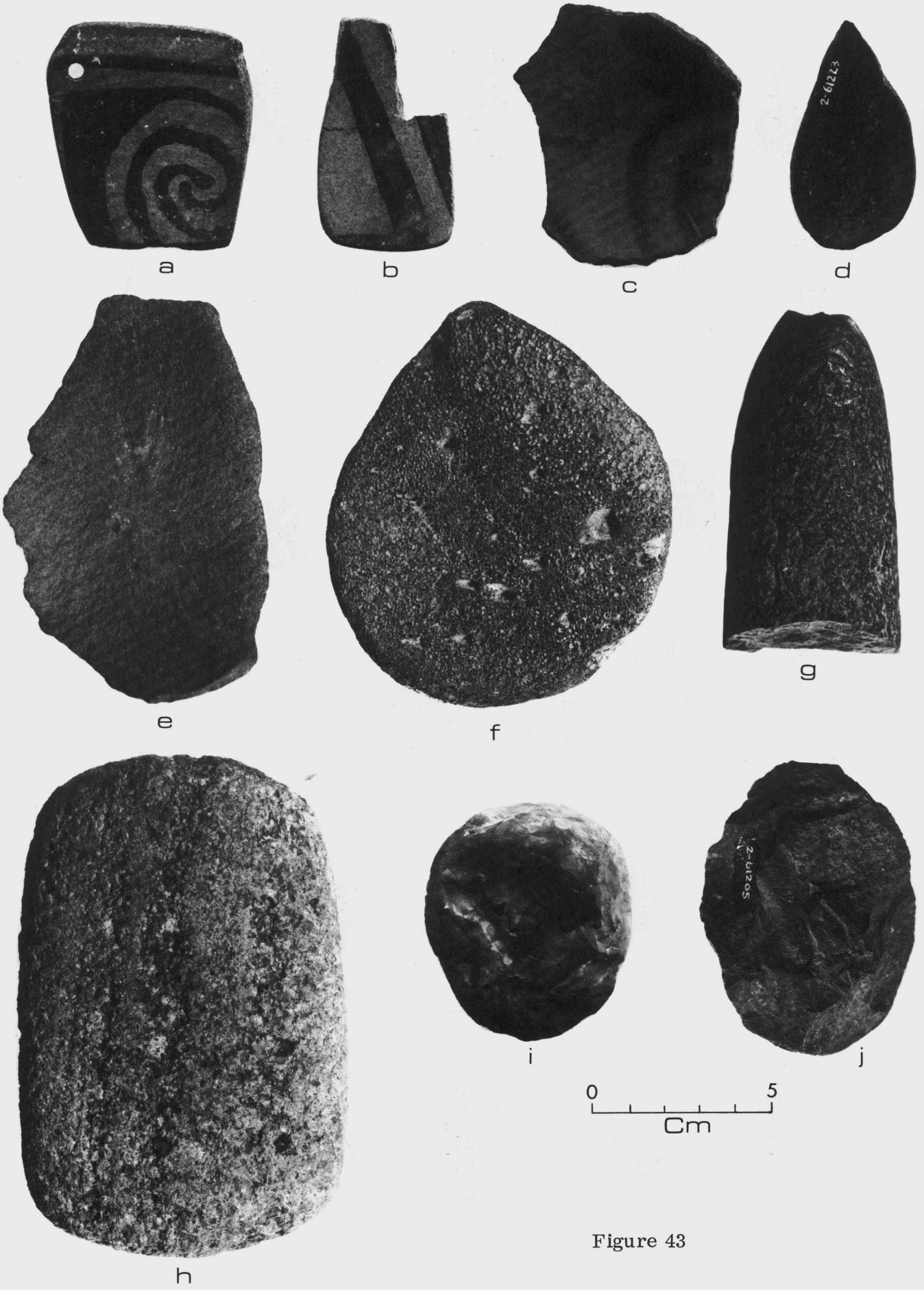
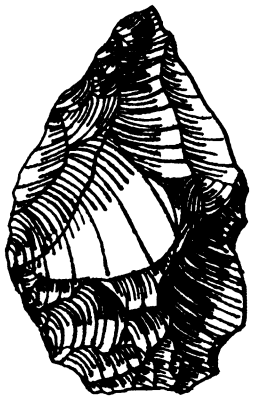


Figure 43



a

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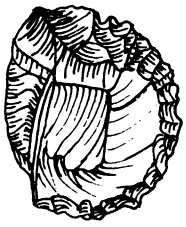

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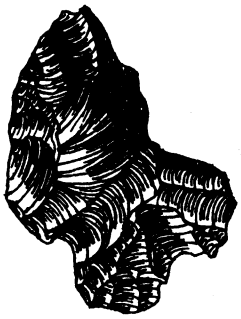

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Figure 44

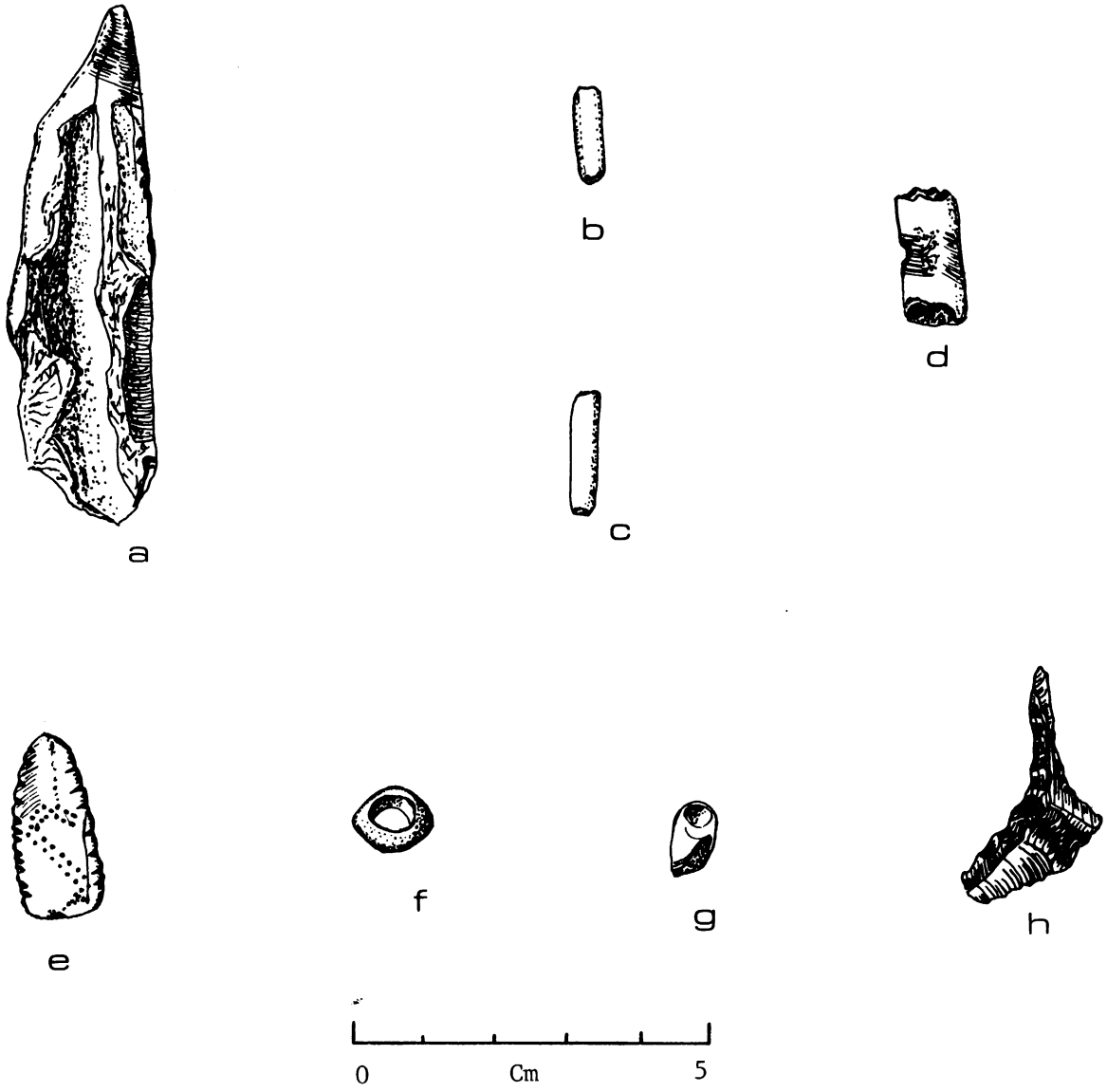


Figure 45

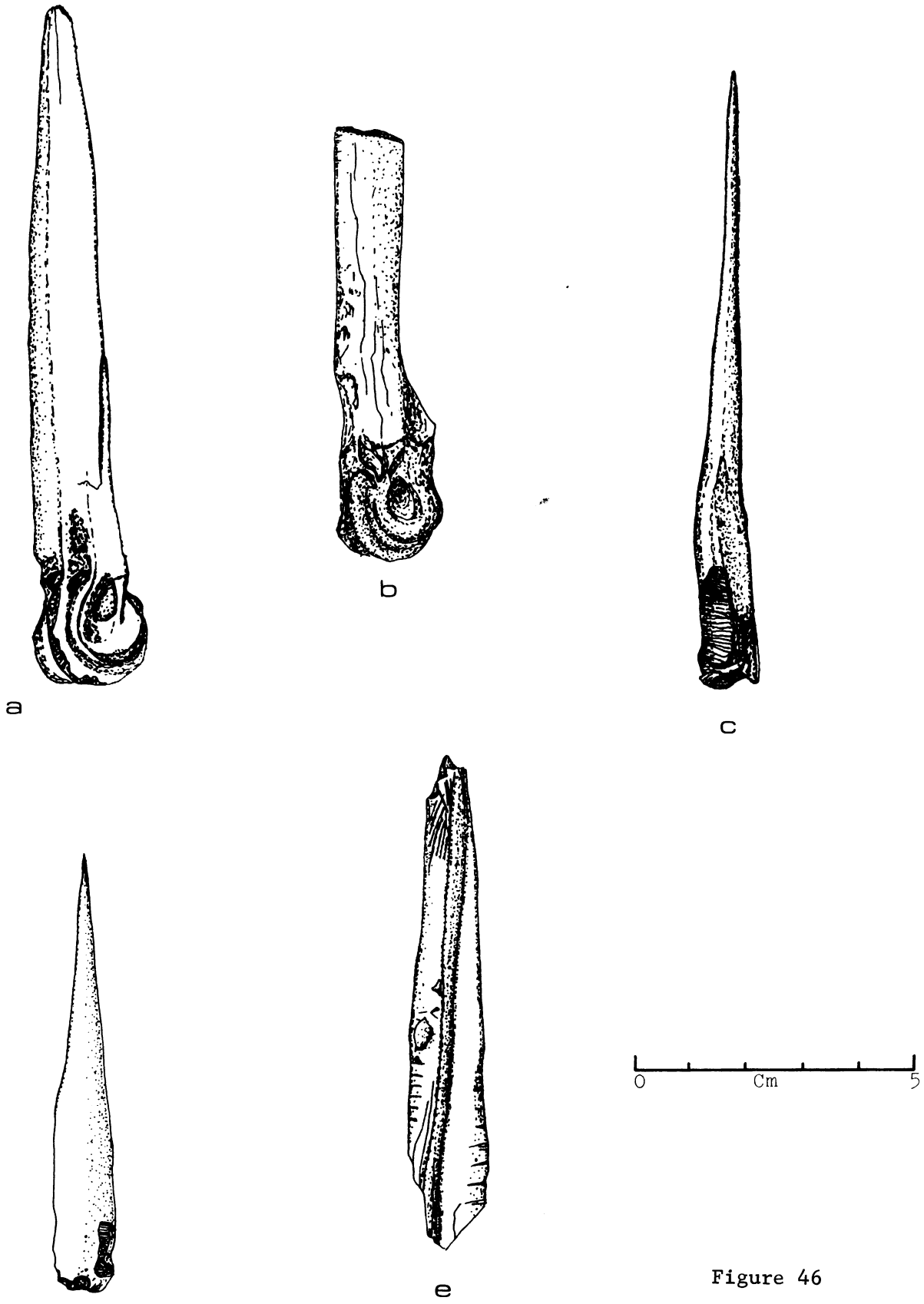


Figure 46

Chapter VII

Avocado Shelter

Avocado Shelter (26-Ny-1263), located in the Quinn Canyon Range of northern Nye County, is a small cave/rockshelter formed by the mechanical weathering of an unnamed Devonian limestone formation (Kleinhampl and Ziony 1967). The site, within the boundaries of the Quinn Canyon District of the Humboldt National Forest, is located in a small canyon at an elevation of 7000 feet (2134 meters). It faces to the southeast and overlooks a small ephemeral stream. Irregular in plan, Avocado measures 6.0 meters across the entrance with the roof ranging from 1.50 - 1.75 meters in height (Fig. 47). A moderately level apron in front of the entrance gently slopes towards the Cherry Creek Summit road passing in front of the shelter.

Ecologically the site is within the Lower Slope Vegetation Zone and Upper Sonoran Life Zone, both described previously in the Natural Setting chapter. Juniper (Juniperus osteosperma), pinyon pine (Pinus monophylla), Artemisia tridentata (sage), along with various grasses and shrubs, are present in the vicinity of the shelter.

Excavation Strategy

When located by the UC Field Party, the shelter had been almost totally vandalized by relic collectors. Salvage operations were carried out to see if any temporal sequence could be determined; to provide comparative material for other sites in the region; and to recover any artifactual materials overlooked by the relic collectors.

Two 'relatively undisturbed' 2 meter units were excavated by both shovel and trowel in 20 cm arbitrary levels (Fig. 47). All fill was screened through one-quarter inch mesh and all cultural materials were saved for future analysis. No stratigraphy was present due to the extreme disturbance of the deposit which exceeded 100 cm in depth.

The Deposits

The deposit of Avocado Shelter, like those of Civa II and Slivovitz Shelter, is the result of elemental accumulation (wind-blown dust, rockfall) and organic remains (ash, charcoal, pinyon nuts and hulls, rodent feces, vegetal material) mixed with varying quantities of faunal remains, lithic debitage and artifacts.

Evidence of small rodent nests and burrows was found throughout the deposit. No distinct hearths were noted, although ash and charcoal were present in the deposit.

The deposit was excavated from the surface down to slightly over 100 cm before excavation ceased. The deposit was dry with some dampness encountered in the lower levels. Due to the vandalization of the site, the stratigraphic sequences (if any existed) had been totally destroyed.

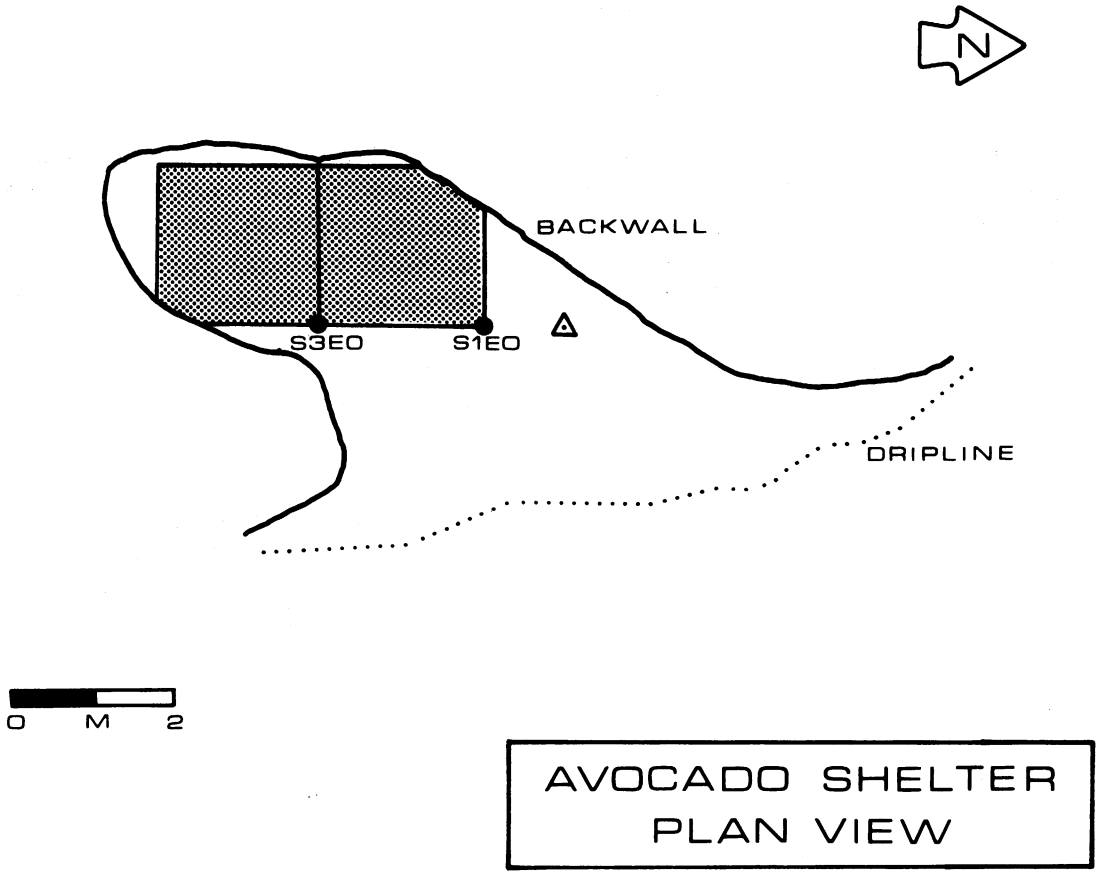


Figure 47: Plan View of Avocado Shelter.

Ceramics

A total of 24 sherds were recovered from the badly disturbed deposit of Avocado Shelter. Of these, 58.3% are Shoshonean Tradition pottery (including Southern Paiute brownware) and 41.7% are Fremont ceramic types.

Fremont Pottery

The 10 sherds of the Fremont Tradition have been identified as Snake Valley Grey Ware (5) and Snake Valley Black-on-Grey (5). All sherds are within the ranges of variability known for these wares (cf. Madsen 1977). A fugitive red wash is present on the exterior surfaces except for 2 of the Snake Valley Grey sherds. Wall thicknesses range from 3.6 mm to 5.1 mm and average 4.2 mm. The design elements on the interior surfaces of the 5 Snake Valley Black-on-Grey sherds are of the Sosi Style and consist of zig zag and straight lines and a possible checkerboard pattern. No rim sherds were recovered and the vessel forms all appear to be bowls.

Shoshonean Tradition Pottery

The 14 sherds of Shoshonean ceramics are within the range of variability of published descriptions (see Civa II and Coal Valley descriptions). The range of wall thickness is 3.7 mm to 6.0 mm and the mean is 4.9 mm. Two rim sherds were recovered. Both represent wide mouthed jars with recurved rims (IB2, IB3 - after Colton 1952). The diameter of one is in the range of 13.0 -20.0 cm, while the other, a larger piece would have been about 17.0 cm in diameter.

Discussion/Comment

The presence of both Shoshone and Fremont ceramics indicates a contemporaniety of use by both groups or the use of trade ware obtained from the Parowan Fremont subarea to the east by a Shoshone group. This follwos the pattern established for both Civa II and Slivovitz Shelter as well as for several of the open sites in the region. Since this site was badly disturbed, no stratigraphic contexts were preserved. Based on Fowler, et. al. (1973) data, we estimate a probable occupation/use of the shelter from A.D. 1000 to contact times.

Projectile Points (Table 25, Fig. 48a-c).

Six chipped stone artifacts were classified as typable projectile points or projectile point fragments. Type classification follows the standard typologies established and in use for the Great Basin (cf. Hester and Heizer 1973a for a discussion). The three identifiable specimens are Rose Spring Corner Notched (2) with the remaining point very similar to the Elko Corner Notched type (Fig. 48c). All specimens are of chert and have some damage present. Projectile point fragments are limited to one distal fragment of chert and two proximal/lateral fragments of chert and obsidian. These fragments probably represent portions of small projectile points similar to those described above.

Discussion/Comment

The recovered projectile points are indicative of the late chronological sequence already established for the Great Basin. Taken in conjunction with the recovered ceramics, a time range of A.D. 1000 to A.D. 1850 is suggested for the shelter.

Bifaces (Table 26, Fig. 48d, e).

As described for the other sites, the specimens assigned to this category are artifacts that show evidence of bifacial flaking with at least one lateral edge capable of being utilized for a cutting action. Eight specimens (2 typable, 6 fragments - 2 medial/3 lateral/1 proximal) were recovered and assigned to the typological categories previously determined for the region. The two complete specimens have been assigned to Type I -

Table 25

UCLMA #	Category	Status	Material	Length	Width	Thickness	Weight	CS	SN
2-60465	RSCN	Comp.	Chert	41.5	18.0	3.0	2.1	PC	4.5
2-60472	RSCN (?)	Frag.	Chert	35.0+	14.0+	2.8	1.7+	PC	-
2-60448	ECN (?)	Comp.	Chert	30.0	18.0	4.0	2.3	BC	3.5

(All measurements in mm and grams)

RSCN - Rose Spring Corner Notched
ECN - Elko Corner Notched
PC - Plano-convex
BC - Biconvex
SN - Side Notch

Table 26

Bifaces

UCLMA #	Type	Length	Width	Thickness	Weight	CS
2-60438	I	62.0	38.0	6.2	17.2	PC
2-60437	IIa	81.0	28.0	7.0	13.8	BC

(All measurements in mm and grams)

PC - Plano-convex
BC - Biconvex

Ovate and Type IIa - Elongate Lanceolate. In all cases the raw material is chert. Cross sections range from plano-convex to biconvex. Percussion is the dominate mode of manufacture. Edge angles range from 38° to 42°.

Miscellaneous Chipped Stone Artifacts

Corner Notched Biface (Fig. 49a).

The proximal portion of a specimen similar to an extremely large Elko Eared projectile point was recovered from S3E0 at a depth of 60-80 cm. The piece is percussion flaked chert and snap fractures are present on 2 of the lateral edges. The notching is deep (11.2 mm) and at an angle to the long axis of the point. This specimen would be included in Fowler, et. al. (1973: 34, Fig. 15q) Class 7 biface category which is distinguished by having a provision for hafting. It is quite likely that this specimen could have been hafted for use either as a projectile point or 'knife'. Its width is 44.5 mm and thickness 7.1 mm.

Unclassifiable Drill/Perforator Fragment

One chert drill bit fragment was noted at Avocado.

Retouched Flakes (Fig. 48f, g).

Two chert complete unifacially retouched interior flakes were recovered. Both have unifacial percussion retouch present at one or more points around their circumference. Lengths range from 30.5 mm to 38.0 mm, width from 20.0 mm to 31.0 mm and thicknesses from 4.5 mm to 10.0 mm.

Lithic Debitage

Because of the disturbed nature of the site, no analysis of the debitage was carried out. A cursory examination of the material indicates a preferred emphasis on the use of chert compared to obsidian. Interior and biface thinning flakes dominate the debitage. This would seem to argue for a pattern of little primary processing of raw material with emphasis placed on the production of interior flakes and the thinning and finishing of preforms and bifaces. This pattern is similar to those present at the other excavated sites. As well, considering the location of the site in an excellent hunting/gathering area, maintenance activities (e.g., resharpening of damaged/broken projectile points, bifaces, etc.) were also probably carried out.

Miscellaneous Ground Stone Artifacts

Tubular Fragment (Fig. 49b).

One tubular ground stone fragment, apparently a rim or end piece, was noted.

The specimen shows traces of smoothing on the exterior surface and striations/grinding marks on the interior. It is possible that this may be a tubular stone bead fragment or a pipe stem/bowl (?). The raw material appears to be a fine siltstone.

Bone Artifacts

Awls (Fig. 49c-e).

A total of 3 complete or identifiable bone awls were recovered from Avocado Shelter. The three have been separated into 2 descriptive types based on Marwitt (1970: 106-113) as adapted from Kidder (1932: 211-213) and Ambler (1966: 55-56).

Type B - Head of Bone Unaltered Except by Original Splitting (Fig. 49c).

One specimen of this type with a recurved tip was recovered. It is made on a split metapodial of a bighorn (Ovis canadensis) with the unaltered articular surface (proximal end) serving as the butt. This awl has been extensively shaped by grinding and sawing. High polish is present over the surface and at the working tip end. Its length is 85.0 mm, width ranges from 2.0 - 21.0 mm and thickness from 4.0 - 9.5 mm.

Type E - Splinter Awl (Fig. 49d, e).

Two specimens of this type made on sections of large mammal bone with one end worked to a point were present. Both specimens have gradually tapering tips. A light red ochre stain is present on one piece. Lengths range from 78.0 - 125.0 mm, width from 2.0 - 13.0 mm and thickness from 2.0 - 5.5 mm.

Discussion

The three awls are roughly similar in size but range in degree of finish and apparent durability. It is probable that these were used for a variety of purposes, ranging from leather working to basket making. Similar types are present at the other excavated sites.

Bone Beads

One fragmentary tubular bone bead made on a midsection of a large mammal long bone was recovered. The specimen was broken in half and cursory grinding/shaping marks are present on one end. Rodent gnaw marks are present on the leading edges of the piece. Length is 43.0 mm, width 19.0 mm and thickness 4.5 mm.

Faunal Analysis

The analysis of the faunal remains recovered from the badly disturbed

deposits of the site point to the refuse of a small socio-political group concerned with the seasonal hunting of Ovis canadensis (bighorn) and other small mammals. Detailed information is presented in Appendix III.

Summary/Conclusions

Avocado Shelter can be classed as a seasonal temporary intermittent use campsite whose aboriginal inhabitants were probably concerned with the gathering of locally available plant foods, especially pinyon nuts, and the hunting of bighorn sheep (Ovis canadensis). A mid-September to early October occupation is suggested as the pinyons are ready for gathering (cf. Thomas 1971a) and the bighorn sheep are known to migrate to lower elevations at this time (cf. Geist 1971).

Its sheltered location on the now Cherry Creek Summit road and quite possibly former aboriginal trail between Railroad and Garden/Coal Valleys, coupled with its proximity to the Pinyon Camp Lithic Scatter near the summit, appear to mark it as a 'way station' for hunting/gathering in the vicinity or travel between the aforementioned valleys. Chronologically, based on the diagnostic projectile points and ceramics present, the site could have been occupied ca. A.D. 1000 to post contact times (ca. A.D. 1850). Precise temporal controls could not be established due to the severe disturbance of the shelter by vandals.

In brief, Avocado Shelter is a temporary seasonal campsite intermittently occupied from A.D. 1000 to post contact times by either Shsohone/Fremont groups or Shoshone groups in contact with the Parowan Fremont subarea to the east. The late use of the site follows the pattern of late occupation noted for the region. It is regrettable that the shelter's deposits were not intact as this smaller site would have provided material for a valuable comparison with Slivovitz Shelter in the near vicinity and Civa Shelter II in Garden Valley.

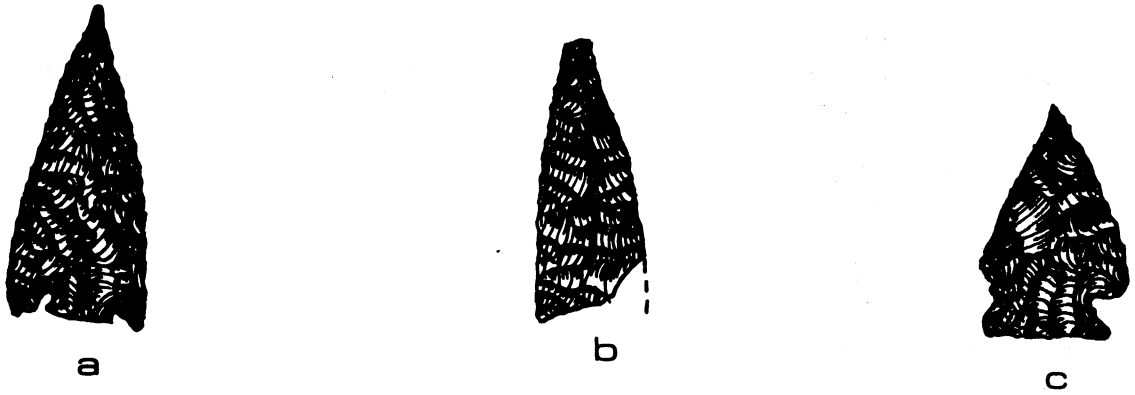
Key To Figures

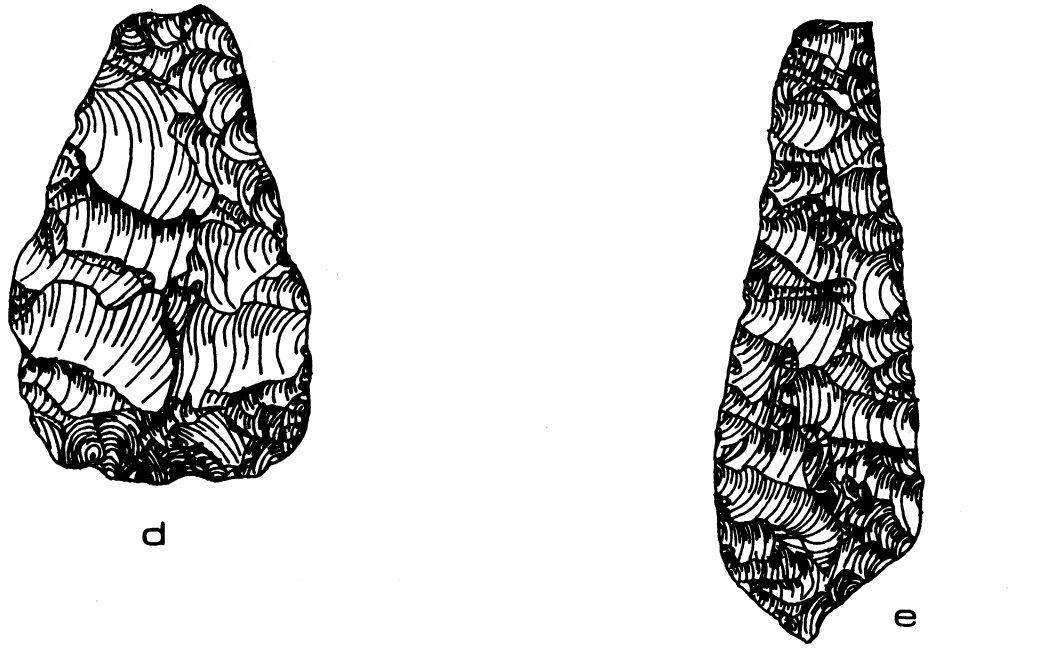
Figure 48

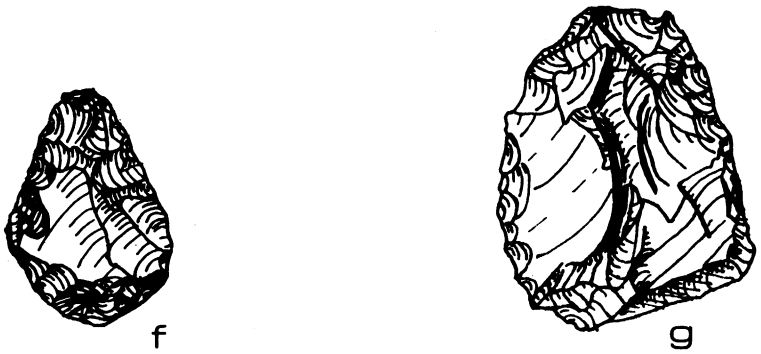
a. Rose Spring Corner Notched (2-60465); b. Rose Spring Corner Notched (?) (2-60472); c. Elko Corner Notched (?) (2-60448); d. Biface Type I (2-60438); e. Biface Type IIa (2-60437); f, g. Retouched Flakes (2-60473, 2-60450).

Figure 49

a. Corner Notched Biface (2-60467); b. Tubular Ground Stone Fragment (2-60451); c. Bone Awl, Type B (2-60459); d, e. Bone Awls, Type E (2-60434, 2-60468); f. Bone Bead Fragment (2-60460).







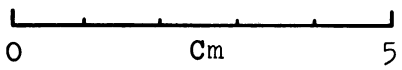


Figure 48

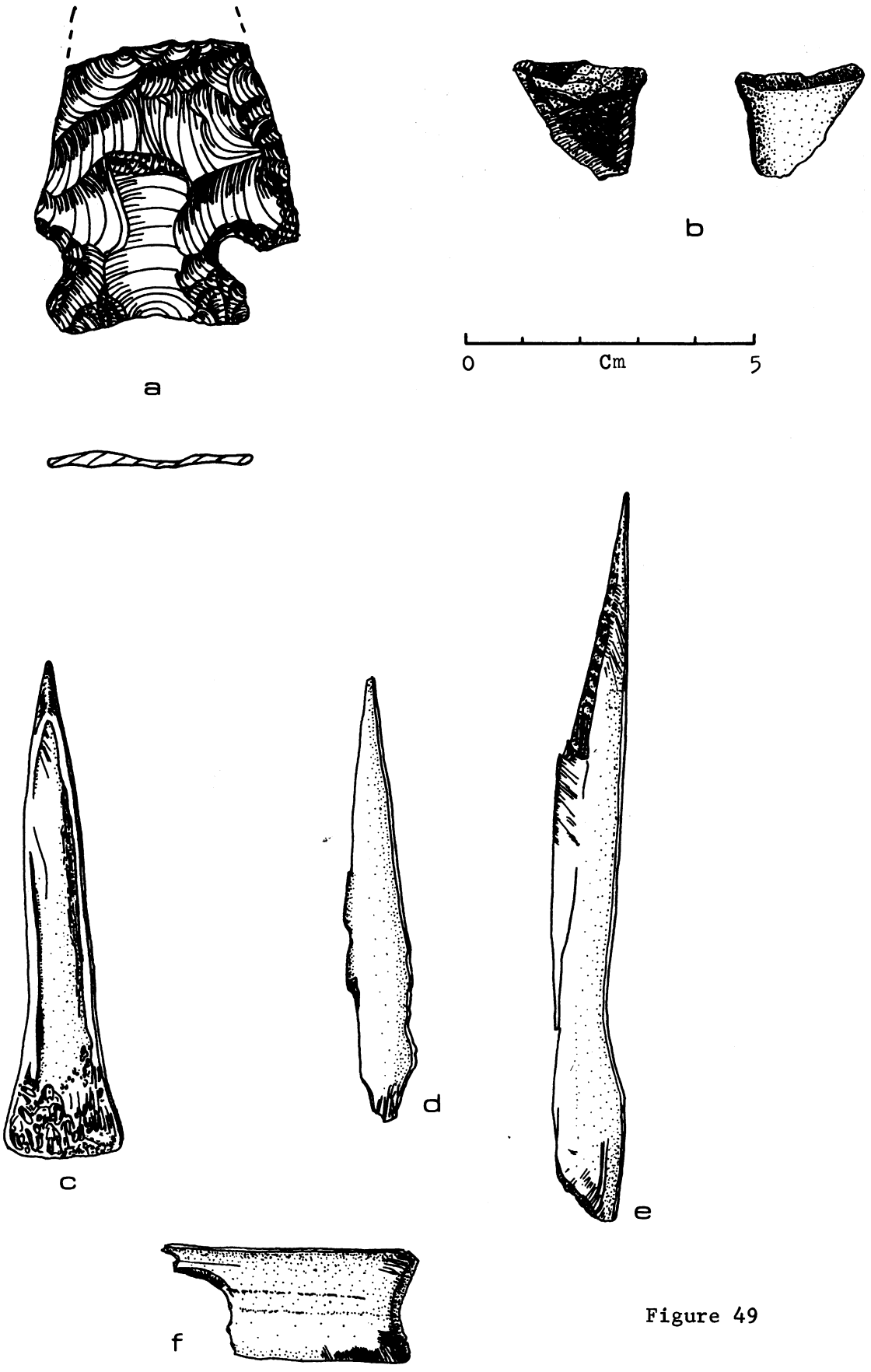


Figure 49

Chapter VIII

Site Survey - Garden and Coal Valleys

Introduction

An intuitive convenience site reconnaissance was undertaken within the boundaries of the previously defined study area as an adjunct project to the main program emphasis of site excavation. Time and the financial constraints placed on the research eliminated a previously developed, stratified, random sample survey from the proposed research design.

The site survey was visualized as contributing important data to the regional research problems discussed previously. That is, as contributing to the development of a chronology of human occupance in the area and in the understanding of man-land relationships (settlement patterns, procurement activities, cultural contacts) present within the study area. In brief, the site survey was undertaken to gain additional information on the chronological/cultural environmental relationships present within Garden and Coal Valleys and to assess/interpret the data within the information framework currently available for southeastern Nevada.

Methodology

Site survey areas were chosen on an intuitive basis. That is to say, suitable areas were picked based on the past knowledge of site location in the area. Localities in the vicinity of past and present water sources and courses, passes, rock overhangs, former lake margins, valley edges, raw material sources, isolated rock bluffs, large boulders and so. In brief, any likely area or natural feature that may have been utilized by the aboriginal inhabitants of Garden and Coal Valleys was inspected for traces of past cultural activity. In addition to 'natural features', large areas were subjected to a systematic pedestrian ground survey.

Generally, in this procedure, survey team members walked not more than 0.5 miles (0.8 km) in a cardinal direction between natural or cultural boundaries (e.g., jeep trails, BLM roads/trails, fence lines, section lines, etc.) with the team members spaced approximately 100 meters apart. Upon reaching the end of each transect, the team then swung around 180^{o} and returned in a parallel direction adjacent to the first swath. Each team member was responsible for observing an area 50 meters wide on both sides of the general walking path, with the area surveyed during one sweep being 200 meters wide. By use of these tactics a 0.5 mile (0.8 km) front (quarter section unit) was covered in 3 or 4 swaths. This general procedure was modified when the terrain or site distribution warranted it.

Archaeological Site Types

For the purposes of this research, an archaeological site was defined as the locus of prehistoric activities which could be delineated specifically by the cultural remains present and could be separated by distance and/or observable geomorphic features from other loci of prehistoric activities. The cultural materials that constitute a site are basically artifacts/lithic debitage and/or cultural features (e.g., fire rings, roasting pits, etc.).

For our research and to facilitate discussion of prehistoric behavior within the study area, 11 site types were designated at the onset. These were defined to assist in understanding the variety of aboriginal activities seen in the archaeological record and to provide a way of 'categorizing' and ordering the data available from the survey. While not all sites can be precisely fitted into one or another of the categories, this 'pigeonholing' of sites into types provides a reasonable means to begin dealing with the diversity present in the archaeological record. The site typology is used for convenience and does not necessarily imply the full range of aboriginal activities that may have been present at any one site.

The site type(s) given each archaeological site is determined by both the information provided on the record form and on the qualitative judgment of the field archaeologist who recorded the site. This method is somewhat flexible in its approach, as it allows both information and archaeological field experience to be used in making a site type determination. In all cases, site type determinations were made either personally or by a supervisor whose determination was later orally justified and approved. The loci recorded as archaeological sites varied considerably in size and abundance of artifacts. Even a very sparse scatter of flakes (5+ concentrated within a 5 m^2 area) was recorded as a site as by definition it was considered a site. Isolated single flakes and artifacts were noted and collected for the area surveyed but were not considered as 'sites'. An exact location for these finds was not recorded.

Some very large areas recorded as single sites were actually made up of many small concentrations of lithic debitage, each of which, had it occurred alone, would have been labelled as a site. For ease of presentation and recording, these concentrations were treated as one site, although undoubtedly each locality was probably utilized at one discrete point in time.

Of the 11 original site types devised for the survey, only 3 were found and utilized in the study region. These are defined below.

Camp - Temporary Occupation: These are sites that were occupied for a short length of time (e.g., one day to one month (?) by a small group (e.g., from one individual to several families)). These sites can be identified archaeologically by scattered artifacts, tool manufacturing/maintenance debitage, firecracked rocks, ground stone fragments and features (e.g., roasting pits, fire hearths, etc.). This type is somewhat of a

catch-all category as the title implies. It includes sites that reflect a wide range of artifacts, waste material and/or cultural features that, in combination, do not allow the site to be placed in another category. The inferred function of this site type is limited camping where specific subsistence (gathering, hunting) and maintenance (repair, etc.) activities were conducted.

Lithic Workshop: These sites are characterized exclusively by the presence of lithic debitage, cores, and raw material chunks of rhyolite, obsidian, basalt and chert. Occasionally finished or semi-finished materials (e.g., projectile points, preforms, etc.) may be present, but the chief differentiation of these sites from temporary occupation camps is the presence of raw material chunks, large amounts of lithic debitage from manufacturing and few artifacts and/or cultural features. These may be considered as lithic scatters in some site type/category schemes.

Rock Art Sites: Petroglyphs (pecked or incised figures or designs) and/or pictographs (painted figures or designs) are present at sites of this type.

Procedure

Standard recording and mapping techniques were employed by the field teams when a site was discovered. The site data was entered on the University of California Site Survey form (cf. Hester, Heizer and Graham 1975: 22-30 for a description and discussion), the site's location was plotted on the appropriate Bureau of Land Management (BLM) 30' map for the area and if necessary a sketch map of the site was drawn. If feasible, the site was photographed and a small sample of lithic debitage and any temporally diagnostic artifacts were collected for future analysis and study.

In addition to the main site form, a supplemental form was devised in order to note other important/significant information concerning the sites. Categories on this form included site situation, site type, geographic situation, ecology, soil type, debitage raw materials, debitage density, debitage categories, chronology - based on temporally significant artifacts (projectile points and ceramics), National Register of Historic Places significance and BLM Significance ratings. [1]

Debitage density was arbitrarily determined by the number of flakes per 10 m^2 area. A ground estimate of 30 flakes per 10 m^2 was classified as heavy; a ground estimate of 15 flakes or less was classified as light; and a moderate scatter fell between the two extremes. Debitage categories have been previously defined in the lithic debitage analysis portions of the various site reports.

Although certain of the categories are admittedly subjective in use and are based in part on personal intuitive interpretations of the field data base, the inclusion of these categories (while somewhat biased) with the standard site form, data will aid future archaeological research strategies in the region. Significance ratings, now commonly required in archaeological reconnaissance surveys as an aid to planning/management

strategies, were made using previously defined BLM criteria (BLM Memorandum Nevada State Office, n.d.).

Results

Seventy archaeological sites were recorded on the estimated 55,000 acres surveyed by the field teams within the boundaries of the study area (Fig. 2). The data derived from this archaeological reconnaissance has been condensed and is presented in Tables 27a-b and Fig. 50. Forty (57%) fall into the category of open sites, 9 (13%) are open sites with natural protection present and 21 (30%) are rockshelter or cave situations (Table 29). Mountain/hillside slope locations are dominant (42.5%) with stream terraces (26.1%) following. Elevated land (9.6%), central valley/playa (6.8%), valley edges (6.8%), canyons (6.8%) and alluvial fans (1.4%) are other favored locations (Table 28). Several sites had several locational characteristics present (e.g., elevated land + valley edge location).

Figure 50

Summary Site Survey Data Coding Key

Site numbers assigned to the sites are Nevada State Museum designations.

GBT - Great Basin Transverse Points
HUM - Humboldt Series
RS - Rose Spring Series
EG - Eastgate Series
CT - Cottonwood Triangular Series
DSN - Desert Side Notched Series
PPF - Projectile point fragments
BIF - Bifaces
PRF - Preform
SCP - Scrapers
UF - Utilized/Edge Damaged Flakes
DRL - Drill
MET - Metate
MAN - Mano
CHRT - Chert
OBS - Obsidian
BST - Basalt
PICTO/PETRO - Pictographs/Petroglyphs
SHO - Shoshone Tradition Ceramics
FRE - Fremont Tradition Ceramics
ELEV - Elevation - in feet a.s.l.
VEG - Vegetation type
SIT/LOC - Situation/Location
TYPE - Type of site
EST. TEMPORAL RANGE - Estimate age in years - judgment based on temporally sensitive projectile points present and ceramics.

Summary Site Survey Data - Garden and Coal Valleys

	PROJECTILE POINTS											ARTIFACTS					DEBITAGE				POTTERY						
SITE	GBT	HUM	PINTO	ELKO	RS	EG	CT	DSN	PPF	BIF	PRF	SCP	UF	DRL	MET	MAN	CHRT	OBS	BST	PICTO/ PETRO	SHO	FRE	ELEV	VEG	SIT/ LOC	TYPE	EST. TEMPORAL RANGE
Ln 1704							x			x					x		x						5800	2	3/2	2	1000AD - ?
Ln 1705										x							x	x					5800	2	1/7	2	?
Ln 1706																	x						6000	2	2/5	2,7	?
Ny 1247					x					x							x	x					6500	1,2	1/3	2	600AD-1850AD
Ny 1248									x	x							x						6000	1,2	3/1	2	?
Ny 1249									x	x							x	x					6000	1,2	1/2	2	?
Ny 1250										x							x					x	5400	2	3/2	2,7	1000AD-1850AD
Ny 1251		x		x	x				x	x							x	x				x	6200	1,2	1/2	2,7	2000BC-1850AD
Ny 1252				x	x				x	x							x	x					8300	1,2	1/2	2,7	2000BC-1850AD
Ny 1253																				x			6000	2	3/2	2	?
Ny 1254																	x						6000	1,2	3/1	2	?
Ny 1255					x		x			x							x	x			x		5600	2	2/2	2,7	600AD-1850AD
Ny 1256					x					x							x	x					5400	2	2/7	2,7	600AD-1850AD
Ny 1257										x							x		x				7000	2	1/2	2,7	?
Ny 1258		x		x	x					x							x	x					6400	1	2/7	2	4000BC-1850AD
Ny 1259		x		x					x	x					x		x	x					6100	1,2	1/3	2,7	4000BC - ?
Ny 1260									x	x													6000	1,2	3/1	2	?
Ny 1261				x						x							x	x					6600	1,2	1/2	2,7	2000BC- ?
Ny 1262																	x	x					7000	1,2	1/2	2	?
Ln 1707		x		x	x		x		x	x		x				x	x	x					6400	1	1/5	2,7	4000BC-1850AD
Ln 1518(2)	x	x	x	x	x			x	x	x		x	x	x	x	x	x	x	x		x		5000	2	1/4	2,7	6000BC-1850AD
Ln 1708							x		x	x							x	x			x		6200	1,2	1/5	2,7	1000AD-1850AD
Ln 1709															x		x	x					6300	1,2	3/2	2,7	?
Ln 1710																	x	x					5100	2	3/2	2	?
Ln 1711					x					x							x						5300	2	1/4	2	600AD-1850AD
Ln 1712																	x						6000	2	1/2	2	?
Ln 1713							x	x		x							x						5800	2	2/1	2	1000AD-1850AD
Ln 1714				x					x	x					x		x	x			x	x	6200	2	3/2	2,7	2000BC-1850AD
Ln 1715										x							x	x					5400	1,2	1/3	2	?
Ln 1716				x?					x	x							x	x					6000	2	3/2	2	?
Ln 1718				x				x	x	x							x	x					6000	2	1/7	2,7	2000BC-1850AD
Ln 1719					x?					x							x	x					6000	2	3/3	2	600AD-1850AD
Ln 1720				x	x				x	x				x			x	x	x		x		5900	2	1/2,7	2,7	2000BC-1850AD
Ln 1721																	x						5800	1,2	1/5,7	2	?
Ln 1722							x			x							x	x			x		6400	1,2	1/5	2,7	1000AD-1850AD

Table 27a

Summary Site Survey Data - Garden and Coal Valleys

	PROJECTILE POINTS											ARTIFACTS					DEBITAGE				POTTERY					
SITE	GBT	HUM	PINTO	ELKO	RS	EG	CT	DSN	PPF	BIF	PRF	SCP	UF	DRL	MET	MAN	CHRT	OBS	BST	PICTO/ PETRO	SHO	FRE	ELEV	VEG	SIT/ LOC	TYPE	EST. TEMPORAL RANGE
Ln 1724							x			x		x					x	x			x		5700	1,2	1/7	2	1000AD-1850AD
Ln 1725				x					x	x							x	x					6100	2	1/7	2,7	2000BC - ?
Ln 1726										x				x			x	x					5000	2	1/4	2,7	?
Ln 1727				x	x		x			x							x	x			x		6300	2	2/8	2,7	2000BC-1850AD
Ln 1728		x	x	x	x		x	x	x	x	x			x			x	x			x	x	7000	1,2	1/2,3	2,7	4000BC-1850AD
Ny 1263				x	x				x	x							x	x			x	x	7000	1,2	3/2	2	600AD-1850AD
Ny 1264		x		x	x		x		x	x							x	x					6600	2	1/7	2,7	4000BC-1850AD
Ny 1265					x										x		x	x			x	x	7500	1,2	3/2	2,7	600AD-1850AD
Ny 1266				x	x		x			x							x	x			x		5800	2	1/7	2,7	2000BC-1850AD
Ny 1267				x			x		x	x							x	x					5600	2	1/7	2,7	2000BC-1850AD
Ny 1268									x	x							x	x			x		7200	1	1/2	2,7	1000AD-1850AD
Ln 1729									x	x							x	x					6400	1,2	1/7	2,7	?
Ln 1730		x	x	x	x		x		x	x				x			x	x	x				5800	2	1/7	2,7	4000BC-1850AD
Ln 1731							x?										x						6200	2	1/1	2	1000AD-1850AD
Ln 1732					x				x									x					6000	2	1/5,7	2	600AD-1850AD
Ny 1271		x		x			x										x	x			x		7500	1,2	2/2	2	2000BC-1850AD
Ny 1272		x	x	x	x	x	x	x	x	x		x	x	x	x	x	x	x	x		x	x	7200	1	3/2	2,7	600AD-1850AD
Ny 1273				x						x								x					7400	1,2	3/2	2	2000BC- ?
Ny 1274								x							x		x				x		7200	1	2/4	2	1000AD-1850AD
Ln 1733										x							x				x		5800	2	1/5,7	2,7	1000AD-1850AD
Ln 1734																		x					5000	1,2	1/5,7	7	?
Ln 1735								x	x								x	x					6400	1,2	1/2	2	1000AD-1850AD
Ny 1270																	x						8000	1	2/2	2,7	?
Ny 1275				x	x	x		x	x	x		x		x		x	x	x			x		7200	1,2	1/5	2,7	2000BC-1850AD
Ln 1519				x			x		x						x	x	x	x	x				5200	2	1/7	2,7	2000BC-1850AD
Ln 1517																	x	x					5800	2	3/2	2	?
Ny 500					x			x							x		x	x					5400	2	3/2	2	600AD-1850AD
Ny 503		x																					5900	2	3/2	2	?
Ny 502			x							x					x		x	x	x				5500	2	1/7	2,7	2500BC- ?
Ny 501			x						x	x							x	x					5300	2	3/2	2	2500BC - ?
Ny 264					x		x	x	x	x			x	x	x		x	x		x			5900	2	3/2	2,9	600AD-1850AD
Ny 1269																				x			8000	1	1/5	9	?
Ln 1590				x	x	x	x	x	x	x		x	x	x	x		x	x	x		x	x	5000	2	3/2	2,7	600AD-1850AD
Pinyon Camp		x		x	x		x		x	x			x	x	x	x	x	x			x	x	7500	1	1/7	2	4000BC-1850AD

Table 27b

Table 28

Type	#	Code
Camp, temporary occupation	30	2
Camp, temporary occupation/Lithic workshop	37	2,7
Camp, temporary occupation/Rock art	1	2,9
Lithic workshop	1	7
Rock art	1	9

Table 29

Site Location	#	Code
Canyon	5	1
Mountain/Hillside	31	2
Valley Edge	5	3
Central Valley/Playa	5	4
Elevated Land	7	5
Lake Terraces	-	6
Stream Terrace	19	7
Alluvial Fan	1	8

Note: Some sites have several locational characteristics present.

Table 30

Situation	#	Code
Open	40	1
Open, natural protection	9	2
Rockshelter/Cave	21	3

As regards elevation, 14 sites (20.0%) fell at or below 5500 feet; 25 (35.7%) at or below 6000 feet; 14 (29.0%) at or below 6500 feet; 6 (8.6%) at or below 7000 feet; 8 (11.4%) at or below 7500 feet; and 3 (4.3%) are above 7600 feet. The majority of the sites (39.0 - 55.7%) are within the boundaries of the Basin Floor/Playa/Upper Bajada vegetation zones (5000 - 6000 feet) with the remainder (31 - 44.3%) present in the Lower Slope Zone (6000 - 10,000 feet). The most common surrounding vegetation type in the vicinity of 37 sites (52.8%) is desert shrub/sagebrush while a combination of pinyon/juniper/desert shrub/sagebrush is present at 25 (35.7%) of the sites. A pinyon/juniper woodland is dominant at only 8 (11.5%) sites (Table 30).

Table 31

Vegetation Type	#	Code
Pinyon/juniper woodland	8	1
Desert shrub/sagebrush	37	2
Pinyon/juniper - desert shrub/sagebrush	25	1/2

Grinding implements (manos/metates) are found at 17 (24.3%) of the recorded sites. The projectile point series recovered from the random surface collections spans the common series known from the Great Basin: Great Basin Transverse, Humboldt, Pinto Elko, Rose Spring, Eastgate, Cottonwood, and Desert Side Notched Series. The data presented in Tables 27 a/b indicates that the Elko/Rose Spring/ Cottonwood/Desert Side Notched series points are the most commonly noted points in the study area.

Both Fremont and Shoshone Tradition ceramics, together and separately, are known to occur at several sites. Twenty-two (31.4%) of the sites have either Shoshone or Fremont pottery present (Shoshone - 12 sites; Fremont - 2 sites) or co-occurring (7 sites).

Three sites (4.3%) have either petroglyphs or pictographs present. Non-diagnostic projectile point fragments are present at 29 (41.4%) sites, while bifaces or biface fragments are found at 49 (70.0%) of the sites. Other artifacts present are drills (9 sites) and scrapers (6 sites).

Varying quantities of lithic debitage representing both manufacturing and maintenance activities were noted at most sites (62 sites - 88.5%). Chert and obsidian are dominant with basalt present at only a few localities. By far, chert is the favored raw material at most sites where chert and obsidian co-occur. This pattern of chert dominance is found at the excavated sites and appears to be typical for the region as a whole.

Chronologically, the sites fall within the range of 6000/9000 BP to post-contact times as determined by the temporally sensitive projectile point specimens and ceramics recovered.

Interpretations/Conclusions

Operating under the hypothesis that the natural resources available prehistorically in the study area were exploited through short term precurement and processing activities, it is apparent that the majority of the sites located during the survey do not represent intensive or long term occupation, but represent instead short periods of site use on what was probably a seasonally limited basis. It is quite probable that the majority of the sites present in the site universe represent base localities or temporary

campsites for the collection/processing of wild plants and for hunting on a seasonal basis. The lithic industries are similar at all sites with 'locally' available raw material used to derive flakes for either immediate use or for tool manufacture.

Utilization of the sites probably occurred from early Spring to late Fall, based on the availability of both plant (esp. seeds and pinyon nuts) and animal (rabbit, bighorn sheep) foods. On the basis of the present data, the site utilization conforms closely to the model tested by Thomas (1971a,b, 1972a,b, 1973) from Steward's (1938) ethnographic work of a broad spectrum economy which makes maximum use of a limited territorial range of microenvironments.

The survey was not complete or intensive enough to indicate any valid preferences in settlement pattern distribution. Repeated intermittent occupation as indicated by temporally diagnostic artifacts and the amount of cultural debris present appears to have centered around Coal Valley Dry Lake, easily accessible and protected rockshelters and stream terraces all in the near vicinity of a water source and in all probability near exploitable subsistence resources.

Chronologically the study area appears to have been intermittently occupied from ca. 9000 B.C. (Western Pluvial Lakes Tradition) to historic times (ca. A.D. 1850). The excavations and survey results apparently indicate a "heavy use" of the area from ca. A.D. 600, based on recovered temporally diagnostic artifacts and ceramics, but it is probable that many earlier occupations may have been buried or destroyed by alluvial fill, erosion or other natural processes. The early materials from the Coal Valley Dry Lake bed are only now beginning to be exposed by wind deflation.

The elevation distribution of sites indicates a heavy utilization of the areas between 5000 - 6600 feet (1524 - 2012 meters) elevation. This is undoubtedly biased, as our survey activities were primarily concentrated in the basin floor areas rather than in the forested higher elevations. In retrospect, it is unfortunate that we did not concentrate on the 7000-8000 feet (2134 - 2438 meters) elevation band as our cursory survey activities within this zone indicated intensive occupation. This zone is characterized by pinyon-juniper vegetation and the presence of many streams and associated riparian environments. Future research is currently being planned so as to rectify this omission and to provide a fuller picture of site distribution in the area.

The distribution of ceramics within the study area is also of interest. Only a few sites have Puebloan ceramic material present, while a moderate number have Shoshone tradition wares present. In several cases both Puebloan and Shoshone sherds were contemporaneous. As postulated previously, it is possible that both Shoshone and Fremont groups utilized the area or that Shoshone groups had contact and trade with the Fremont groups in the Meadow Valley Wash drainage to the east. Brooks's (1977) recovery of only Puebloan ceramics from the Mariah Site near Hiko lends credence to the possible use of the area by Fremont groups.

Petroglyphs and pictographs are rare in the area in contrast to the numerous reported instances from the White River Narrows and adjacent areas to the east (cf. Heizer and Hester 1974).

In general, the results of the survey indicate initial occupation of the area by peoples of the Western Pluvial Lakes Tradition, ca. 9000 B.C., centered around Coal Valley Dry Lake with a later intermittent occupation by Desert Archaic groups. The area was utilized by peoples from the Parowan Fremont subarea ca. A.D. 600/900 to ca. A.D. 1100-1200 (?) who were contemporaneous with Shoshonean groups present at ca. A.D. 1000. The area was apparently shared by both Shoshone and Southern Paiute groups until historic times. Primarily used as a hunting/gathering region, the area was probably marginal to the Southern Paiute groups in the Pahranagat Valley and the Shoshone groups in Railroad Valley to the east.

NOTES

1. Complete site records are on file at the Nevada State Museum, Carson City, and the Ely District Office of the Bureau of Land Management. All records are available for inspection by qualified, professional archaeologists.

Chapter IX

Summary/Interpretations

The archaeological data presented in this report, coupled with previous research in surrounding areas (esp. Fowler, Madsen and Hattori 1973; Brooks 1977), allows the reconstruction of a general tentative outline of the prehistory of the study area. Furthermore, sophisticated future research can now be planned to take advantage of the data base and add further to the interpretation of the culture history of southeastern Nevada.

Peoples of the Western Pluvial Lake Tradition (WPLT) apparently were the initial occupants of the Garden/Coal Valley area, concentrating in and around the now dry Coal Valley Lake. The intermittent, seasonal occupation of these temporary campsites occurred from ca. 9000 B.C. to 6000 B.C. (cf. Hester 1973b for a discussion of the WPLT) for this lacustrine oriented tradition. Exploitation of the lakeside ecozone along with use of the surrounding desert upland areas undoubtedly made this site location a favorable occupation locus for the aboriginal groups utilizing the area.

Following, or possibly concurrent in later times, with the Western Pluvial Lakes Tradition is the occupation by carriers of a Desert Archaic culture from ca. 6000 B.C. to contact times. Both the desert upland areas and Coal Valley Dry Lake appear to have been the focus of use by these groups. The former lake sites were probably utilized when favorable climatic conditions (e.g. precipitation and temperature) allowed for the formation of standing water due to runoff and evaporation conditions on the now dry Coal Valley Lake. Environmental and ecological changes are not well understood in this portion of the Great Basin, although minor changes in climate may have had major effects on the vegetation and ecology of the study area. Upland occupation, consisting of temporary, seasonal camps, was primarily along stream terraces with possibly some use of the higher elevation pinyon/juniper areas. Fowler, et.al. (1973) indicate three periods of abandonment - ca. 6500 - 4600 BP, ca. 3000/2000 BP to ca. A.D. 1, and ca. A.D. 1 to A.D. 1000 - in the neighboring areas to the east and southeast based on their surface reconnaissance and excavation of several stratified rockshelters. Madsen and Berry (1975), in a reassessment of the prehistory of the northeastern Great Basin, suggest a hiatus from 2500 to 1500 BP possibly as a "... result of the rapid post-Neoglacial decline in effective moisture and concomitant reduction in upland resource availability" (1975: 401).

Since no stratified sites falling within these time ranges were excavated and the surface survey material is inconclusive in terms of abandonment, no conclusions can be drawn from the study area regarding any hiatuses that may have occurred in human occupance. Future research may shed further light on the postulated abandonments, although it is unlikely to come from the Garden/Coal Valley area.

Based on the artifact yield, the early Desert Archaic culture appears to have

utilized the study area only marginally perhaps due in part to the changing climatic conditions postulated by Madsen and Berry (1975). However, it is probable that many earlier occupations may have been buried or destroyed by alluvial fill, erosion or other natural processes. As a case in point, the early materials (Western Pluvial Lakes Tradition) from the Coal Valley Dry Lake bed are only now beginning to be exposed by wind deflation.

The excavation and survey results apparently indicate a "heavy use" of the area from ca. A.D. 600 based on the recovered temporally diagnostic artifacts and ceramics. Civa Shelter I (Busby 1977), Civa Shelter II, Slivovitz and Avocado Shelters all have large numbers of Rose Spring, Cottonwood and Desert Side Notched projectile points present. Elko and Humboldt Series projectile points also co-occur throughout the deposits in small numbers, although their presence can probably be attributed to reuse by later aboriginal peoples. Fowler (personal communication 1978) indicates that a study of Powell's ethnographic collections in the Smithsonian (cf. Fowler and Fowler 1971) from southeastern Nevada shows a high incidence of reuse of older projectile points on ethnographic specimens. Qualitative site survey results from Garden and Coal Valleys also show a predominance of Rose Spring and Desert Side Notched projectile points in the collections.

Civa Shelter II and Slivovitz Shelter were intermittently utilized, seasonal, temporary occupation sites probably used by both Shoshone and Southern Paiute groups as well as by Fremont peoples. Civa II can be assigned a relative dating using the recovered projectile points and ceramics at A.D. 600/700 to historic times. Slivovitz Shelter, using the ceramics and projectile points for relative dating, also falls within this range, although perhaps a bit later in time, ca. A.D. 900 (?) to historic times. Both sites were utilized as hunting/gathering base camps because of their excellent views of the surrounding terrain and nearness to seasonally available sources of water. Civa II was primarily utilized for seed gathering and the hunting of jackrabbits in the Upper Bajada Zone, while Slivovitz Shelter represents a seasonal Fall camp with a focus on pinyon nut/seed gathering and the hunting of bighorn sheep within the boundaries of the Lower Slope Zone. The moderate quantity of artifacts and lithic debitage recovered at both sites argues for a lack of primary manufacturing or processing activities, quite possibly due to the briefness of occupation or their location/occurrence elsewhere away from the main occupation site. Pottery manufacture was also apparently carried out during one occupation at Civa II. It should be noted that no deep stratified rockshelters or caves were located during our field research, and it may be possible that these sites (Civa II and others) were not available for occupation prior to A.D. 600.

The ceramic materials from both the excavated sites and surface reconnaissance appear to indicate either early or contemporaneous use of the study area by both Shoshone and Fremont groups or trade/contact by Shoshone peoples with the Fremont in the Meadow Valley Wash area to the southeast and east. Perhaps both Fremont use and Shoshone trade occurred in the area as Brooks's excavations at the Mariah Site (Brooks 1977) recovered only Puebloan ceramics from the cultural deposits. The

Fremont pottery (Snake Valley Gray, Black-on-Gray and Corrugated) is indicative of the Parowan subarea and dates from A.D. 900 to A.D. 1200. The Shoshonean Tradition ceramics can be ascribed to both Southern Paiute and Shoshone groups, and Fowler, et.al. (1973) has assigned a date of ca. A.D. 1000 for the introduction of this pottery into the surrounding area. I am in agreement with this date, although it is possible that a slightly earlier date (ca. A.D. 900) might be possible based on the excavations at Civa Shelter II. The single Virgin Branch Anasazi sherd (North Creek Black-on-Gray) recovered can possibly be linked to the Lost City Phase (A.D. 700-1100) or the Mesa House Phase (A.D. 1100-1150) defined by Shutler (1961) for the Lost City area to the south. It is probable that this specimen was transported from the nearby Pahranagat Valley (cf. Brooks 1977 and Fowler, et.al. 1973) where specimens of this type are known to occur. All ceramics fall within the known boundaries for both Puebloan (cf. Harrington 1928; Madsen 1972, 1977) and Shoshone Tradition (cf. Fowler 1968a; Tuohy 1973) pottery.

The presumed ancestors of the Numic speaking Southern Paiute and carriers of the Shoshonean culture entered the study area from the southwest around A.D. 1000 (cf. Lamb 1958; Miller, Tanner and Folley 1969; Fowler, et.al. 1973; Madsen 1975). The later occupation/use of the Garden and Coal Valley area apparently falls around this date and on the basis of the artifact assemblage (esp. projectile points) from the excavated sites and surface reconnaissance can be attributed to both Fremont and Shoshone groups. These two distinct cultural traditions have been a matter of some controversy (cf. Fowler, et.al. 1973: 73-85) for a discussion and overview) but this will not be discussed here. For our purposes, drawing on previous research, what is important is that they are distinct and represent either alternate or coeval occupation of the study area. Fowler, et.al. (1973) have suggested that the Fremont peoples were intermittent or seasonal occupants of the Meadow Valley Wash area. A probable boundary marked by the Delamar and Highland Mountains (Fig. 5) has been suggested by Fowler, et.al. (1973:135) as the southwestern limit of the Parowan Fremont range. This is based in part on the apparent paucity of Fremont artifacts in the Pahranagat Valley. However, Brooks's (1977) excavations at the Mariah Site in the Hiko area recovered only Fremont or Virgin Branch Anasazi ceramics. The association of both Fremont and Shoshone ceramics in the Garden and Coal Valley area, as stated previously, may indicate either alternative or coeval occupation or trade by Shoshonean groups. Based on the research conducted in the study area and on Brooks's (1977) work in the Hiko area, it is suggested that the boundary proposed by Fowler, et.al. (1973) for the Parowan Fremont should be moved westward to include the Pahranagat Valley.

The archaeological investigations within Garden and Coal Valleys indicate that Shoshonean/proto-Numic groups were the principal inhabitants of the area. While Fremont groups may have ranged into the area in their foraging quest, it is probable that Shoshonean groups may have also travelled eastwards into the Meadow Valley area to hunt and gather. Fowler, et.al. (1973: 73) suggest that pinyon nuts are more plentiful in the Meadow Valley area than in the Pahranagat area, although the same can also be said for the Quinn Canyon and Grant Ranges bordering Garden Valley on the west.

However, for whatever reason, it is probable that seasonal meetings and trade did occur between the Shoshone and Fremont groups in the area.

The Shoshone/proto-Numic groups followed a seasonal round probably similar to that described for the ethnographic record (cf. Steward 1938; Kelly 1964; Euler 1966b; Ruppert 1976; Stewart 1942). Corn horticulture may have been practiced in certain areas. A crude pottery was manufactured (Shoshonean Tradition) using a *combination of paddle and anvil and coiling techniques. These peoples remained in the* area to become the ethnographic Shoshone and Southern Paiute groups after the 'demise' of the Fremont by ca. A.D. 1300.

In summary, the archaeological record for the study area indicates intermittent occupation (probably seasonal) by four distinct cultural traditions - the Western Pluvial Lakes Tradition, Desert Archaic, the Fremont and the Shoshone - between ca. 9000 B.C. and historic times. As well, the research investigations appear to offer some additional support for the postulated appearance of the Shoshone/proto-Numic culture into the area around ca. A.D. 1000. The archaeological evidence indicates a marginal use of the valleys from 6000 B.C. on with an incurease in use intensity ca. A.D. 600 to historic times. From the cultural resources present and the ethnographic data, it is apparent that these two valleys were probably marginally utilized by both the prehistoric occupants and the ethnographically known Southern Paiute and Shoshone groups.

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Abbreviations Used

AA	American Anthropologist
Am Ant	American Antiquity
NAS-R	Nevada Archeological Survey Reporter
NSM-AP	Nevada State Museum Anthropological Papers
SWM	Southwest Museum
-M	Masterkey
-P	Papers
UC	University of California
-AR	Anthropological Records
-CARF	Contributions, Archaeological Research Facility
-PAAE	Publications, American Archaeology and Ethnology
UCAS	University of California Archaeological Survey
-R	Reports
UUAP	University of Utah Anthropological Papers

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Appendix I

Sediment Analysis of Civa II and Slivovitz Rock Shelters

by

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Introduction

Sediments from Civa II and Slivovitz Rock Shelters were examined in order to distinguish visible strata and to draw inferences about the depositional history of the two sites. Additional study of soils outside the shelters and a sample of a lacustrine sediment from Coal Valley Dry Lake provided some basis of comparison of cultural and natural deposits. Information gathered from the determination of particle size distribution, color, presence or absence of free carbonates, % loss on ignition, pH, and % total phosphorous plus a cursory mineralogical analysis served to characterize the sediments.

Methods

Site study of the soils and sediments were precluded due to a lack of time. Other tests (e.g., calcium, organic carbon) which could have yielded additional information were not carried out for the same reason. A more systematized procedure for field sampling of the deposits would have provided for more valid results but this was not possible due to field conditions. The tests that were carried out gave consistent results and independently confirmed field observations (e.g., the aeolian deposit in Slivovitz Shelter).

All samples were allowed to reach air dry condition before sieving through a 2 mm sieve. Percent by weight of $>$ 2 mm fractions was determined. The water content (Pw) of the $<$ 2 mm fractions was determined and a few grams of each sample were crushed with the Spex Mixer/Mill for the phosphorus and % loss by ignition analyses. Phosphorus was extracted by digestion with perchloric acid and determined by standard colorimeter methods. Percent loss by ignition was found by recording weight loss of samples (beyond Pw) placed in 450° C oven for 1.5 hours. Color was determined on dry and moist sampled under natural lighting according to the Munsell Soil Color Charts. A few drops of 10% HCl solution were placed on samples to check for presence and degree of free carbonates (cf. USDA Soil Manual 1951). pH was determined by the saturation paste method withthe Beckman Zeromatic pH Meter. Textual analysis of the $<$ 2 mm fraction was done by the hydrometer method (Day 1965: 562-566). Samples of the clay fraction for X-ray diffraction were taken from the suspended load after a 2 hour settling period. The sand fractions were initially retained by wet sieving (0.05 mm sieve)

and then separated by dry sieving.

Discussion

I. Lithology and External Soils

Both rock shelters are included in the Younger Volcanic Rocks unit (Tertiary) described in Tschanz and Pampeyan (1970). The rocks of Civa II are made up of devitrified welded ignimbrite which contains "...up to 50% broken crystal fragments of quartz, potash feldspar, plagioclase, biotite and hornblende, and a few foreign rock fragments" (Tschanz and Pampeyan 1970: 73). Slivovitz consists of partially devitrified obsidian with what looks to be a small percentage of quartz and feldspar crystals. Based on the excavator's description (Busby, personal communication, 1977) and lab analysis, the soils just outside the sites are shallow (about 5 cm to paralithic contact) and residual, with little profile development. Periodic erosion (slipes are 5-10% outside the rock shelters), a fairly resistant bedrock, and the generally arid climate probably all contribute to the shallowness and general lack of development of the soils. Interestingly, the soil outside Civa II is calcareous and light colored, in contrast to the soil outside Slivovitz which is non-calcareous and much darker in color (Table 1). The soil outside Slivovitz also has a higher % of total phosphorus that expected (cf. Cook and Heizer 1965: 22-23) and is associated with higher organic matter content there. Grazing animals may be contributing to this high organic matter content.

Civa II is located at a lower elevation, ca. 5800 feet (1768 m), in a much more arid area with sparse desert vegetation (see Natural Setting chapter), whereas Slivovitz is located in forested canyon at about 7000 feet (2134 m). Moister conditions and higher amounts of organic matter have made for a distinctive A1 horizon outside of Slivovitz directly overlying bedrock.

2. Rock Shelter Deposits

The primary source of sediment, about 80 cm thick in both rock shelters, is the breakdown of the enclosing bedrock. A comparison of the sand fractions (Table 1, Fig. 2) shows the general similarity of most of the cave strata with the weathered bedrock (Civa II) and external soils. Fragments of bedrock ranging from gravel (numerous) through boulder (few) size have been found in most levels. The mechanical and chemical weathering of the fallen rock partially accounts for the finer textures in most of the strata as compared to the weathered bedrock and external soils. The variable addition of wind-blown fine sands, silts and clays also contributes to the finer textures of the rockshelter sediments. Similar findings on the origins of prehistoric rockshelter sediments are described in other studies (Butzer 1971, Farrand 1975). Special aspects of the deposits are discussed in the context of each rockshelter.

A. Civa Shelter II

Although no pattern is apparent in the strata of Civa II some special deposits

are noted. A higher level of occupation (subsistence related??) is suggested in Stratum B_2 by the high carbonate (calcium) content, accompanying higher pH, and higher percentage of total phosphorus (Table 1). Analysis of discrete clay deposits reveal that they are likely to have been culturally introduced to the shelter. X-ray diffraction shows one clay sample to be pure montmorillonite in contrast to the clay fractions analyzed from a continuous stratum (Level B) which includes quartz, feldspar, mica and calcite as well as montmorillonite. The main clay deposit is the only non-calcareous deposit in the shelter and contains little phosphorus (Table 1). It seems impossible for such a pure clay to be altered from a volcanic rock low in bases, especially in a short time. The sand fraction in the clay deposit is much coarser than in the other shelter strata and may have been deliberately mixed with the clay as a tempering material for pottery manufacture. This sand fraction does show the same bimodality in size as the other deposits, external soil, and weathered bedrock. One problem in speculating that the clay was used for ceramics is that montmorillonite is a poor choice of clay because of its tendency to shrink and swell upon drying and wetting.

B. Slivovitz Shelter

Slivovitz Shelter's deposits provide a clearer picture of depositional history than do the Civa II sediments, mainly because of Stratum B, which is primarily aeolian in origin. This is shown in the preponderance of silt and very fine sands (Table 1, Figs. 1 and 2) which are the size classes most readily transported by wind (Brady 1974). The $>$ 2 mm fraction drops off considerably in Stratum B as well. A brief look at the mineralogy of the silt fraction by Dr. Richard Hay, Department of Geology, University of California, Berkeley (Hay, personal communication, 1977) revealed two factors diagnostic of aeolian activity: 5-10% volcanic glass shards and opal phytoliths which are inorganic biogenetic plant particles (cf. Rovner 1971). An unknown percentage of the opal phytoliths have probably been derived from plants brought into the shelter by the occupants. Both of these are found in the silt fraction of the Coal Valley Dry Lake sediment sample which is a likely source for the aeolian material. Actually, all of the natural strata of both rock shelters have an aeolian component but only in Stratum B of Slivovitz does it predominate.

The overall siltier textures of the Slivovitz deposits (Table 1, Fig. 1) suggest they have been more exposed to prevailing winds and aeolian deposition. It was observed during excavation that swirling winds inside the shelter are active in certain areas and not in others. This probably accounts for the variation in thickness of Stratum B (Busby, personal communication, 1977).

A lower percentage of total phosphorus and lower organic matter content (roughly given by % loss on ignition) in the primarily aeolian deposit (Stratum B), compared to Stratum A above it and Stratum C below it, appears to indicate a less intense level of cultural activity. What is suggested is a drought (increased aeolian activity with dessication ofthe Coal Valley Dry Lake) during which hunting and other subsistence activities declined. Stratum B may even represent a period of abandonment or extreme

disuse if the artifacts recovered from Stratum B are assumed to be intrusive from later occupation. Considering the thickness of Stratum B (5-10 cm and discontinuous over the surface) this may be a valid possibility.

As a final note, the Slivovitz deposits have been subjected to leaching as shown by the pH profile in Fig. 3 and the relative amounts of carbonates in Table 1. This supports the hypothesis that Slivovitz has been more exposed to outside climatic conditions than Civa II. The phosphorus profile has more or less retained its original form because phosphorus is immobilized in the form of calcium phosphates at the pH range of the deposits (Table 1 and Fig. 3). Also, phosphorus levels are higher at Slivovitz (except for Stratum B) than at Civa II, possibly indicating a higher level of subsistence activities (esp. hunting related activities) at this shelter.

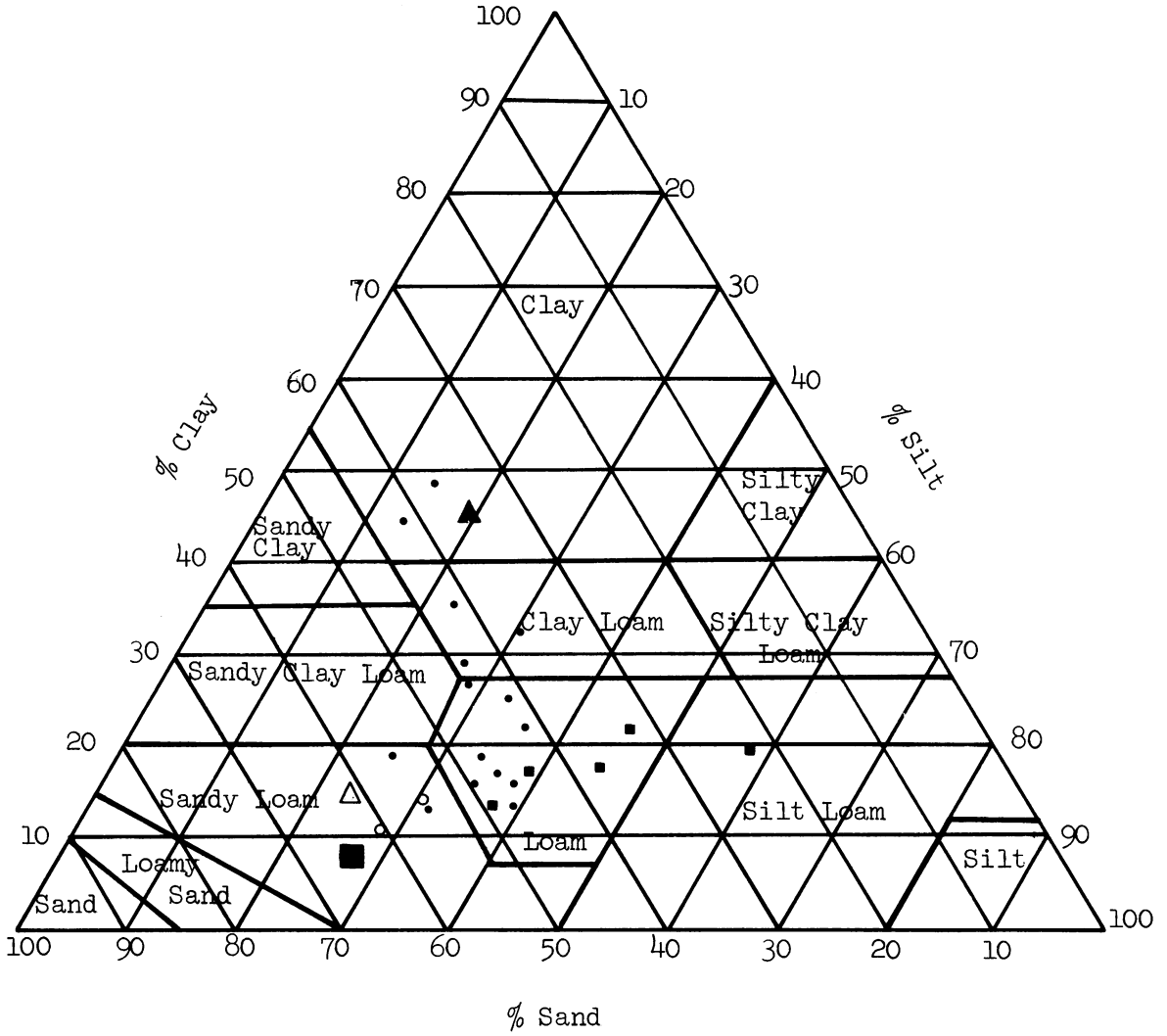
Acknowledgement

This analysis was carried out in the laboratory of Dr. R.J. Arkley and Dr. P.L. Gersper, Department of Soils and Plant Nutrition, University of California, Berkeley, under the supervision of Dr. Rudy Glauser. X-ray diffraction of the clay fractions was done with the assistance of Mr. Brian Viani of the same department.

TABLE 1 - Civa II and Slivovitz Rockshelters: Sediment Data

Sample	Organic Matter %Loss Ignition	%Sand	%Silt	%Clay	Texture	Sand Fractions - % of Sand Total: Very Coarse	Coarse	Medium	Fine	Very Fine	Pw	% > 2mm Wt.	Dry Color	Moist Color	Carbonation R x Nw/HCl	pH	Total P % of soil
Slivovitz																	
Stratum A (upper)	22.70	37.4	45.2	17.4	gravelly loam	14.7	24.9	14.0	21.3	25.1	6.92	30.1	10YR4/2	10YR2/2	+ e	7.0	0.37
Stratum A (lower)	21.16	32.6	45.6	21.8	"	13.2	25.3	14.1	21.7	25.7	9.14	21.5	10YR4/2	10YR2/2	+ e	7.8	0.60
Stratum B	1.35	22.8	57.7	19.5	silt loam	3.0	6.1	3.9	16.9	70.2	4.07	5.2	10YR6/3	10YR3/3	+ e	8.3	0.11
Stratum C	4.87	44.5	38.9	16.6	very gravelly loam	14.7	27.4	13.6	21.0	23.2	5.31	38.2	10YR4/1	10YR2/1	+ es	8.3	0.29
Ash Layer	0.77	49.6	37.2	13.2	gravelly loam	12.0	30.0	14.1	22.3	24.7	1.87	30.1	10YR6/2	10YR3.5/3	+ es	8.7	0.24
Civa II																	
Stratum A (N8E0, N)	2.88	36.7	30.9	32.4	clay loam	6.1	22.9	15.0	30.6	25.3	6.10	8.6	10YR6/2	10YR3/2	+ es	7.7	0.16
Stratum A (N8E0, E)	2.34	41.7	36.3	22.0	loam	5.7	18.2	13.8	31.1	31.3	3.40	14.5	10YR6/2	10YR3/3	+ e	7.8	0.16
Stratum B (N8E0, N)	1.98	41.7	22.4	35.9	gravelly clay loam	8.9	26.4	16.0	28.9	19.9	6.41	16.6	10YR6/2	10YR3/2	+ e	7.6	0.18
Stratum B (N8E0, E)	2.84	47.9	38.6	13.5	loam	11.3	18.3	12.5	29.3	28.7	3.53	9.7	10YR4.5/2	10YR2/2	+ es	7.7	0.22
Stratum B_1 (N8E0, N)	3.19	35.5	16.3	48.2	gravelly clay	15.9	28.9	16.1	24.6	14.5	10.12	20.4	10YR5/1	10YR4/2	+ e	7.4	0.05
Stratum B_2 (N8E0, E)	0.35	45.7	38.6	15.7	loam	4.4	17.9	13.8	33.3	30.7	4.66	4.9	10YR6/1	10YR4/2	+ ev	8.3	0.30
Stratum C^2 (N8E0, E)	3.66	44.3	28.8	26.9	gravelly heavy loam	13.8	23.5	14.7	27.4	20.6	6.53	18.2	10YR6/1	10YR3.5/1	+ es	7.6	0.15
Stratum D (N8E0, N)	5.23	41.5	32.6	25.9	loam	10.5	23.6	15.8	28.8	21.4	6.82	7.7	10YR5/1	10YR2/1	+ es	7.7	0.19
Stratum D (N8E0, E)	2.66	49.9	34.3	15.8	light loam	10.3	20.4	14.4	29.4	25.5	5.06	7.8	10YR5/1	10YR3/1	+ es	7.9	0.18
Stratum E (N8E0, E)	2.64	44.1	26.9	29.0	clay loam	13.1	24.0	15.2	27.9	19.7	7.44	13.4	10YR5.5/1	10YR3/1	+ e - es	7.7	0.12
Stratum F (N8E0, E)	3.60	46.9	36.1	17.0	loam	10.5	19.5	13.4	29.7	26.8	4.44	10.5	10YR5.5/1	10YR3/1	+ es	7.9	0.20
Stratum G (N8E0, N)	3.85	55.4	31.6	13.0	gravelly sandy loam	12.5	21.2	14.7	29.6	22.1	3.90	18.0	10YR5/1	10YR3/1	+ es	7.9	0.19
Stratum N (N8E2, E)	3.12	47.0	34.3	18.7	loam	10.9	20.5	14.3	29.4	24.8	5.33	10.1	10YR5/1	10YR3/1	+ es	7.9	0.20
Ash - N8E0	2.10	55.1	25.9	19.0	sandy loam	8.0	18.8	15.5	34.5	23.3	4.22	4.8	10YR8/2	10YR6/2	+ es	7.9	0.03
Clay Deposit	0.41	41.4	14.3	44.3	clay	14.5	28.7	16.6	24.1	16.1	8.75	2.2	10YR6/2	10YR3/1	-	7.2	0.02
Weathered Contact Bedrock	0.78	64.9	26.9	8.2	"sandy loam"	9.6	17.5	14.8	34.2	24.0	5.72	-	10YR8/1	10YR6/2	-	7.5	0.02
Outside Soil - Layer 1	1.55	55.7	31.2	13.1	gravelly sandy loam	15.6	18.1	12.9	27.8	25.6	2.39	28.6	10YR6.5/3	10YR4/3	+ ev	8.0	0.04
Outside Soil - Layer 2	2.37	60.9	28.3	10.8	very gravelly sandy loam	14.4	19.7	13.1	26.7	26.1	5.32	36.2	7.5YR7/4	7.5YR5/4	+ ev	8.1	0.05
‡Slivovitz - Outside Soil	4.83	61.7	23.0	15.3	gravelly sandy loam	29.9	25.0	11.6	17.6	15.8	9.07	33.9	10YR3/1	10YR2/1	-	6.8	0.17
Coal Valley Dry Lake Sediment Sample	1.42	36.1	18.8	45.1	clay	0.1	4.7	14.6	48.7	32.0	4.97	0.0	10YR7/2	10YR6/3.5	+ ev	8.0	0.04

Figure 1: Textural Classification of Samples



• : Civa II Sediment
o : Civa II External Soil
■ : Civa II Weathered Bedrock
▪ : Slivovitz Sediment
△ : Slivovitz External Soil
▲ : Coal Valley Dry Lake Sediment

Figure 2

Slivovitz Shelter - Sand Fraction Distribution

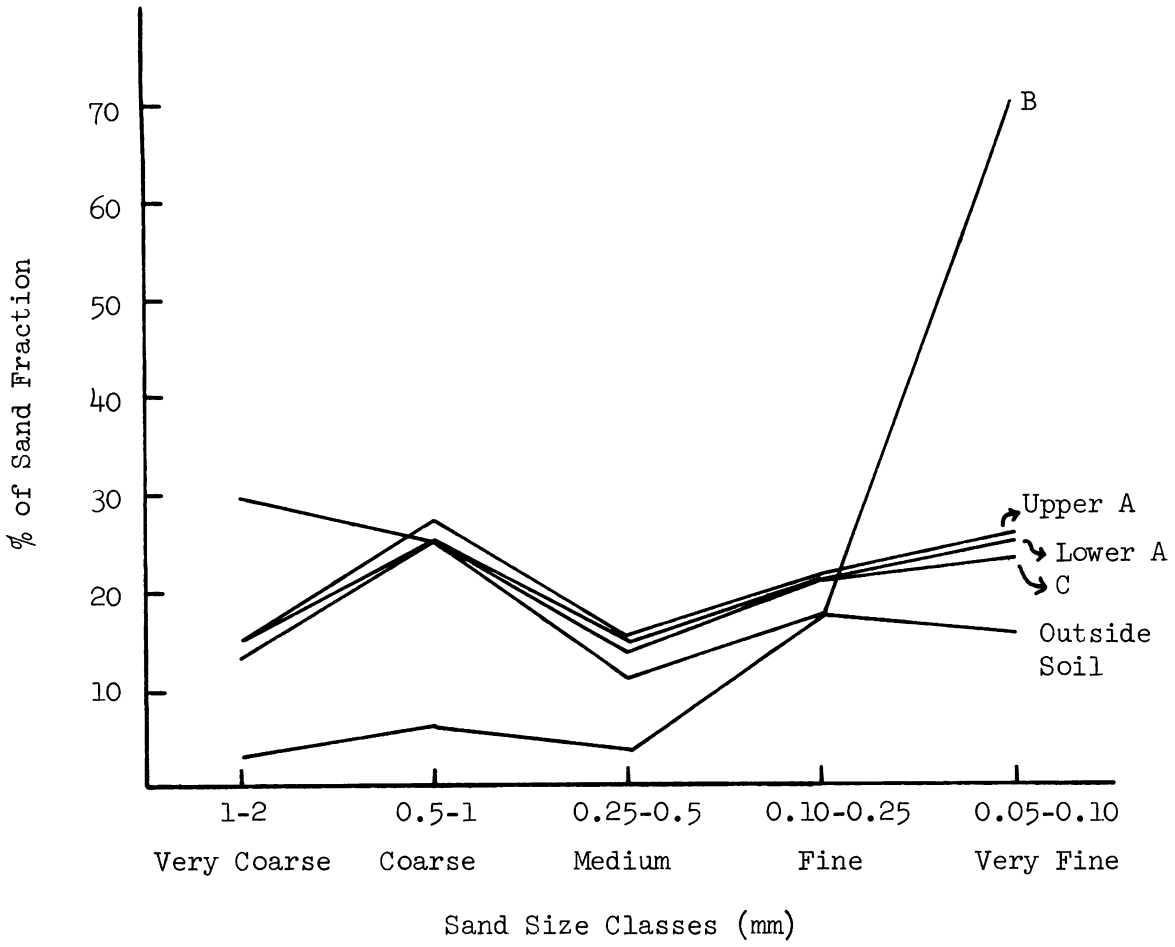
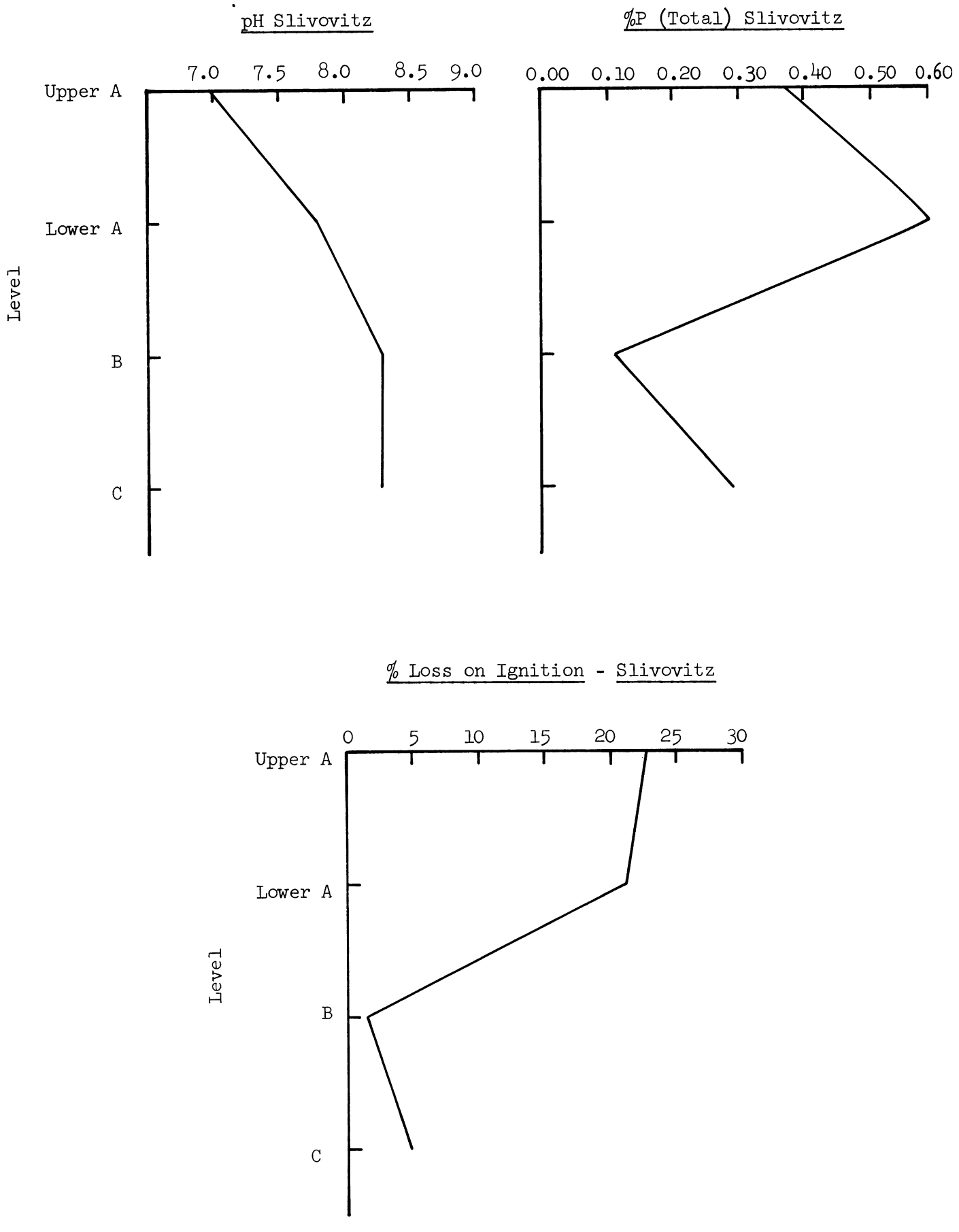


Figure 3


pH Slivovitz
7.0
7.5
8.0
8.5
9.0
%P (Total) Slivovitz
0.00
0.10
0.20
0.30
0.40
0.50
0.60
Upper A
Lower A
B
C
Level
% Loss on Ignition - Slivovitz
0
5
10
15
20
25
30
Upper A
Lower A
B
C
Level

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Appendix II

An Analysis of the Fauna From Civa Shelter II, Lincoln County, Nevada

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Civa Shelter II, excavated by a University of California field party under the direction of Colin I. Busby, yielded a large quantity of vertebrate faunal remains (43,482 bones and fragments). These are for the most part fragmentary and only one-sixth (7675 specimens) are identifiable to species. A preliminary survey of the mammalian remains indicates that small to medium-sized mammals, particularly jackrabbit (Lepus californicus) are most abundant, although bighorn sheep (Ovis canadensis), mule deer (Odocoileus hemoinus) and a larger bovid (possibly Bison bison) are also present, along with the remains of several carnivores. The Civa II fauna is of particular interest because of the apparent abundance of jackrabbit. Investigations focusing on subsistence in the Great Basin have until now dealt primarily with faunas containing an abundance of bighorn and cottontail (e.g., Kobori, In press; Thomas 1969, 1972; Fowler 1968). Steward (1938), in his study of Great Basin aboriginal groups, has observed that such species are best hunted singly, through stalking in the case of the former, and trapping in the case of the latter. Civa Shelter II is unique in providing an opportunity for examining an occupation in which the dominant food resource is part of Steward's (1938) antelope/jackrabbit complex, characterized generally by communal hunts (often in the form of massive seasonal drives). An analysis of the Civa II fauna thus offers the potential for gaining a better understanding of the effects of subsistence on settlement patterning and social organization among Great Basin groups by contributing more information for use in testing Steward's (1938) hypotheses.

The analysis which follows will therefore focus on evidence for local environment during the period of occupation; subsistence patterns and seasonality; and if possible, evidence regarding butchery techniques and site function.

Method

The faunal remains included in this analysis come from 10 $2m^2$ pits excavated in 10 cm arbitrary levels, and were recovered largely from 1/4" mesh screen. Although the particular nature of the deposits made excavation in terms of natural stratigraphic units difficult, the use of these arbitrary units does present some problems for

quantitative analysis. Prominent among these problems is the combination of the samples recovered into meaningful units for the determination of species frequencies and analysis of skeletal element representation. A preliminary analysis of the Civa II fauna (Northey 1978) found that calculations of Minimum Numbers of Individuals (MNI) are affected greatly by the nature of the particular units selected for study. A pit by pit, level by level analysis (Grayson's "maximum distinction" approach (1978: 60)) was found for example to minimize the chance of grouping samples from different levels across the site; however because of the small sample sizes involved, the resulting species frequencies are skewed in the direction of larger species represented by relatively fewer bones. This is also the case when the analysis was conducted in terms of arbitrary 10 cm levels across the site (Northey 1978: 433). Remains of larger species such as bighorn and bison would appear to be spread over a relatively larger area than those belonging to smaller species such as jackrabbit and are therefore overemphasized when arbitrary units are considered.

In an attempt to combine the samples into more meaningful units for analysis, dental remains belonging to Ovis canadensis were matched on the basis of eruption and wear, and the samples were grouped accordingly. Three units result from this grouping. Unit I consists of surface material and levels 1-2; Unit II consists of levels 3-5; and Unit III comprises levels 6-8. It should be emphasized that because of the fragmentary nature of the dental and postcranial remains identified, these groupings are tentative. However, comparisons of the frequency of faunal remains with the stratigraphic distributions plotted for pottery and lithic artifact frequencies (Busby 1978) show significant variation in the relative abundance of both artifactual and faunal material corresponding to points in the stratigraphic sequence defined by Units I-III, thereby supporting their use as a basis for analysis.

The Minimum Numbers of Individuals computed for each species for Units I, II and III are presented in Table 1. Along with these figures, calculations of the percentage of useable meat contributed by selected species are presented as well. There are once again numerous problems associated with this approach (Stewart and Stahl 1977), and these figures should be viewed with caution. They are presented primarily for the purpose of providing a basis for comparison when discussing the relative abundance of species of differing sizes. Particularly in the case of comparisions involving jackrabbit and larger bovids such as bighorn and bison, Minimum Numbers of Individuals are somewhat misleading. In terms of dietary importance, one jackrabbit for example cannot possibly make a contribution equal to that of a bighorn sheep. Thus, although there are numerous inaccuracies involved in the use of useable meat figures, they do serve to suggest general patterns which can be used, along with other data to provide a general picture upon which some preliminary conclusions concerning subsistence can be based.

Discussion

As summarized in Table 1, the mammalian species present (and particularly the smaller animals such a Neotoma lepida, Citellus townsendii, Thomomys talpoides and

Sylvilagus nuttalli and Sylvilagus idahoensis) are typically characteristic of the Upper Sonoran Life Zone, and are commonly found in dry, brushy areas (cf. Hall 1946). The occurrence of Sorex merriami in Unit II (20-50 cm) is consistent with this, since it is often found on dry hillsides amid sagebrush (Hall 1946: 114). Two species, Spilogale purtorius, the spotted skunk, and Neotoma lepida, the desert wood rat, are commonly found in rocky, more sheltered environments (e.g., the immediate vicinity of the site), and the former in particular may have occupied the site during a period of abandonment by the human occupants. Of special interest as well is the occurrence of Vulpes macrotis throughout the site. Normally characterized by a low zonal position in or below the Upper Sonoran Life Zone, it is commonly found in more open areas, generally on the lower valley floors (e.g., the neighboring Garden and Coal Valleys (Hall 1946: 233)).

As was observed initially, Lepus californicus is the most abundant of the mammals present throughout the history of the occupation of the site in terms of the number of individuals represented (although, because of its size, its contribution in terms of pounds of useable meat is somewhat less than that of the larger mammals such as Ovis canadensis; see Table 1). Clearly, the occupants of the shelter were concentrating heavily on this animal as a major source of food and raw material (e.g., for the manufacture of bone beads) and ethnographic data (summarized in Steward 1938) indicate that it was the object of regular communal hunts.

> "Its habitat was open, sage covered valleys. Its speed and ability to hide made it difficult to hunt with the bow and arrow, but the large and rapidly multiplying herds rewarded communal hunting. Drives were held throughout most of the area and were the most important communal activity. The usual plan was to place a number of long, low nets end to end in a vast semi-circle many hundred yards in diameter. A large crowd, often including the women and children, then beat the brush, driving the animals into the nets where they were dispatched" Steward 1938: 38).

In the neighboring Railroad Valley, and in the Steptoe and Spring Valleys further north, these drives were generally held in the Fall, around November, lasting from six weeks to two months (Steward 1938: 119). The number of people involved appears to have varied. In the Railroad Valley drives, a number of villages were commonly involved, whereas participants in the northern drives generally came from one or a few villages (Steward 1938: 122). In the case of Civa Shelter II, the number of people involved is difficult to estimate. The size of the shelter and the nature and extent of the various occupation horizons would tend however to argue against a major winter camp. Rather, a more reasonable interpretation might view this as a late Fall - early Winter camp occupied by one or two families (Busby 1978).

Although limited in number when compared with the great abundance of

jackrabbit at the site, the larger mammals (Ovis canadensis, Odocoileus hemionus and Bos taurus or Bison bison) would appear to contribute a large proportion of the meat potentially used by the occupants of Civa II (see Table 1). In Unit I for example roughly 300 lbs. of useable meat is contributed by bighorn sheep, compared to 197 lbs. contributed by jackrabbit. The amount of meat contributed by these species is more or less equal in Units II and III. Whether the hunting and initial butchery of the larger bovids was carried out in the vicinity of the site or at another locality is difficult to say. Certain discrepancies in the frequencies of various body parts (Table 2) would appear to suggest the operation of a "Schlepp Effect", particularly in the case of Bos or Bison. Comparisons of the skeletal element frequencies obtained for Lepus californicus and Ovis canadensis suggest however that the discrepancies observed may be related more to bone durability than deliberate selection. Of the body parts represented belonging to these species, more durable elements such as teeth, distal humeri, distal tibiae, innominates, calcanea and other tarsal bones are most common.

Of particular interest among these large mammal remains are those which have been tentatively assigned to Bos taurus in the upper levels of the site, and Bison bison in the lower (given the absence of evidence indicating any disturbance of the lower deposits). These large bovid remains are comprised solely of very fragmentary postcranial elements (belonging primarily to the manus and pes); therefore, the precise taxonomic assignment can be debated. Although bison has not been reported in the area during historic times (Hall 1946: 644), its presence in neighboring archaeological sites has recently been suggested (Fowler 1968). However, until more faunal samples are obtained and hopefully some dentitions and less fragmentary postcranial elements are recovered, its occurrence in the area should be viewed as no more than a possibility. It is clear, however, that these large bovids were hunted elsewhere and only certain parts of the carcass (i.e., lower limbs and feet) were brought back to the site.

It is noteworthy here as well that most of the specimens provisionally assigned to Bos taurus and Bison bison belong to immature individuals, and this is true of at least one-half of the bighorn remains as well. The sample is, however, too small and fragmentary to obtain age distributions which might provide some additional information regarding the season of occupation, and all that can really be said at the moment is that there would appear to have been some degree of emphasis on younger individuals.

Medium-size carnivores such as Canis latrans and Lynx rufus have also been identified in the site. Although evidence at Slivovitz Shelter (cf. Kobori 1978) and elsewhere in the Great Basin (Kobori, In press) suggest that Lynx rufus may have been hunted as a food source, there is little direct evidence at Civa II to suggest that this was the case. In fact, there is some evidence suggesting the contrary in the less fragmentary nature of some of the postcranial remains recovered (particularly in Unit I of N12W2 where an articulated radius and ulna were recovered along with several bones of the manus), when compared to the almost universally broken-up limb bones of the other medium-size mammal present (Lepus californicus), not to mention the larger mammals in the site. It is interesting to note here, however, that several of the

metapodial fragments belonging to both Lynx rufus and Canis latrans exhibit cut/saw marks done apparently while the bone was still relatively fresh, suggesting the use of the shafts for other purposes (possibly for the production of bone beads).

Of the small mammals present, Sylvilagus nuttalli is the most common, followed by Neotoma lepida, Citellus sp., Thomomys talpoides, Cricetid mice and Sorex merriami. Unlike Slivovitz Shelter, rodent activity did not appear to have been too intense, and there are very few bones showing evidence of chewing or gnawing.

Burnt bone forms only a small part of the total (756 bones, or 1.7%). The burnt pieces which have been identified belong primarily to the larger species and there is very little burnt bone in the sample of Lepus californicus. This can probably be related to the manner in which the jackrabbits were prepared and cooked, and as was suggested by Kobori (In press) for Ezra's Retreat, the meat was possibly stripped prior to cooking or the animals were cooked whole in their skins.

Summary

Despite the fragmentary nature of the faunal remains and the problems encountered with respect to sampling and subsequent attempts at quantitative analysis, certain observations can be made concerning local environment and subsistence patterns during the period of occupation of Civa Shelter II. The great abundance of jackrabbit would suggest that it was the scene of repeated communal rabbit hunts or drives, very likely occurring in the late Fall as has been reported for various Shoshone groups in the vicinity (Steward 1938). The nature of the site would not appear to support the possibility of a major winter camp in the immediate vicinity, and it is probably better viewed as the Fall camping spot of one or two nuclear families concentrating on the hunting of jackrabbits (either by drives or through snaring) and to a lesser extent bighorn in the surrounding areas.

The mammalian fauna found within the deposits is not unlike the local fauna observed today. Of particular interest is the occurrence of very large bovid postcranial remains in the lower levels of the site which may be tentatively referred to as Bison bison. It is probable that as more research is conducted in this area and more faunal samples are recovered through excavation, the presence of bison in the area will be more securely documented.

Table 1 - Species Frequencies and Useable Meat [1] (Units I, II, III)

Unit	Bone#	%	MNI	lbs/kg	Useable Meat %
Unit I (Surface - 20 cm)					
Ovis canadensis	142	5.45	3	300.00/136.08	28.47
Odocoileus hemionus	4	0.15	1	100.00/ 45.46	9.49
Bos taurus	10	.38	1	400.00/181.44	37.96
Canis latrans	33	1.27	2	25.00/ 11.34	2.37
Lynx rufus	13	0.50	1	14.00/ 6.80	1.33
Vulpes macrotis	1	0.04	1	----------	-----
Lepus californicus	1323	50.77	87	196.62/ 89.61	18.66
Sylvilagus nuttalli	346	13.28	18	14.04/ 6.30	1.33
Spilogale purtorius	1	0.04	1	0.42/ 0.19	0.04
Neotoma lepida	23	0.88	8	0.68/ 0.76	0.16
Thomomys talpoides	4	0.15	3	0.42/ 0.19	0.04
Citellus townsendii	7	0.27	3	1.05/ 0.48	0.10
Citellus sp.	2	0.08	2	0.56/ 0.25	0.05
Cricetid	1	0.04	1	----------	-----
Small/Medium Mammal	138	5.30	-	----------	-----
Snake	500	19.19	-	----------	-----
Tortoise	1(?)	0.04	-	----------	-----
Bird	3	0.12	-	----------	-----
	2606	100.00	132	1053.79/478.90	100.00
Unit II (20-50 cm)					
Ovis canadensis	229	6.00	3	300.00/136.08	25.82
Odocoileus hemionus	6	0.16	1	100.00/ 45.46	8.61
Bos taurus	39	1.02	1	400.00/181.44	34.43
Canis latrans	75	1.97	2	25.00/ 11.34	2.15
Lynx rufus	14	0.37	1	14.00/ 6.80	1.21
Vulpes macrotis	1	0.03	1	----------	-----
Lepus californicus	2415	63.30	134	302.84/138.02	26.07
Sylvilagus nuttalli	355	9.31	22	17.16/ 7.70	1.48
Sylvilagus idahoensis	2	0.05	1	0.40/ 0.18	0.03
Neotoma lepida	35	0.91	9	1.80/ 0.86	0.07
Citellus townsendii	3	0.08	1	0.35/ 0.16	0.03
Citellus sp.	7	0.18	4	1.12/ =0.50	0.10
Cricetid	1	0.03	1	----------	-----
Sorex merriami	1	0.03	1	----------	-----

Unit II (20 - 50 cm)

Unit	Bone#	%	MNI	lbs/kg	Useable Meat%
Thomomys talpoides	3	0.08	1	0.14/ 0.04	0.01
Small/Medium Mammal	203	5.32	-	----------	-----
Snake	401	10.51	-	----------	-----
Bird	8	0.21	-	----------	-----
	3815	100.00	182	1161.78/528.58	100.00
Unit II (50-80 cm)					
Ovis canadensis	61	4.90	2	100.00/ 90.72	22.72
Odocoileus hemionus	2	0.16	1	100.00/ 45.46	11.36
Bos taurus/Bison bison	2	0.16	1	400.00/181.44	45.44
Canis latrans	8	0.64	1	12.50/ 5.67	1.42
Lynx rufus	7	0.56	1	14.00/ 6.80	1.59
Vulpes macrotis	1	0.08	1	----------	-----
Lepus californicus	824	66.13	63	142.38/ 64.89	16.18
Sylvilagus nuttalli	123	9.87	13	10.14/ 4.55	1.15
Neotoma lepida	3	0.24	3	0.63/ 0.29	0.07
Thomomys talpoides	5	0.08	1	0.28/ 0.13	0.03
Small/Medium Mammal	50	4.01	-	----------	-----
Snake	147	11.80	-	----------	-----
	1246	100.00	89	880.21/400.03	100.00

1

The average weight figures employed are those computed previously by L. S. Kobori (In press).

Table 2 - Body Part Frequencies (MNI) - Unit I (Surface - 20 cm)

	Cranial	Maxilla	Mandible	Vertebrae	Ribs	Scapula	Humerus prox.	Humerus dist.	Radius prox.	Radius dist.	Ulna	Innominate	Femur prox.	Femur dist.	Tibia prox.	Tibia dist.	Fibula	Astragalus	Calcaneum	Tarsal/Carpals	Metapodial	Phlanges
Ovis canadensis	1	1	2	1	*	1	-	2	1	1	1	3	1	-	1	1	-	1	3	2	1	2
Odocoileus hemionus	-	1	-	-	*	1	-	-	-	-	1	-	-	1	-	-	-	-	-	-	-	-
Bos taurus	-	-	-	1	*	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1	-
Canis latrans	1	-	-	1	*	-	-	1	-	-	1	-	-	-	-	1	-	-	-	1	1	1
Lynx rufus	-	-	-	-	*	-	-	1	-	-	1	-	-	-	-	-	-	-	-	-	1	1
Lepus californicus	17	18	44	**	*	42	9	30	21	12	23	21	15	14	10	87	-	18	30	7	6	2
Sylvilagus nuttalli	2	11	18	**	*	8	2	11	2	-	3	7	7	3	9	18	-	1	8	-	3	1

* Ribs: Small = 11, Medium = 11, Large = 1 (N)

** Vertebrae: Small - 2, Medium = 26 (N)

(Lepus californicus is considered a "medium-size" mammal in this instance)

Table 2 - Body Part Frequencies (MNI) - Unit I (20 - 50 cm)

	Cranial	Maxilla	Mandible	Vertebrae	Ribs	Scapula	Humerus prox.	Humerus dist.	Radius prox.	Radius dist.	Ulna	Innominate	Femur prox.	Femur dist.	Tibia prox.	Tibia dist.	Fibula	Astragalus	Calcaneum	Tarsals/Carpal	Metapodials	Phlanges
Ovis canadensis	1	2	1	2	*	2	1	2	2	1	1	2	1	1	1	3	-	1	3	2	1	2
Odocoileus hemionus	-	1	1	-	*	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bos taurus	-	-	-	-	*	-	-	-	-	-	-	1	-	-	-	-	-	1	1	1	1	1
Canis latrans	1	1	2	-	*	1	-	1	1	-	-	2	1	1	-	1	1	-	-	-	2	1
Lynx rufus	-	-	1	-	*	1	-	-	1	-	1	-	-	-	-	-	-	-	-	-	-	1
Lepus californicus	10	89	60	**	*	80	18	41	18	30	27	27	45	9	17	134	-	28	30	28	8	2
Sylvilagus nuttalli	3	7	22	**	*	11	6	15	4	2	6	10	4	4	6	21	-	-	7	-	3	1

* Ribs: Small = 31, Medium = 37, Large = 1 (N)

** Vertebrae: Small = 22, Medium = 84 (N)

Table 2 - Body Part Frequencies (MNI) - Unit III (50 - 80 cm)

	Cranial	Maxilla	Mandible	Vertebrae	Ribs	Scapula	Humerus prox.	Humerus dist.	Radius prox.	Radius dist.	Ulna	Innominate	Femur prox.	Femur dist.	Tibia prox.	Tibia dist.	Fibula	Astragalus	Calcaneum	Tarsals/Carpals	Metapodials	Phalanges
Ovis canadensis	1	2	1	-	*	1	-	1	1	-	1	1	2	1	1	1	-	1	1	1	1	2
Odocoileus hemionus	-	-	1	-	*	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
Bos/Bison	-	-	-	1	*	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
Canis latrans	-	1	-	-	*	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1	1
Lynx rufus	-	-	1	-	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Lepus californicus	3	36	24	**	*	36	5	10	16	8	8	6	10	9	4	63	-	6	9	7	3	1
Sylvilagus nuttalli	1	5	7	**	*	5	1	1	1	2	3	2	2	2	2	13	-	-	-	-	1	1

* Ribs: Small = 1, Medium = 8 (N)

** Vertebrae: Small = 13, Medium = 9 (N)

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Appendix III

Analysis of Two Faunal Assemblages: Slivovitz Rockshelter and Avocado Rockshelter

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The faunal remains from Slivovitz Rockshelter (26-Ny-1272) and Avocado Rockshelter (26-Ny-1263) were excavated in July 1977 by a University of California field party under the direction of Colin I. Busby, Department of Anthropology, University of California, Berkeley. Of the 8 total excavated units at Slivovitz Shelter, only 4, primarily from the theorized central occupation area, were selected for a full faunal analysis. Only one unit from the badly vandalized Avocado Shelter was analyzed. The bones were analyzed at Arizona State University, Tempe and the University of California, Berkeley. The results of the analysis are presented below.

The faunal assemblages for the two sites are in general:

1. Badly broken and fragmented;
2. indicative of the remains left by a small, social group-band (i.e., probably one-two nuclear families); and
3. support the conclusion that the rockshelters represent temporary occupation hunting/gathering sites.

The fragmentary and often rodent chewed/gnawed bones made species identification very difficult. As well, many small mammal bones were undoubtedly lost due to the use of 1/4" mesh screen although diligent examination of the screened fill by the field crew members appeared to minimize this loss.

Table 1 lists for Slivovitz Shelter the identified species or category (small, medium, large mammal); the number of bones per species/category; the percentage of

bone per species per species/category; minimum number of individuals per species only; lbs/kg usable meat per species; and the percentage of usable meat per species. This data is presented by pit and excavated level. Table 2 lists the same data for a single unit at Avocado Shelter.

The percentage of usable meat per level and pit is presented in Fig. 1 - 4 for selected small and large mammal species. These calculations are based on the estimated minimum number of individuals multiplied by the lbs/kg usable meat per individual animal as determined previously by Kobori (In press).

Interpretation of the upper levels (0 - 20 cm below surface) from Slivovitz is a difficult task. While identifiable large mammal species in pits N5E0 and N3E0 are zero (Fig. 1 and 2), the actual percentage of unidentified large mammal bones is high - 56% and 85% respectively. Decreased site utilization, rodent activity and subsequent human disturbance probably contribute to an apparent mix of the deposit. Data from the other levels clearly demonstrate the exploitation of Ovis canadensis (bighorn) as the main source of hunted food. The various small mammal species were secondary sources (Tables 1 and 2, Figs. 1-4). Interestingly, at both Slivovitz and Avocado Shelters, Lynx rufus (bobcat) apparently was a hunted food source. This has been recorded ethnographically (Steward 1938, 1941; Stewart 1941, 1942) and inferred for the archaeological record (Kobori, In press). This particular region is well suited for bobcat (see Natural Setting chapter). The possibility that these animals used the rockshelters (at various times) for dens must also be considered. However, from 60-80 cm in N3E0 the left half of a Lynx rufus mandible was recovered. On the internal (lingual) surface of the mandible posterior to the symphysis are distinct butchering marks. This bone supports the supposition that the bobcat was indeed a hunted food source for this area. The occurrence of Lynx bones in cave/rockshelter deposits cannot be unilaterally dismissed as the result of 'natural' processes although it is true they may be involved.

Slivovitz units N5E2 and N5E0 yielded isolated Castor canadensis bones. The stream which now flows in front of the shelter today has a small meadow surrounding it, but there is no trace of any recent or past beaver activity. Hall (1946: 482) indicates no known beaver distribution for this area and we have no way of determining any chronological age for the presence of beaver except to suggest that it was present when the shelter was occupied (ca. 1000 A.D. - 1850 A.D.).

The faunal assemblages from both sites are characterized by species which can be most efficiently stalked and hunted by either a solitary hunter or a small number of hunters. Despite the relatively few identified species, the sites' fauna are clearly most similar to the deer-sheep-cottontail faunal complex (cf. Thomas 1969; Kobori 1976, In press). This particular faunal complex may represent the hunted food remains of a small socio-political group. The size of the sites support the conclusion that only 1-2 nuclear families were utilizing the shelters at any one time.

Seasonality of the sites is difficult to determine. There are very few

immature bones present. The occurrence of pinyon nuts in the Slivovitz deposits points to an early fall occupation (cf. Thomas 1971). Very little can be said, based on the broken and often burned animal bones. Overall the bones are relatively few in number and appear concentrated only at Slivovitz in N5E0 and N5E2. This concentration of bone leads to the conclusion that the site was utilized for short periods over an unknown tomporal span. In addition, the possibility must remain open that the same group utilized the site year after year.

While the bones are centainly not in the best of condition, additional analysis has brought to light some interesting points. The bones (many of them burned) at Slivovitz and Avocado are heavily rodent chewed (Table 3). Large mammal bones were predominately gnawed but occasional small mammal (Sylvilagus sp.) bones were also subjected to the chewing. Close examination of these chewed and highly fragmented bones has revealed that this rodent activity probably occurred when the bone was very fresh (still oily and moist).

To verify this idea, fresh bone was placed within the cages of the common lab mouse (stored at ASU) Mus musculus. In addition, several rodent nests were examined (some currently occupied and some abandoned) in the desert region surrounding the Phoenix Metropolitan area. The skeletal materials recovered from the rodent nests was less fresh and drier. The few gnawed bones reveal more irregular incisor-produced grooves. This is probably due to the drier and flaked surface of the bone. In comparison, the fresh bone chewed by the lab mice exhibits regular, well formed grooves without jagged borders. The field and lab observations have ruled out mice as the most likely candidates for the gnawing present on the Slivovitz and Avocado bone. Mouse produced grooves on fresh bone and recently cooked bone are not wide enough, or deep enough. We postulate that Neotoma sp. and possibly Citellus spp. (larger species) were responsible for the extensive gnaw marks.

Some of the faunal remains from Slivovitz and Avocado appear to have been gnawed and then burned. We inferred this conclusion from charred bone scratched and/or cut by a surgical scapel, exposing a lighter brown color below the original bone surface. If the excavated skeletal material was burned and then rodent chewed, we would have detected a lighter brown color below the original bone surface. If the excavated skeletal material was burned and then rodent chewed, we would have detected a lighter brown color where gnawed. The exception to this is when the bone is completely burned, both externally and internally. On incompletely burned bone from the Slivovitz and Avocado deposits, the pattern of fire induced blackening is not restricted to the original bone surface but extends down to the bottom of the rodent chewed grooves. Also burned and hence drier bone when chewed, should produce a more uneven groove which is not the case here. The picture that emerges is one of a group breaking up long bones for probable bone marrow extraction with the 'debitage' from this activity apparently attracting rodents. For unknown reasons, the rodents did not drag off the bone fragments but chewed them 'on the spot' so to speak. During and after this, some of the bone was gathered and burned by the people occupying the site.

The sites are not bighorn kill sites but the freshness of the bone would point to the possibility of a kill site or sites in the immediate vicinity of the two shelters. This concurs with the geography of the area which in the past must have been an ideal region for the observation and hunting of game. After initial dismemberment and field butchering, the kill was brought from a short distance to the shelter for further processing. We propose that the kill took place within the confines of the small canyon and surrounding mountain slopes. The high number of distal projectile point fragments found with the bone appears to suggest this conclusion. The initial butchering activity apparently did not entail the removal of projectile points and it is probable that portions of the animals were brought into the shelters with the distal point fragments still present within the carcass.

In conclusion, the highly fragmented nature of the bones severely limited the determination of the number and variety of identifiable species. Despite this problem the results are consistent for each excavated pit. The faunal remains from both point to the refuse of a small socio-political unit concerned with the seasonal hunting of Ovis canadensis (bighorn) and other small mammals.

Notes

Mammal Size Determinations

Unidentified small mammals - up to and including cottontail
Unidentified medium mammals - jackrabbit to coyote
Unidentified large mammals - larger than coyote and bobcat

Table 1

Slivovitz Shelter

N5E0

Level 1 (0 – 20 cm)	Bone#	%	MNI	lbs/kg	Usable Meat %
Citellus sp.	1	0.91	1	0.35/ .159*	15.98
Sylvilagus nuttalli	5	4.55	2	1.56/ .70	71/23
Thomomys talpoides	2	1.82	2	0.28/ .128	12.79
Small mammal	40 15	36.36	-	-	-
Large mammal	62	56.36	-	-	-
	110			2.19/ .987	
Level 2 (20 - 40 cm)					
Citellus sp.	2	1.00	1	0.35/ .159*	0.29
Neotoma cinerea	3 2	1.50	2	1.54/ .698	1.27
Sylvilagus nuttalli	9	4.50	5	3.90/ 1.75	3.23
Lynx rufus	1	0.50	1	15.0 / 6.804	12.42
Ovis canadensis	2	1.00	1	100.0 / 45.36	82.79
Small mammal	63 20	31.50	-	-	-
Large mammal	120	60.00	-	-	-
	200			120.79/54.771	
Level 3 (40 - 60 cm)					
Neotoma cinerea	1	0.35	1	0.77/ .349	0.54
Sylvilagus nuttalli	8	2.77	2	1.56/ .70	1.11
Castor canadensis	1	0.35	1	38.5 /17.463	27.34
Ovis canadensis	14	4.84	1	100.00/45.36	71.01
Small mammal	90	31.14	-	-	-
Large mammal (Over 2/3 are burnt)	175	60.55	-	-	-
	289			140.83/63.872	
Level 4 (60 - 80 cm)					
Citellus sp.	2	0.41	1	0.35/ .159*	0.17
Sylvilagus nuttalli	8	1.66	2	1.56/ .70	0.77
Thomomys talpoides	1	0.21	1	0.14/ .064	0.07

	Bone #	%	MNI	lbs/kg	Usable Meat %
Ovis canadensis	120	24.95	2	200 /90.72	98.99
Large mammal	350	72.77	-	-	-
	481			202.05/91.643	
N5E0					
Level 1 (0 - 20 cm)					
Neotoma cinerea	4	3.60	2	1.54/ .698	1.49
Ovis canadensis	39	35.14	1	100.00/45.36	97.09
Sylvilagus idahoensis	1	0.90	1	0.40/ .181	0.39
Sylvilagus nuttalli	5	4.50	1	0.78/ .350	0.76
Thomomys talpoides	2	1.80	2	0.28/ .128	0.27
Large mammal	60	54.06	-	-	-
	111			103.0 /46.717	
Level 2 (20 - 40 cm)					
Castor canadensis	1	0.47	1	38.5 /17.463	26.22
Citellus townsendii	1	0.47	1	0.35/ .159	0.24
Citellus sp.	1	0.47	1	0.35/ .159*	0.24
Lagurus curtatus	2	0.94	1	0.40/ .018	0.027
Neotoma cinerea	9	4.25	3	2.31/ 1.05*	1.57
Neotoma lepida	1	0.47	1	0.21/ .095	0.143
Ovis canadensis	51	24.06	1	100.0 /45.36	68.11
Sylvilagus nuttalli	8	3.77	4	4.78/ 1.40	3.26
Thomomys talpoides	2	0.94	2	0.28/ .128	0.19
Large mammal	136	64.15	-	-	-
	212			146.82/65.832	
N5E2					
Level 3 (40 - 60 cm)					
Lynx rufus	3	0.61	1	15.0 / 6.80	12.83
Neotoma cinerea	4 (imm)	0.82	1 (imm)	0.77/ .349	0.66
Neotoma lepida	1	0.21	1	0.21/ .095	0.18
Ovis canadensis	133	27.25	1	100.0 /45.36	85.54
Sylvilagus nuttalli	5	1.03	1	0.78/ .35	0.67
Thomomys talpoides	3	0.61	1	0.14/ .064	0.06

	Bone #	%	MNI	lbs/kg	Usable Meat %
Large mammal	339	69.47	-	-	-
	448			116.9 /53.02	
Level 4 (60 - 80 cm)					
Castor canadensis	1	0.14	1	38.5 /17.463	15.81
Lepus californicus	1	0.14	1	2.26/ 1.03	0.93
Neotoma cinerea	1	0.14	1	0.77/ .349	0.32
Neotoma lepida	5	0.69	3	0.63/ .285	0.26
Odocoileus hemionus	1	0.14	1	100 /45.36	41.07
Ovis canadensis	151	20.88	1	100 /45.36	41.07
Sylvilagus idahoensis	1	0.14	1	0.40/ .181	0.16
Sylvilagus nuttalli	4	0.55	1	0.78/ .35	0.32
Thomomys Talpoides	1	0.14	1	0.14/ .064	0.06
Large mammal	557 70	77.04	-	-	-
	723			243.48/110.42	
N3E0					
Level 1 (0 - 20 cm)					
Neotoma cinerea	2	2.25	1	0.77/ .349	39.09
Neotoma lepida	1	1.12	1	0.21/ .095	10.66
Neotoma sp.	2	2.25	1	0.21/ .095*	10.66
Sylvilagus nuttalli	5	5.62	1	0.78/ .35	39.59
Medium mammal	3	3.57	-	-	-
Large mammal	76 10	85.39	-	-	-
	89			1.97/ 0.889	
Level 2 (20 - 40 cm)					
Lepus californicus	1	1.06	1	2.26/ 1.03	2.17
Neotoma cinerea	2 (imm)	2.13	1	0.77/ .349	0.74
Ovis canadensis	2 (imm)	2.13	1	100.0 /45.36	46.20
Sylvilagus nuttalli	2	2.13	1	0.58/ .35	0.75
Thomomys talpoides	1	1.06	1	0.14/ .064	0.14
Large mammal	86 12	91.49	-	-	-
	94			103.95/47.153	

	Bone #	%	MNI	lbs/kg	Usable Meat %
Level 3 (40 - 60 cm)					
Citellus townsendii	1	0.92	1	0.35/ .159	0.30
Citellus sp.	2	1.83	2	0.70/ .318*	0.60
Lynx rufus	1	0.92	1	15.0 / 6.804	12.82
Neotoma sp.	1	0.92	1	0.21/ .095*	0.18
Ovis canadensis	1	0.92	1	100.0 /45.36	65.44
Sylvilagus nuttalli	4	3.67	1	0.78/ .35	0.66
Large mammal	99	90.82	-	-	-
	109			117.04/53 036	
Level 4 (60 - 80 cm)					
Lynx rufus	1	1.37	1	15.0 / 6.804	12.96
Ovis canadensis	2	2.74	1	100.0 /45.36	86.37
Sylvilagus nuttali	3	.11	1	0.78/ .35	0.67
Large mammal	67	91.78	-	-	-
	73			1.55/ 0.699	
Level 5 (80 - 100 cm)					
Neotoma sp.	2	1.24	1	0.77/ .349	49.68
Sylvilagus nuttalli	3	1.86	1	0.78/ .35	50.32
Large mammal	156 15	96.90	-	-	-
	161			1.55/ 0.699	
Level 6 (100 - 120 cm)					
Neotoma sp.	2	2.50	1	0.21/ .095*	21.21
Sylvilagus nuttalli	2	2.50	1	0.78/ .35	78.79
Large mammal	76 5	95.00	-	-	-
	80			0.99/ 0.445	
N6W7					
Level 1 (0 - 20 cm)					
Neotoma cinerea	1	2.50	1	0.77/ .349	43.75
Neotoma sp.	1	2.50	1	0.21/ .095*	11.93
Sylvilagus nuttalli	2	5.00	1	0.78/ .35	44.32
Large mammal	36 6	90.00	-	-	-
	40			1.76/ .794	

Table 2 - Avocado Shelter - S3E0

Level 1 (0 - 20 cm	Bone #	%	MNI	lbs/kg	Usable Meat %
Neotoma cinerea	1(im)	1.33	1	0.77/ .347	0.37
Sylvilagus nuttalli	7	9.33	4	3.12/ 1.4	1.53
Odocoileus hemionus (?)	1	1.33	1	100.00/45.36	49.05
Ovis canadensis	5	6.67	1	100.00/45.36	49.05
Small mammal	5	6.67	-	-	-
Large mammal	56 (11)	74.67	-	-	-
	75			203.89/92.469	
Level 2 (20 - 40 cm)					
Neotoma cinerea	2(im)	2.41	2	1.54/ .698	1.49
Neotoma sp.	1	1.21	1	0.21/ .095*	0.20
Sylvilagus nuttalli	6	7.23	2	1.56/ .70	1.51
Ovis canadensis	5	6.02	1	100.00/45.36	96.80
Small mammal	10	12.05	-	-	-
Large mammal	59 (11)	71.08	-	-	-
	83			103.31/46.853	
Level 3 (40 - 60 cm					
Citellus sp.	1	0.54	1	0.35/ .159	0.16
Neotoma cinerea	1(im)	0.54	1	0.77/ .159	0.35
Neotoma sp.	3	1.62	3	0.63/ .285*	0.29
Sylvilagus nuttalli	10	5.31	3	2.34/ 1.05	1.07
Lynx rufus	1	0.54	1	15.0 / 6.804	6.85
Odocoileus hemionus(?)	1	0.54	1	100.00/45.36	45.64
Ovis canadensis	3	1.62	1	100.00/45.36	45.64
Small mammal	15	8.11	-	-	-
Large mammal	150 (17)	81.08	-	-	-
	185			219.09/99.367	
Level 4 (60 - 80 cm)					
Sylvilagus nuttalli	6	3.59	2	1.56/ .70	0.77
Ovis canadensis	5(1 im)	2.99	2	200.00/90.72	99.23
Small mammal	71	42.52	-	-	-
Large mammal	85 (15)	50.90	-	-	-
	167			201.56/91.42	

Table 3

Slivovitz Shelter - Rodent Chewed Bones

N5E0	Large Mammal # Chewed	# Chewed & Burned	Small Mammal # Chewed	# Chewed & Burned
L-1 (0 - 20 cm	28	4	2	0
L-2 (20 - 40 cm)	73	16	4	0
L-3 (40 - 60 cm)	105	19	3	2
L-4 (60 - 80 cm)	91	14	1	0
L-5 (80 - 100 cm)	14	3	0	0
N5E2				
L-1 (0 - 20 cm)	10	9	0	0
L-2 (20 - 40 cm)	31	7	0	0
L-3 (40 - 60 cm)	72	5	0	0
L-4 (60 - 80 cm)	97	10	3	1
N3E0				
L-1 (0 - 20 cm)	17	5	2	0
L-2 (20 - 40 cm)	9	0	0	0
L-3 (40 - 60 cm)	14	1	1	0
L-4 (60 - 80 cm)	67	0	0	0
L-5 (80 - 100 cm)	15	4	0	0
L-6 (100 - 120 cm)	7	0	0	0

Avocado Shelter - Rodent Chewed Bones

S3E0				
L-1 (0 - 20 cm)	16	11	0	0
L-2 (20 - 40 cm)	20	2	0	0
L-3 (40 - 60 cm)	3	1	1	0
L-4 (60 - 80 cm)	21	1	1	0

PERCENT USABLE MEAT BY LEVEL

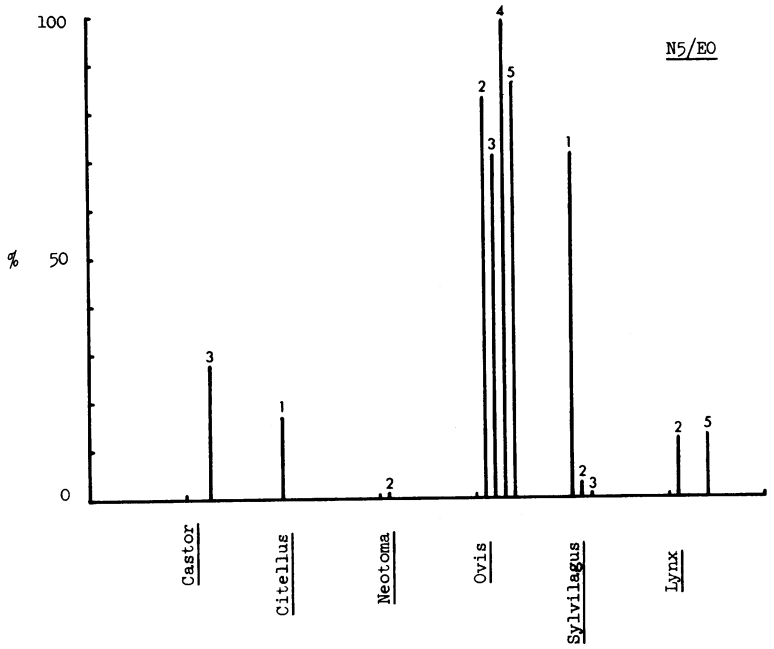

Figure 1

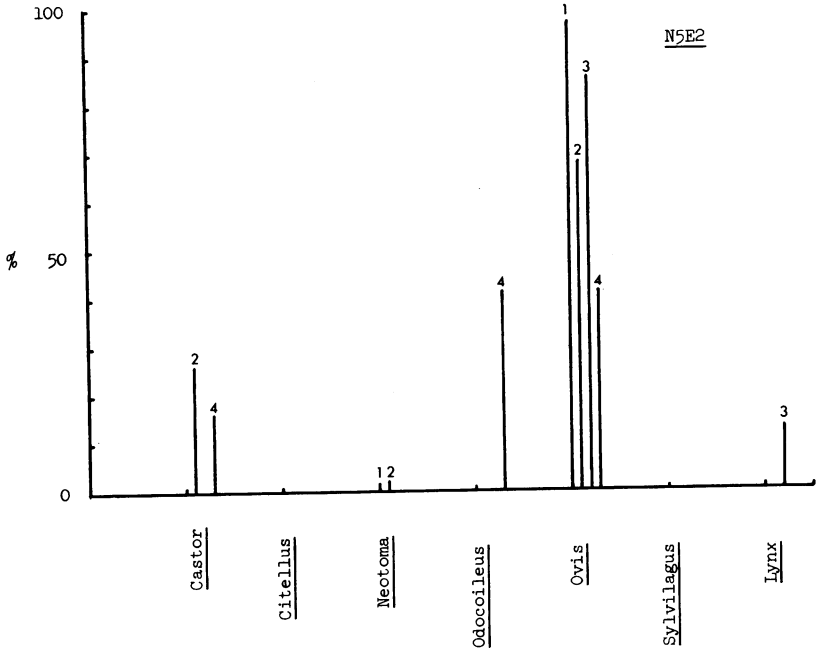

Figure 2

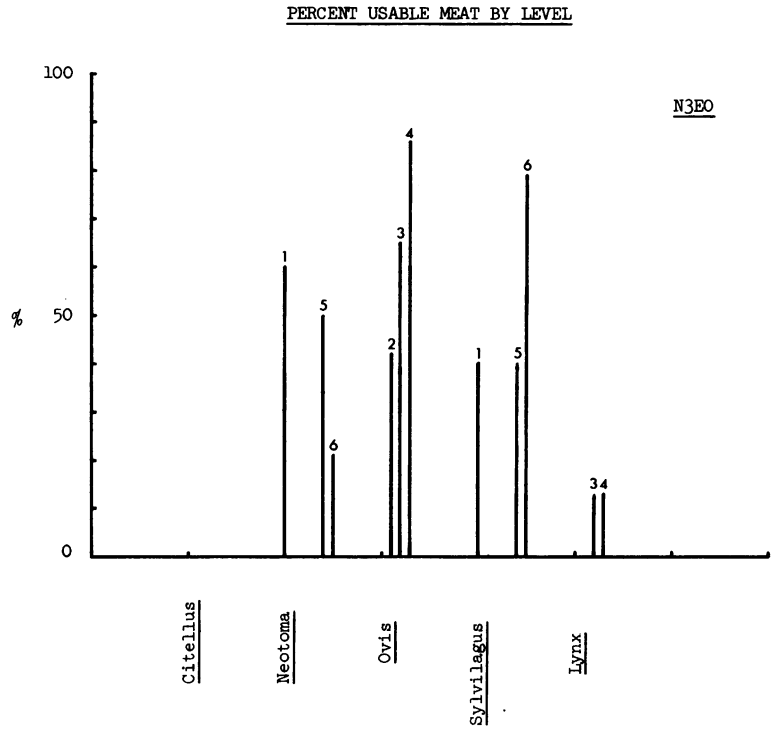

Figure 3

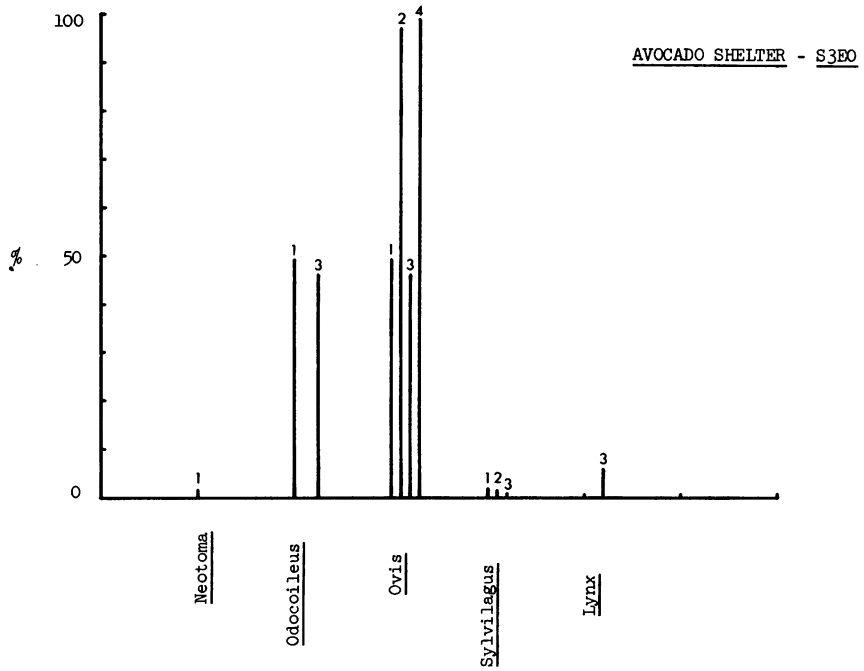

Figure 4

Acknowledgements

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