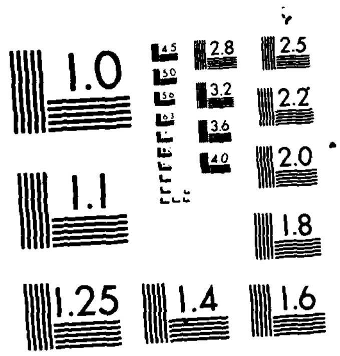
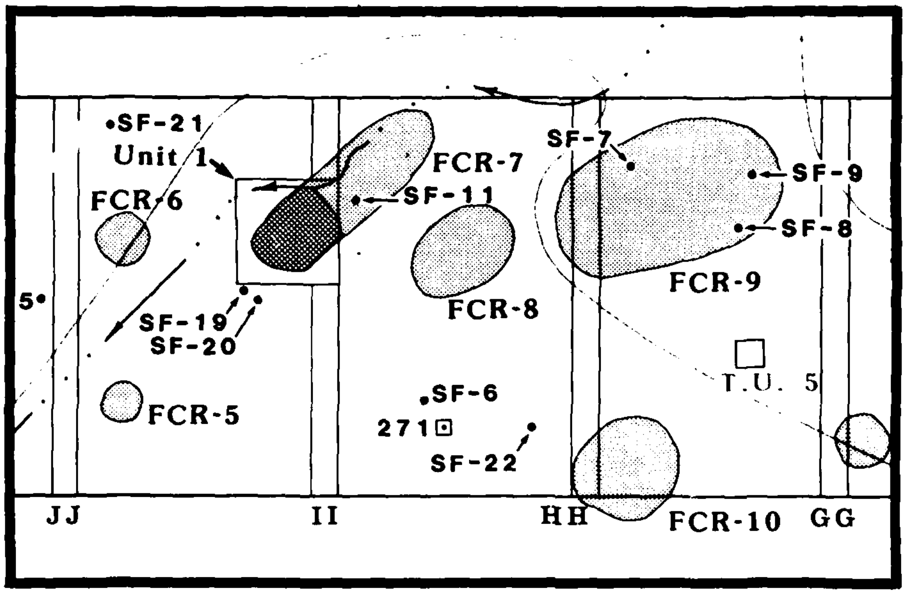
AD-A174 024 ARCHEOLOGICAL TESTING AT AT THE FAIRCHILD SITE (LA 45732) OTERO COUNTY NEW MEXICO(U) NEW MEXICO UNIV ALBUQUERQUE OFFICE OF CONTRACT ARCHEOLOGY R ANYON 1/3

UNCLASSIFIED 11 MAY 85 185214A F/G 5/6 NL



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

ARCHEOLOGICAL TESTING AT THE FAIRCHILD SITE (LA 45732) OTERO COUNTY, NEW MEXICO



by

Roger Anyon

with sections by
Jack B. Bertram, Karen H. Clary, Andrew P. Fowler,
Eric E. Ingbar, Dale R. Rugge, and Mollie S. Toll

Prepared for
U.S. Army Corps of Engineers,
Albuquerque District

Office of Contract Archeology
UNIVERSITY OF NEW MEXICO

SECURITY CLASSIFICATION OF THIS

REPORT DOC[UMENTATION PAGE]

AD-A174 024

READ INSTRUCTIONS
[B]EFORE COMPLETING FORM

1. REPORT NUMBER 185-214a	[3. RECIP]IENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Archeological Testing at the Fairchild Site (LA 45732) Otero County, New Mexico	[5. TYPE] OF REPORT & PERIOD COVERED Final
	6. PERFORMING ORG. REPORT NUMBER 185-214a
7. AUTHOR(s) Roger Anyon	8. CONTRACT OR GRANT NUMBER(s) DACW-83-D-0068#3
9. PERFORMING ORGANIZATION NAME AND ADDRESS Office of Contract Archeology University of New Mexico Albuquerque, NM 87131	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS U.S. Army Corps of Engineers Albuquerque District P.O. Box 1580, 517 Gold Ave SW, Albuq. NM 87103	12. REPORT DATE May 11 1985
	13. NUMBER OF PAGES 200
14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office)	15. SECURITY CLASS. (of this report) unclassified
	15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

Unrestricted

This document has been approved for p... its

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

Unrestricted

18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Archeological Testing
Fairchild Site
Otero County
Fire-Cracked Rock

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

The Fairchild site (LA 45732) is a huge archeological site covering an area of at least one-half by one-quarter mile on a west slope alluvial fan of the Sacramento Mountains. This report covers limited surface collection and subsurface testing of a 1500 ft long section of a 50 ft wide right-of-way through the site. The right-of-way is for the construction of a water pipeline from a series of wells to Holloman Air Force Base. This report contains the results of archeological testing by the U.S. Army Corps of Engineers (continued)

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

Albuquerque District, in November 1983, and also by the Office of Contract Archeology in May 1984. Systematic 10 percent surface collection shows that archeological materials are scattered across the right-of-way, with some areas of much greater material density. These high-density areas are primarily discrete concentrations of fire-cracked rock, ranging from less than 1 m to more than 4 m in diameter. Subsurface test excavations uncovered no subsurface features within the right-of-way, not even beneath the fire-cracked rock concentrations. Analysis of the recovered artifacts and ecofacts reveal that the right-of-way area was utilized between AD 200 and 1150. It appears that the right-of-way area was used by groups of hunter-gatherers on a scheduled round of seasonal mobility. We suspect that it was used primarily as a location for roasting succulents during the spring. Mesquite may also have been procured and processed at the site during the fall.

Codes

/or

Special

A1

ARCHEOLOGICAL TESTING AT THE FAIRCHILD SITE (LA 45732)
OTERO COUNTY, NEW MEXICO

by

Roger Anyon

with contributions by

Jack B. Bertram, Karen H. Clary, Andrew P. Fowler
Eric E. Ingbar, Dale R. Rugge, and Mollie S. Toll

submitted by

Joseph C. Winter, Ph.D
Principal Investigator

prepared for
U.S. Army Corps of Engineers
Albuquerque District

Office of Contract Archeology
University of New Mexico

UNM Project 185-214a
Contract #DACW-83-D-0068 #3

May 1985

ABSTRACT

The Fairchild site (LA 45732) is a huge archeological site covering an area of at least one-half by one-quarter mile on a west slope alluvial fan of the Sacramento Mountains. This report covers limited surface collection and subsurface testing of a 1500 ft long section of a 50 ft wide right-of-way through the site. The right-of-way is for the construction of a water pipeline from a series of wells to Holloman Air Force Base. This report contains the results of archeological testing by the U.S. Army Corps of Engineers, Albuquerque District, in November 1983, and also by the Office of Contract Archeology in May 1984. Systematic 10 percent surface collection shows that archeological materials are scattered across the right-of-way, with some areas of much greater material density. These high-density areas are primarily discrete concentrations of fire-cracked rock, ranging from less than 1 m to more than 4 m in diameter. Subsurface test excavations uncovered no subsurface features within the right-of-way, not even beneath the fire-cracked rock concentrations. Analysis of the recovered artifacts and ecofacts reveal that the right-of-way area was utilized between AD 200 and 1150. It appears that the right-of-way area was used by groups of hunter-gatherers on a scheduled round of seasonal mobility. We suspect that it was used primarily as a location for roasting succulents during the spring. Mesquite may also have been procured and processed at the site during the fall.

ACKNOWLEDGMENTS

All archeological fieldwork requires the assistance of many individuals, both directly and indirectly. This project is no exception. The Office of Contract Archeology field crew consisted of Jim Enloe, Andrew Fowler, Eric Ingbar, and Ron Stauber. Sandy Rayl and John Schelberg of the Army Corps of Engineers facilitated the fieldwork, and Sam Fairchild allowed us access to the project area through his land. Report production is the result of the work of June-el Piper, Martha Graham, and M. Robyn Cote, and drafting has been produced by Matthew Schmader.

TABLE OF CONTENTS

	Page
Abstract	i
Acknowledgments	ii
Table of Contents	iii
List of Figures	v
List of Tables	vii
1. INTRODUCTION	1
Project Background and Report Structure	1
Previous Research	3
Culture History	4
The Natural Environment	8
Modeling the Prehistoric Use of the Fairchild Site	12
2. SURFACE COLLECTION AND TEST EXCAVATIONS	16
Preparation for Data Recovery	17
Site Mapping Strategy	17
Surface Collection	19
Surface Finds	23
Description of Excavations	23
Auger Hole Testing	40
The Pit in the Arroyo	41
3. ANALYSES OF FIRE-CRACKED ROCK AND CHIPPED STONE ASSEMBLAGES by Eric Ingbar	44
Introduction	44
Fire-Cracked Rock	45
Chipped Stone	56
Discussion	80
4. CERAMICS	85
Previous Research	85
Procedures	86
Results	91
Summary	100
5. OTHER ANALYSES	102
Groundstone	102
Analysis of Faunal Material by Jack B. Bertram	107
Analysis of Flotation Sample by Mollie S. Toll	112
Analysis of Pollen Samples by Karen H. Clary	113
Analysis of Radiocarbon Samples	120
Petrographic Analysis of Ceramic Technology by Dale R. Rugge	121
Monitoring Pipeline Construction by Andrew P. Fowler	136
6. CONCLUSIONS	137
REFERENCES	143

Table of Contents (continued)

Page

APPENDIX A Artifacts from the Surface-Transect Collection . . 156

APPENDIX B OCA Excavation Provenience Data 163

APPENDIX C Auger Hole Descriptions 166

APPENDIX D Fire-Cracked Rock and Chipped Stone Data 173
Table 1. Fire-cracked rock assemblage collected by OCA from the Fairchild site 174
Table 2. Fire-cracked rock assemblage collected by COE from the Fairchild site 176
Table 3. Chipped stone attribute codes and definitions 177
Table 4. Chipped stone assemblage from excavations at the Fairchild site 181
Table 5. LA 45732 OCA systematic surface collection, chipped stone assemblage 184
Table 6. Chipped stone assemblage from the pit in the arroyo and surface finds 185

APPENDIX E Ceramic Data 186
Table 1. Ceramic assemblage from surface collection and excavation, Fairchild site 187
Table 2. Attributes of ceramic assemblage 191

APPENDIX F Catalog of Materials Recovered 193
Table 1. Catalog of Army Corps Material Recovered . . . 194
Table 2. Catalog of OCA Material Recovered 196

LIST OF FIGURES

		Page
1.1	The region and the study area	2
1.2	Location of the Fairchild site (LA 45732) in study area	9
1.3	View of the Tularosa Basin to the west of the Fairchild site	11
1.4	View of the Sacramento Mountains to the east of the Fairchild site	11
2.1	Fairchild site, main fire-cracked rock mound group, view to the north	18
2.2	Fairchild site, main fire-cracked rock mound group, view to the northeast	18
2.3	Topographic map of the project right-of-way showing cultural features, surface transects, and excavation locations (end map)	in pocket
2.4	Detail of Units 1, 2, and 5, and Test Unit 4 showing loci and auger hole locations	27
2.5	Plan of Unit 1 fire-cracked rock, surface distribution, in FCR-7	28
2.6	FCR-7 prior to excavation, looking northeast	29
2.7	East-West (A-A') and north-south (B-B') profiles through FCR-7	30
2.8	Staggered test pits on the west side of FCR-7, looking north	32
2.9	Profile of east face of Unit 4	35
2.10	Profile of south face of COE Test Unit 3	35
2.11	Plan of fire-cracked rock, surface distribution, in COE Test Unit 4	39
2.12	Profile of the south face of the pit in the arroyo . . .	42
3.1	Weight classes of fire-cracked rock from OCA and COE excavation units, by provenience	51
3.2	Mean weight classes of fire-cracked rock from OCA and COE excavation proveniences, by size class	52
3.3	Mean weight of fire-cracked rock from OCA and COE excavation proveniences (total assemblage)	53
3.4	Surface fire-cracked rock counts in OCA Units 1, 2, and 5	57
3.5	Fire-cracked rock counts 0 to 10 cm below surface in OCA Units 1, 2, and 5	58
3.6	Surface fire-cracked rock weights (g) in OCA Units 1, 2, and 5	59
3.7	Fire-cracked rock weights (g) 0 to 10 cm below surface in OCA Units 1, 2, and 5	60
3.8	Surface fire-cracked rock less than 8 cm in diameter mean weights (g) in OCA Units 1, 2, and 5	61
3.9	Fire-cracked rock less than 8 cm in diameter mean weights (g) 0 to 10 cm below surface in OCA Units 1, 2, and 5	62

List of Figures (continued)

		Page
3.10	Material types in chipped stone assemblage from OCA and COE excavated proveniences	66
3.11	Artifact types in the chipped stone assemblage from OCA and COE excavated proveniences	68
3.12	Flake types in the chipped stone assemblage from OCA and COE excavated proveniences	70
3.13	Dorsal scar counts in the chipped stone assemblage from OCA and COE excavated proveniences	71
3.14	Dorsal cortex cover in chipped stone assemblage from OCA and COE excavated proveniences	72
3.15	Platform angles (using 5 degree increments) in chipped stone assemblage from OCA and COE excavated proveniences	73
3.16	Length of artifacts in chipped stone assemblage from OCA and COE excavated proveniences	74
3.17	Width of artifacts in chipped stone assemblage from OCA and COE excavated proveniences	75
3.18	Thickness of artifacts in chipped stone assemblage from OCA and COE excavated proveniences	76
3.19	Weight classes in chipped stone assemblage from OCA and COE excavated proveniences	77
3.20	Chipped stone artifacts OCA and COE excavated proveniences, by level	79
3.21	Surface chipped stone frequencies in OCA Units 1, 2, and 5	81
3.22	Chipped stone frequencies 0 to 10 cm below surface in OCA Units 1, 2, and 5	82
3.23	Projectile points from the Fairchild site	83
4.1	Profiles of various rim sherds collected at the Fairchild site	89
4.2	Sherd frequencies Units 1, 2, and 5 (OCA), surface level and 0 to 10 cm deep combined	97
5.1	A sample of ground stone fragments collected from the project right-of-way	104
5.2	Relative abundance of Microperthite to Quartz for unspecific brownwares and El Paso painted wares	127

LIST OF TABLES

		Page
1.1	Diagnostic ceramic and architectural styles in the Jornada branch of the Mogollon, AD 200 to 1400	6
2.1	Munsell designations for surface-collection	21
2.2	Total artifact counts in surface collections	22
2.3	Catalog of surface finds collected from Fairchild site	24
3.1	Frequencies of fire-cracked rock, OCA and COE collections	49
3.2	Vertical distribution of fire-cracked rock weight and mean weight, corrected for volume of excavation level	55
4.1	Distinguishing attributes of Jornada and El Paso brown	87
4.2	Sherds collected from right-of-way, by type and date range	91
4.3	Ceramic types at selected sites near El Paso and White Sands	93
4.4	Density and distribution of sherds collected on surface transects	95
4.5	Sherds collected from fire-cracked rock concentrations in surface transects	95
4.6	Horizontal distribution of sherds from 1 by 1 excavation proveniences (surface and 0-10 cm levels combined)	96
4.7	Vertical distribution of sherds from OCA and COE excavations	99
4.8	Vessel form by sherd type	100
5.1	Ground stone attributes	103
5.2	Charcoal recovered from the Fairchild site, OCA Unit 1	112
5.3	Results of pollen analysis of the Fairchild site samples	115
5.4	Petrographic data for unspecific brownware, El Paso Bichrome, and El Paso Polychrome ceramics	123
5.5	Comments on rock types present in unspecific brownware, El Paso Bichrome, and El Paso Polychrome petrographic ceramics	124
5.6	Unspecific brownware, El Paso Bichrome, and El Paso Polychrome listed by Granite temper association	128
5.7	Petrographic data for Mimbres Black-on-white ceramics	130
5.8	Comments on rock types present in Mimbres Black-on-white ceramics	131

Chapter 1

INTRODUCTION

This report concerns the results of a testing project at the Fairchild site (LA 45732) near Alamogordo in south-central New Mexico (Figure 1.1). The Fairchild site is a large, multicomponent site consisting of numerous concentrations of fire-cracked rock and a scatter of cultural debris including ceramics, chipped stone, and ground stone. It appears to have been utilized between AD 200 and 1400 but was also probably used in the preceding Archaic period as well as by the Apaches prior to and during the historic period. Test excavations were conducted in a 1500 ft section of a 50 ft wide right-of-way through the site. Thus, this report concerns the remains from an extremely small portion of the Fairchild site.

Archeological test excavations were restricted to the right-of-way of a pipeline being constructed to transport water to Holloman Air Force Base from a series of wells on the alluvial fan along the west side of the Sacramento Mountains. This fieldwork was conducted in accordance with Section 106 of the National Historic Preservation Act of 1966 and Public Law 93-291, and specifically in accordance with the "Archeological Resources Protection Plan, Holloman Air Force Base" as noted on Page 9 of the Scope of Services drawn up by the U.S. Army Corps of Engineers, Albuquerque District Office. Office of Contract Archeology fieldwork, analysis, and write-up of the materials were performed under Delivery Order #3 of Contract #DACW47-83-D-0068.

Project Background and Report Structure

Archeological work along the proposed water pipeline right-of-way began with a cultural resources survey in May and June of 1983 by Human Systems Research Inc., Tularosa, New Mexico (Eidenbach 1983a). The Fairchild site and seven isolated occurrences were encountered during the survey. It was noted that a 1500 ft section of the 50 ft wide right-of-way crossed a portion of the Fairchild site. Because a major portion of the Fairchild site is located on what was previously National Park Service land (now State of New Mexico land), and because the site had previously been evaluated as eligible for nomination to the National Register of Historic Places by the National Park Service as it meets Criterion "d" of 36 CFR 60.6, it was determined that archeological testing was necessary prior to pipeline construction. Criterion "d" of the criteria for evaluation for inclusion in the National Register is concerned with sites "that have yielded, or may be likely to yield, information important in prehistory or history." Consequently, testing to determine artifact density and depth was conducted by the U.S. Army Corps of Engineers (COE), Albuquerque District Office, and excavation to mitigate the adverse impact was conducted by the Office of Contract Archeology (OCA), University of New Mexico.

Fieldwork was performed in two separate field sessions by the Corps of Engineers (COE) and by OCA. The COE test excavations were

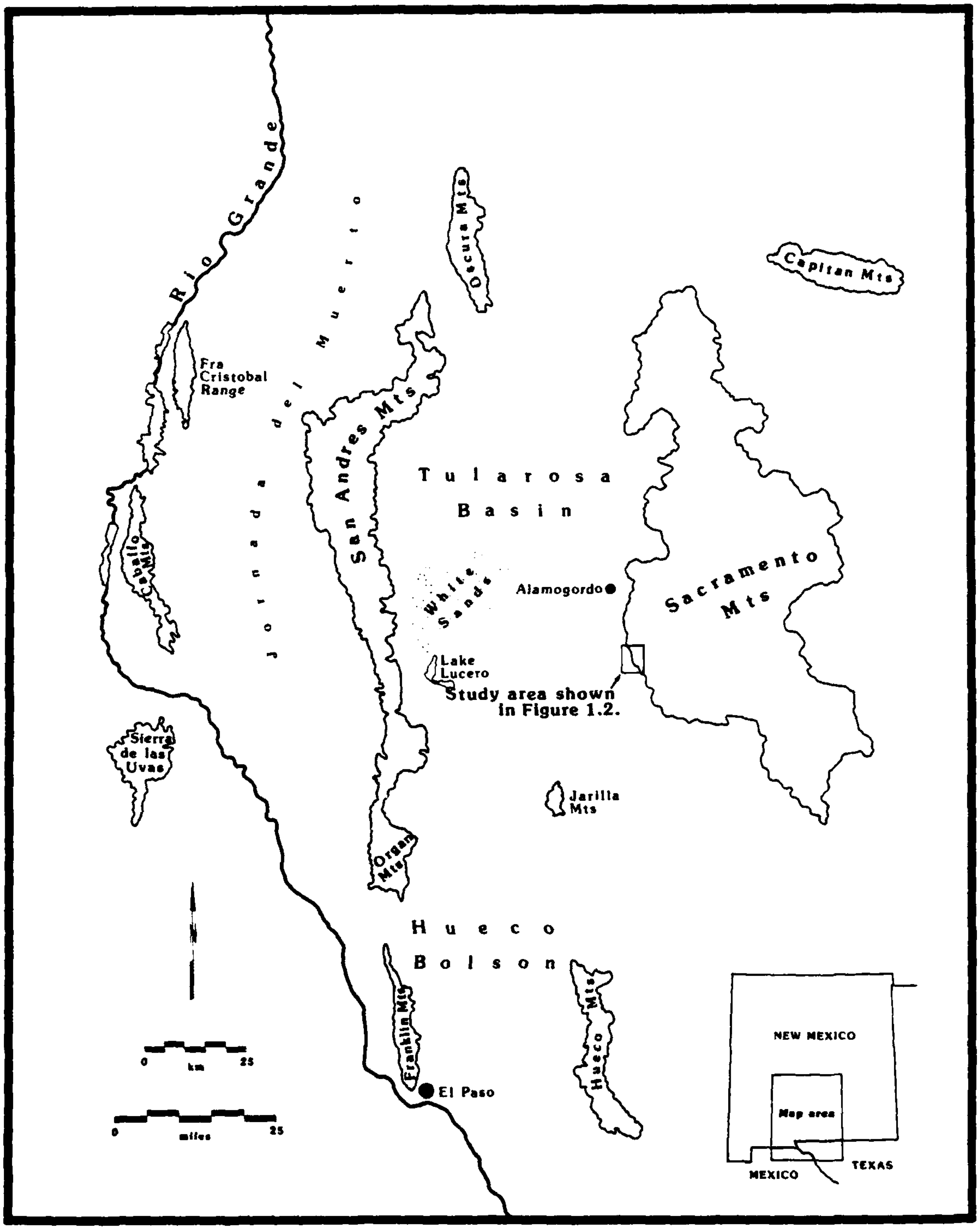


Figure 1.1. The region and the study area

conducted during November and December 1983 under the direction of Sandy Rayl and John Schelberg. The OCA excavations were performed in May 1984 under the field direction of Roger Anyon. OCA analyzed the collected materials from both the testing and the excavation seasons. This report contains the descriptions and results of these two field sessions.

The report is divided into six chapters. The first presents the archeological background of the region, a description of the environment, and a model for prehistoric and historic use of the Fairchild site locality. Chapter 2 describes the surface collections, the excavation strategies, and the test excavations. The most abundant culturally derived materials at the site are the subject of Chapters 3 and 4. Results of the fire-cracked rock and chipped stone analyses are presented in Chapter 3, while the ceramic analysis results are the topic of Chapter 4. Other material classes and other studies are presented in Chapter 5, they concern ground stone, faunal remains, macrobotanical and pollen samples, chronometric dating, and petrographic analysis of ceramic temper. The results of archaeological monitoring of pipeline construction activities are also presented in Chapter 5. The conclusions are given in the final chapter.

Throughout the report we intend to view the Fairchild site within a regional context. We believe that because the people who used the Fairchild site locality at any point in time represented a only portion of a functioning cultural system, the archeological remains from the Fairchild site cannot be viewed in isolation. This regional context is important if the people who used the Fairchild site were sedentary groups, but it is of even greater importance if they were mobile groups of hunter-gatherers. Because we believe that the major use of the Fairchild site was by groups of mobile hunter-gatherers, we must employ a regional perspective in our analysis of the archeological remains.

Previous Research

Compared to other areas of the American Southwest, the Tularosa Basin and the Hueco Bolson have been virtually ignored by archeologists until recently. The first major archeological work in the region was by Cosgrove (1947) in many cave sites, and Lehmer (1948). Lehmer excavated sites of the El Paso phase near Alamogordo, the La Cueva cave, and the Los Tules pithouse site. Based on these excavations, Lehmer formulated the concept of the Jornada branch of the Mogollon, which is the foundation of the culture history of the region.

During the 1960s the pace of fieldwork began to pick up, with some small scale excavations primarily carried out by the El Paso Archaeological Society. Much of what is known about the archeology of the Hueco Bolson and the Tularosa Basin in the 1960s was the result of this amateur group's activities which were reported in the El Paso Archaeological Society publication The Artifact. Professional work in the Sacramento Mountains was performed by Kelley (1966), following the earlier work of Jennings (1940). Much of this work was at pithouse sites. Research was also beginning at the rock "middens" of far west

Texas (Greer 1965, 1968a, 1968b), following the much earlier work by Wilson (1930). Until 1970 these projects were the primary focus of research in the region.

The advent of cultural resource management legislation has resulted in a large amount of fieldwork and reporting. Much of the land in the Hueco Bolson, the Tularosa Basin, and the surrounding mountains is managed or owned by various agencies of the federal government; thus, there is a need for responsible culture resource management. The vast majority of this work has been surface survey; however, in some cases this has been followed by excavations. Large-scale surface surveys have been performed in the Hueco Bolson and the southern part of the Tularosa Basin (e.g., Beckes 1977; Carmichael 1983; Whalen 1977, 1978). Most of the work in the Tularosa Basin has been done by Human Systems Research Inc. (e.g., Eidenbach and Wimberly 1980; Wimberly and Rogers 1977). Survey has also been carried out in the Sacramento Mountains (Harrill 1980).

Excavations have been primarily confined to the area around El Paso, although some have taken place in the Tularosa Basin and the Sacramento Mountains. Those in the El Paso area have been either in the Rio Grande Valley (e.g., Fields and Girard 1983; O'Laughlin 1977, 1980, 1981), on the eastern flanks of the Franklin Mountains (e.g., Aten 1972; Hard 1983a; O'Laughlin 1979; O'Laughlin and Greiser 1973), or in the Hueco Bolson (e.g., Whalen 1980). In the Tularosa Basin, excavation has been on a less extensive scale than in the El Paso area. Excavations have been reported at White Sands (Oakes 1981), at Fresnal Shelter (Human Systems Research 1973a), in the Jarilla Mountains (Way 1979), in Alamogordo (Marshall 1973), and at Rhodes Canyon (Eidenbach 1983b), among other locations.

In the immediate vicinity of the Fairchild site there have been several small surveys and excavations primarily in conjunction with the development of Oliver Lee State Park. This research has included survey at the mouth of Dog Canyon and within the canyon itself (Dart 1977) followed by subsequent excavations (Wimberly et al. 1979). The detached portion of what is now the state park was surveyed for the National Park Service (Human Systems Research 1973b), and it was during this survey that the main fire-cracked rock mound group and a large portion of the Fairchild site were mapped and recorded. The present project was the result of a survey along the right-of-way, which indicated that a portion of the Fairchild site would be impacted by pipeline construction (Eidenbach 1983a).

Culture History

Human occupation of the Tularosa Basin and the Hueco Bolson began with the use of the area by Paleoindian hunters between approximately 10,000 and 6000 BC (Beckett 1983a; Human Systems Research 1973a). The major evidence of Paleoindian use of the region is in the form of distinctive projectile points found near the edge of playas. Archaic occupation, from approximately 6000 BC to AD 200, is only slightly better known (Beckett 1983b). Archaic sites contain ground and chipped stone, fire-cracked rock, and occasional indications of shallow huts (O'Laughlin 1980). Ceramics appear in the archeological record of the region at about AD 200 during the Formative period (e.g., Marshall 1973; O'Laughlin 1979, 1980) which is divided into a number of phases. Given the archeological remains excavated at the Fairchild site, it is the ceramic period with which we are most concerned.

By far the majority of the previous research in the region has been surface survey with few subsurface excavations, as was noted above. This can lead to ambiguous interpretation of the archeological remains, as is evident in some of the problems associated with formulating the culture history. An even greater problem in the Hueco Bolson and the Tularosa Basin is that of chronometrically dating archeological remains. Until recently, most of the site dates were primarily based on the cross-dating of ceramics that had been dated in other, nearby areas.

The initial formulation of a culture history for the region was developed by Lehmer (1948) as part of the concept of the Jornada branch of the Mogollon. The area was identified as part of the Mogollon culture from the ceramic and architectural remains that Lehmer excavated at Los Tules, La Cueva, and the Bradfield sites. Material remains from these sites, and their similarities to remains in the previously defined Mogollon area, led Lehmer to postulate a culture history consisting of four phases for the southern portion of the Jornada branch: the Hueco, Mesilla, Doña Ana, and El Paso. The Hueco phase is now regarded as the Archaic manifestation of the area and the phase name is not used today; the remaining three phases, and their diagnostic attributes, are still in use today.

Lehmer dated the Doña Ana phase between AD 1100 and 1200 and the El Paso phase between 1200 and 1400. These dates are almost identical to those in use today, but his dating for the Mesilla phase has been substantially revised. Using the Three Circle phase dates for the Mimbres branch, Lehmer dated the beginning of the Mesilla phase at AD 900. The Three Circle and Mesilla phase dates have since been revised to anywhere between AD 1 and 200 (see below).

While the terminology used to describe the culture history of the region has been revised, Lehmer's formulation remains the basis of these revisions. Marshall (1973), for example, presents a thorough review of Jornada branch culture history by correlating the various phase sequences from different geographical areas. LeBlanc and Whalen (1980) have divided the Mesilla phase into the Early and Late Pithouse periods (see also Whalen 1981a), which have been modeled after the period and phase system of the Mimbres branch. The Early Pithouse period is dated from AD 200 to 600 and the Late Pithouse period from 600 to 1100. This temporal division, based on diagnostic architectural and village locational criteria in the Mimbres branch (see Anyon et al. 1981), does not appear to be one which best fits the ephemeral remains of the Jornada branch even though the painted ceramics are similar in the two branches. Hard (n.d.) provides a better division of the Mesilla phase using the absence (early) or presence (late) of painted Mimbres Black-on-white ceramics.

In this report we divide the Formative into three phases: the Early Mesilla (AD 200 to 750), the Late Mesilla (750 to 1150), and the

El Paso (1150 to 1400). Though these dates are all approximate and do not entirely correspond to those presented by other researchers; justification for their use is given below. The diagnostic material remains for these phases are primarily ceramics and secondarily architecture (Table 1.1).

Table 1.1 Diagnostic ceramic and architectural styles in the Jornada branch of the Mogollon, AD 200 to 1400

Phase	Architecture	Ceramics
Early Mesilla	Huts/pithouses	Plain brownware
Late Mesilla	Huts/pithouses	Mimbres B/w styles I-III
El Paso	Adobe-walled pueblos	El Paso Polychrome

The distinction between the Early and Late Mesilla phases is based on the absence or presence of Mimbres Black-on-white ceramics. The date used to divide these phases (AD 750) is the same as the known dates for Mimbres Black-on-white ceramics in the Mimbres branch (Anyon et al. 1981) which have not been shown to be chronometrically different in the Jornada area. While the Early Mesilla phase cannot presently be subdivided, the late Mesilla phase can be divided based on different styles of Mimbres Black-on-white ceramics. These subdivisions may be of use in determining the date of various features or structures in the Jornada area. The styles and their dates are given in the ceramics discussion (Chapter 4).

Whalen (1978, 1980, 1981b) recognizes a difference between the plain brownware rim forms of the Early and Late Pithouse periods. This is still a tentative rim chronology, and recovery of more rims from well-dated contexts is needed before it is clearly demonstrated that rim form can be used as a relative dating system within the Mesilla phase.

Architecture of the Mesilla phase is often quite ephemeral, primarily consisting of pithouses. The term "pithouse" is used to describe both shallow (e.g., Whalen 1980), and deep structures (e.g., Lehmer 1948). Hard (1983a) has distinguished between what he calls huts, which are less than 30 cm deep, and pithouses, which are more than 30 cm deep. This distinction is an important one because Hard believes that huts are short-term occupation structures while pithouses are winter (long-term) habitation units.

The El Paso phase is quite different from the Mesilla phase. Adobe-walled pueblos are the primary habitation form, and a new series of ceramic types appears, including El Paso Polychrome, Chihuahua polychromes, and Chupadero Black-on-white, among others (Marshall 1973). The presence of these ceramic types on sites lacking pueblos presumably indicates El Paso phase use of the site (for example, at the Fairchild site).

A major difference between the culture history described herein and those commonly used in the Hueco Bolson and Tularosa Basin is that we have dropped the Doña Ana phase (also see Whalen [1978] and Eck [1979] for a similar abandonment of the phase). Whalen (1981b) now distinguishes a transitional pithouse-to-pueblo phase in the area, which he calls the pithouse-to-pueblo transition rather than the Doña Ana phase. In general the Doña Ana phase is dated between AD 1100 and 1200, as first proposed by Lehmer (1948). It is assumed that the Doña Ana phase is transitional between the Mesilla and El Paso phases (e.g., Carmichael 1983; Marshall 1973; Whalen 1981a), and that pithouses and surface structures were used contemporaneously during this phase (Lehmer 1948; Marshall 1973). Diagnostic ceramics are listed as El Paso Bichrome, Mimbres Black-on-white, and El Paso Polychrome.

It is widely acknowledged that Doña Ana phase sites are difficult to identify (e.g., Carmichael 1983; Hard n.d.). These sites have been discerned using both excavation and surface survey data (Carmichael 1983; Marshall 1973). Perhaps the most vigorous proponent of the Doña Ana phase is Carmichael, who believes that human population density in the southern Tularosa basin was at its greatest during this phase. Others working in the area suggest that this peak occurred during the El Paso phase. Despite his interpretation of population dynamics, Carmichael is hard-pressed to present unambiguous data distinguishing what could be called multicomponent sites from Doña Ana phase sites. His Doña Ana phase ceramic assemblages from excavated sites apparently represent samples from trash middens within abandoned borrow pits (Carmichael 1983:72). No chronometric dates have been secured from Doña Ana phase features. The problem with distinguishing Doña Ana phase sites, or Doña Ana phase components, is so great that this phase presently does not have viable utility.

Because we have decided not to use this phase, we date the shift from the Mesilla to the El Paso phase between AD 1100 and 1200. We have chosen AD 1150 as an appropriate date, based on the chronometric dating of Mimbres Black-on-white ceramics and El Paso Polychrome. Mimbres Black-on-white ceramics are not found in structures dated after AD 1130, while El Paso Polychrome does not occur in structures dated prior to AD 1200 (LeBlanc and Whalen 1980). Given the presently available data, an approximate date of AD 1150 for the end of the Mesilla phase and the beginning of the El Paso phase appears to be reasonable.

Subsistence practices were different during the Mesilla and El Paso phases. The Mesilla phase is generally regarded as being one of mobile hunter-gatherer populations who used corn agriculture as a secondary food resource and wild foods as a primary resource (Carmichael 1983; Hard n.d.; Whalen 1981a). While interpretations of the relative importance of corn may differ, there appears to be general agreement that by the end of the Mesilla phase the dependence on corn is greater than when the phase began. The El Paso phase is seen as being one of sedentary villages with the population primarily dependent on agriculture for subsistence needs. These issues are raised in more detail below, where a model for the prehistoric use of the Tularosa Basin, and the Fairchild site in particular, is presented.

The Natural Environment

The Tularosa Basin is a wide, flat expanse of desiccated Pleistocene lake beds which today are playas and sand dunes. The east side of the basin is bounded by the Sacramento Mountains, the west side by the San Andres Mountains, and the north by the Oscura Mountains, while the south is open through the Hueco Bolson across the Rio Grande into the Republic of Mexico (Figure 1.1). The Fairchild site is located on an alluvial fan on the west flank of the Sacramento Mountains (Figure 1.2) overlooking the Tularosa Basin.

The central portion of the Tularosa Basin (Figure 1.3) is at elevations between 1189 and 1250 m (3900 and 4100 ft). The mountain ranges rise abruptly out of the basin (Figure 1.4) to heights of more than 2255 m (7400 ft), with some peaks reaching elevations of 3685 m (12,000 ft). This vertical rise of the mountains above the basin floor is quite dramatic, with elevation changes of 914 m (3000 ft) occurring within 2 horizontal kilometers.

The west slope of the Sacramento Mountains is an uplifted fault block of sedimentary rocks which is approximately 2438 m (8000 ft) thick (Pray 1961). This almost vertical west slope is mainly composed of Paleozoic dolomites and limestones with some cherts. A series of steep-sided canyons cut through the west escarpment and create access to the east side of the Sacramentos. One of these canyons is Dog Canyon, a route from the Tularosa Basin to the top of the escarpment often used during the historic period (Dart 1977). Occasional volcanic sills and dykes throughout this escarpment affect subsurface water flow, thereby creating a series of permanent springs (Meinzer and Hare 1915). The alluvial fans at the base of the escarpment upon which the Fairchild site is located consist of young terrace Quaternary gravels and alluvium (Pray 1961).

Soils on the alluvial fans are not well developed (Derr 1981). The Fairchild site is located on one soil association, the Mimbres Tome (MTA) and adjacent to two others, the Mimbres Prelo (MPA) and the Nickel Tencee (NTD). The MTA associations are well-drained soils, usually located on nearly level surfaces. The upper 13-15 cm (5-6 inches) is silt-loam, and below that is a silt-clay-loam. It is moderately alkaline, has moderately slow permeability, and its available water capacity is high (Derr 1981).

The surface of the alluvial fan is cut by a series of arroyos which often change course. These arroyos channel seasonal runoff from the mountain escarpment; otherwise, they are dry (Meinzer and Hare 1915). The permeability of the alluvial gravels causes any surface flow of water issuing from the Sacramento Mountains to become subsurface where the escarpment ends and the alluvial fans begin. The closest permanent surface flow of water to the Fairchild site at present is in the lower course of Dog Canyon, where a spring-fed creek runs for approximately 1 km before it reaches the gravels on the fan and sinks beneath the surface (Figure 1.2).

The climate of the Tularosa Basin is arid. The average annual precipitation at Alamogordo is 256 mm (10.1 inches), with a 10-year

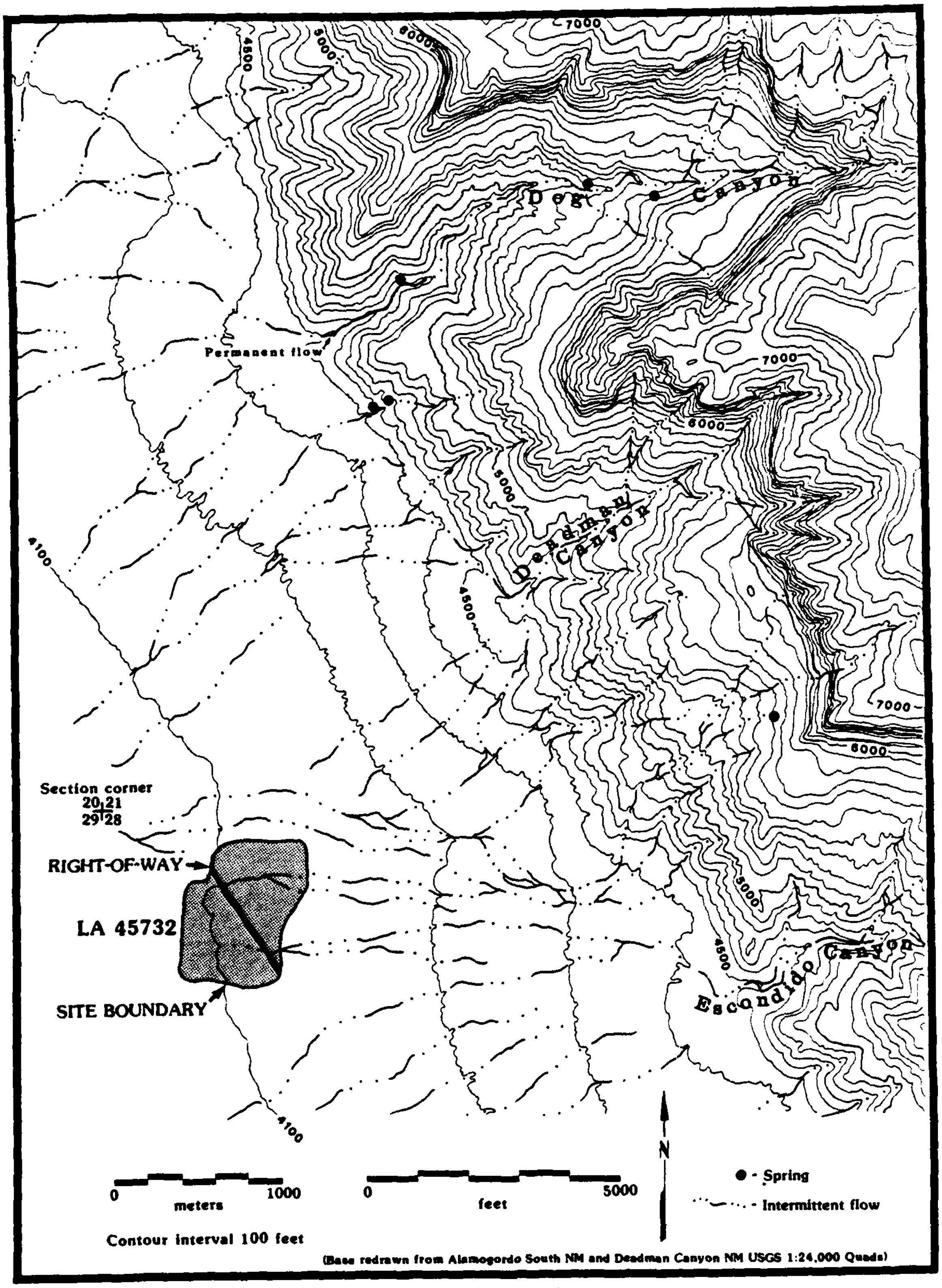


Figure 1.2. Location of the Fairchild site (LA 45732) in study area

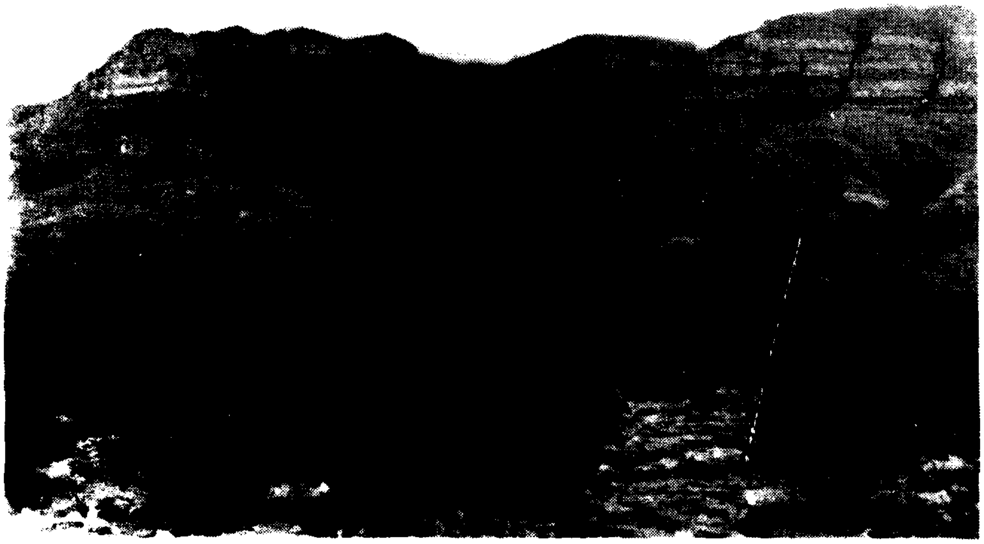
range between 163.3 and 339 mm (6.4 and 13.3 in). Most of the yearly precipitation falls during July, August, and September, with the two driest months being April and May (Derr 1981:136). The average annual frost-free period is 213 days. Temperature averages range from near 0 degrees F to more than 100 degrees F throughout the yearly cycle. Evapotranspiration greatly outpaces precipitation on an annual average basis (Tuan et al. 1973). Winds can be ferocious during the spring, causing dust storms.

The flora and fauna in the vicinity of the Fairchild site reflect the availability of water and the arid climate. Today the plant life is dominated by creosote (Larrea tridentata), an occasional mesquite (Prosopis sp.), and a few species of grasses. There are presently few cacti at the site, though lechuguilla (Agave lechuguilla), yucca (Yucca sp.), sotol (Dasylirion wheeleri), and ocotillo (Fouquieria splendens) grow slightly upslope on the alluvial fan close to the escarpment of the Sacramentos. The vertical relief of the escarpment provides a range of flora extending into piñon, juniper, and ponderosa forest. Fauna on the alluvial fans consist of deer (Odocoileus virginianus and O. hemionus), various reptiles, and rabbits (Lepus californicus and Sylvilagus auduboni). In the mountains, elk (Cervus canadensis) as well as deer can be found in the coniferous forests. Cully (1973) lists mammals tentatively identified on the western slope of the Sacramento Mountains.

Whether the prehistoric environment was substantially different from that of today is a topic of considerable interest; however, most of this concern is focused on time periods before AD 200 when the Fairchild site appears to have been extensively used for the first time. It is generally accepted that by AD 200 the environment of the Tularosa Basin was basically that of today (e.g., Van Devender and Toolin 1983). The main difference between the prehistoric and the present environment is the change in vegetation caused by historic ranching operations. In the Jornada del Muerto, Gardner (1951) has documented the invasion of creosote in areas that were previously covered with bunch grasses, mesquite, and yucca. In many historic records there is discussion of extensive grasslands in the Tularosa Basin (Human Systems Research 1973). Therefore the lack of extensive grasslands in the basin today should not obscure the fact that grasses were much more plentiful prior to the beginning of large-scale ranching in the late 1800s. However, it is unclear how ranching and well drilling have affected the surface flow of water and the availability of flowing springs.

What is clear is that the Fairchild site is near a permanent water source, a key element in the survival of any prehistoric group. Both floral and faunal resources were also available for exploitation, and there was potential for corn agriculture on the alluvial fan. Thus, the Fairchild site location could have been used in a variety of ways by prehistoric groups. In the following pages we present a synopsis of a model for the prehistoric use of the region formulated by Hard (n.d.). We also discuss ethnographic information concerning the use of locations such as the Fairchild site and how this use would fit into Hard's model.

1.3. View of the Tularosa Basin to the west of the Fairchild site



1.4. View of the Sacramento Mountains to the east of the Fairchild site

Modeling the Prehistoric Use of the Fairchild Site

Modeling prehistoric use of the Fairchild site involves the determination of site function, duration of site occupancy, and subsistence pursuits. We wish to address these problems using a twofold approach. First we present a model of Late Mesilla phase regional land use proposed by Hard (n.d.) which thereby allows us to place the use of alluvial fans within a regional predictive framework. Second, we approach the use of the Fairchild site from the perspective of the potential for prehistoric exploitation of the immediate area. This local perspective will enable us to refine the expectations of site function, duration of site occupancy, and subsistence strategies developed in the regional model.

The Regional Model

Although the regional land-use model proposed by Hard (n.d.) focuses on the Late Mesilla phase, his model can also be used for the Early Mesilla phase. The major expected difference between the early and late phases is that corn became slightly more important as a food source during the Late Mesilla phase. Even during the late phase, however, Hard proposed that corn was stored and used only as an overwintering strategy to relieve subsistence stress. The model does not apply to the El Paso phase, when the population was probably dependent on a sedentary horticultural subsistence economy. Differences between the way in which the Fairchild site may have been used during the El Paso and Mesilla phases are given in a later discussion.

Hard's model is based on the widely accepted interpretation that the Late Mesilla phase population was primarily that of a mobile hunter-gatherer adaptation. He assumes that water, food, and fuel are critical to a mobile hunter-gatherer population in the region. By monitoring the seasonal and spatial availability of these critical resources for each environmental zone, he predicts where residential sites ought to be located at various times of the year. Based on hunter-gatherer mobility strategies proposed by Binford (1980), Hard divides site types into residential and special-use sites. He argues that once we have determined the potential locations of residential sites we can begin to understand special-use sites throughout the region.

Hard divides the environment into four zones: mountain, riverine, mountain periphery (alluvial fans), and central basin. These divisions are based on a gross categorization of landform and the different biological communities available for human exploitation. He then divides the year into four seasons; however, these are not calendar seasons. Instead, they are based on the annual distribution of precipitation and the occurrence of frost (Hard n.d.:Table 2), factors that affect plant and animal reproduction.

According to Hard's model, the central basin was the primary zone of human exploitation during the summer since critical summertime resources would be available in this zone. Hard predicts that locations near mountain springs may also have been used during summer but were probably not utilized as intensively as resource areas in the central basin. During the fall when the available basin resources begin to decline, mountain zone resources (e.g., deer and piñon nuts) would increase. During the winter, the hunter-gatherer populations would have relied primarily on stored foods. Wintertime residential sites are expected to be primarily located in the riverine zone where water, stores of cultivated corn, and fuelwood would all be available. In contrast, during the spring, when water and food supplies may be in short supply, "Residential sites should be located along the mountain bases or along the rivers, with perhaps special emphasis on succulent resource areas" (Hard n.d.:26).

While these predictions for the location of residential sites at various times of the year are based on seasonal resource availability, they only suggest what the predominant pattern should have been over a span of centuries. In any one year, groups may have used particular environmental zones in a different manner. It is therefore possible that the mountain bases (i.e., the alluvial fans) could have been used for residential sites during each of the seasons over a long period of time, but it is most likely that they were primarily used as residential areas during the spring.

Special-use sites are not specifically addressed in Hard's model. These logistically utilized locations were reached by small groups collecting specific resources located outside the daily foraging range around the residential site. These logistical trips could occur in any environmental zone during any season of the year.

The Local Resources

The Fairchild site is located on an alluvial fan at the base of the western edge of the Sacramento Mountains in an area with access to wild resources and arable land potentially suitable for the cultivation of corn. Perennial water is available at the base of the Sacramentos where both a surface stream and springs are located (Meinzer and Hare 1915). Mesquite, a major resource recorded in the ethnographic record (e.g., Basehart 1974; Bell and Castetter 1937; Castetter and Opler 1936), is available during the late summer and early fall. Historic Southwestern Indian groups collected the beans and ground them into flour; the roots of mesquite provide good fuelwood. Exploitation of springtime succulents, primarily yucca and agave, has also been ethnographically documented (e.g., Basehart 1974; Bell and Castetter 1941; Castetter and Opler 1936). Both yucca and agave lechuguilla grow on the alluvial fan immediately to the east of the Fairchild site.

Overgrazing during the historic period has reduced the grasses in the Tularosa Basin to a minor portion of the vegetation. Based on ethnographic accounts of grass utilization (Bell and Castetter 1941), we would expect that any prehistoric exploitation of grasses in the immediate vicinity of the Fairchild site most probably occurred during the spring.

The agricultural potential of the area around the Fairchild site is limited more by the lack of water than by soil types (e.g., Derr 1981). During the last century Oliver Lee constructed a simple gravity fed irrigation system using the water in Dog Canyon to irrigate land at his farmstead which was located immediately north of the Fairchild site (Dart 1977; Wimberly et al. 1979). Doubtless a similar system which could have allowed the potential for some irrigation horticulture at the Fairchild site was well within the technical capabilities of a Mesilla or El Paso phase population. Dry farming of the alluvial fans in the Hueco Bolson and Tularosa Basin is known to have been quite successful during the El Paso phase (Whalen 1981a). Horticulture, either dry or irrigation farming, may have been practiced at the Fairchild site during the Mesilla and El Paso phases.

The primary faunal resource in the local area is rabbit; small reptiles and some deer also occur but were probably not hunted in any systematic fashion. Because rabbits are available in great numbers over the whole Tularosa Basin, it is unlikely that the site was occupied for the sole purpose of rabbit hunting. More likely, the rabbits were exploited as an embedded strategy while a plant resource was being procured.

Expected Use of the Fairchild Site

According to Hard's (n.d.) model and the recorded ethnographic uses of resources in the general vicinity, the site could have been used for a variety of purposes year round. As noted in the regional model, during the Late Mesilla phase the alluvial fans may have served as a residential locale any time of the year but most probably in the spring when succulents were locally available. The site may also have been used as a mesquite-gathering location during the fall. Both of these practices are well documented in the ethnographic record. It is also possible that the site was used logistically by inhabitants of a residential base site to procure succulents and mesquite. This could have occurred during the Mesilla phase. During the El Paso phase we suggest that the use of the Fairchild site would most probably have been almost completely logistical. This suggestion is based on the assumption that El Paso phase populations were residentially based, year-round, in adobe-walled pueblos; that they relied on horticulture for the main part of their vegetal foodstuffs; and that procurement of wild foods would have been on a logistical basis away from the pueblos. El Paso phase pueblos occur nearby, at Alamogordo (Lehmer 1948) and near Escondido Canyon (Hedrick 1967). During the historic period, Apaches hunted and gathered in the area. We may expect their use of the Fairchild site to have been more comparable to that of the Mesilla than of the El Paso phase populations.

Binford (1982) has noted the tendency for populations to reuse site locations that offer a variety of easily accessible resources. In addition to the above mentioned food resources, the gravel covered alluvial fans in the vicinity of the Fairchild site provided easy access to supplies of rock suitable for cooking (i.e., roasting) and artifact manufacture (e.g., lithic and ground stone). Eventually the presence of site furniture (e.g., fire-cracked rock concentrations, ground stone) becomes an important factor in the reuse of sites. Given the likelihood that the Fairchild site was intensively used by several groups of people for a variety of purposes over a long period of time, it is expected that the archaeological record will be quite complex. Multiple occupations, sometimes overlapping spatially, make archaeological interpretation of any particular part of the site potentially difficult.

While it has been postulated that the primary function of the site may have related to procurement and/or processing (e.g., roasting succulents or procuring mesquite), determining whether it was a residential or a logistical use area would require large-scale excavations that are beyond the present scope of work. Assigning function to sites based on surface survey data alone is difficult (see the discussion regarding the nature of Fairchild site surface deposits in the beginning of Chapter 2). An example of attempting to assign a particular function to sites by using inflexible definitions has been detailed by Hard (n.d.). Determining site function in the Hueco Bolson and the Tularosa Basin has been a matter of debate during recent years. This debate has centered on the problem of distinguishing residential sites from short-term camps. Whalen (1978) proposes that residential sites are larger than 0.10 ha and contain a variety of artifactual materials including ceramics, chipped stone, and ground stone. Camps, in contrast, do not meet these criteria. Carmichael (1983) defines residential sites as those with either sheet trash or a trash midden. Hard (n.d.) notes that using these two methods of determining site function produces radically different results. Using the same data base from Fort Bliss maneuver areas 1-8, there would be 225 residential sites by Whalen's method and only 12 residential sites by Carmichael's method. Hard's statement that there is "no developed way of accurately differentiating residential sites from short-term camps" (Hard n.d.:12) is almost an understatement of the problem.

Because of these functional identification problems, and because of the need for an adequate methodological and theoretical framework within which to understand the archeological remains, especially at a site as complex as we expect the Fairchild site to be, we do anticipate that we will not be able to identify actual functional use of the minor portion of the site that we have excavated. Rather, we should be able to support the expectations proposed here.

Chapter 2

SURFACE COLLECTION AND TEST EXCAVATIONS

The Fairchild site has been described as a "large El Paso phase puddled adobe pueblo village" comprising of approximately 25 mounds covered with a scatter of cultural materials that extends for at least 1/4 mi to the west as well as to the southeast toward the mouth of Escondido Canyon (Eidenbach 1983a:12; Human Systems Research 1973b:20-22). There is very little surface indication, however, that this was actually a puddled adobe village. During the course of the OCA fieldwork, the main mound group was visited by the whole crew, by five archeologists from the Fort Bliss Environmental Protection Office (all of whom have extensive experience in Hueco Bolson archeology), and by Joseph Winter (OCA) and Sandy Rayl (U.S. Army Corps of Engineers, Albuquerque Office). All agreed that from the surface indications the Fairchild site does not appear to have been an adobe-walled village; rather, it is an extensive scatter of fire-cracked rock concentrations (Figures 2.1 and 2.2). One of the fire-cracked rock mounds had previously been cut by mechanical equipment. Although we did not clean the profiles, none of the visiting archeologists believed that there was any subsurface indication of adobe walls or other materials along this cut. Despite these assessments of the Fairchild site we do, however, wish to note that at the nearby Escondido site the surface scatter contained a similar range of artifact types and no indication of subsurface adobe rooms (Regge Wiseman, personal communication). Excavation at the Escondido site revealed an El Paso phase adobe walled pueblo (Hedrick 1967). The ceramic types previously recorded at the Fairchild site (Eidenbach 1983a; Human Systems Research 1973b) were informally noted by the visiting archeologists.

We believe that the Fairchild site was used at least between AD 200 and 1400 and probably also during the preceding Archaic period. Given historically documented Apache use of nearby locations (Dart 1977) an historic Apache component may be expected although none has been recorded.

In many respects the Fairchild site resembles a similar site located on a large alluvial fan at the base of Fusselman Canyon in the Franklin Mountains which has been affected by the urban growth of El Paso and by activities of the Department of Defense. Consequently it has been archeologically investigated in a piecemeal fashion and has been divided into a number of separate sites: the Transmountain Campus sites (O'Laughlin 1979), the Northgate site (Aten 1972), and the Castner Range site (Hard 1983a). In aggregate these sites cover a large area of an alluvial fan and, on the surface, consist of many concentrations of fire-cracked rock. The size, topographic location, and surface materials at the Fairchild site and the site near Fusselman Canyon are quite similar.

Data recovery at the Fairchild site was restricted to a 1500 by 50 ft right-of-way through the site. As noted in Chapter 1, the fieldwork was conducted in two field sessions, the first by the COE and the second by OCA. The COE fieldwork was purely test excavation while the OCA fieldwork consisted of both surface collection and test excavation. The remainder of this chapter describes the data recovery. The mapping and surface collection by OCA are first described, then the OCA and COE test excavations are reviewed.

Preparation for Data Recovery

Prior to the recording of archeological features and artifacts it was necessary to delineate the boundaries of the right-of-way, as defined by the COE. This portion of the site had been determined to lie between pipeline station stakes 267+00 and 282+00. The 50 ft wide right-of-way was defined as the area between 10 ft west and 40 ft east of the pipeline station stakes. The boundaries of the right-of-way were marked on the ground at each station by running a tape perpendicular to the stake alignment using a Brunton compass and by setting a lath at 40 ft east and 10 ft west of each stake.

After the right-of-way boundary between stations 267+00 and 282+00 was marked, three crew members spaced about 5 m apart traversed the entire area in order to identify surface features and artifacts. Pin flags of different colors were used to mark concentrations of fire-cracked rock (FCR), ground stone, painted sherds, and formal chipped stone tools. The pin flags were left in the ground for the mapping crew to map all features on the site as well as the abovementioned artifact classes. The concentrations of fire-cracked rock were given sequential FCR numbers from north to south, and the painted sherds, ground stone, and formal chipped stone tools were given sequential SF (surface find) numbers from north to south (Figure 2.3) [end map].

Site Mapping Strategy

Preparation for mapping the right-of-way began immediately following placement of the boundary lathing. Because of its narrowness and great length (50 by 1500 ft), and to allow for accurate location of features, it was decided to establish a series of permanent site control datum stakes outside the right-of-way corridor. Beginning at a point visually determined to have a higher elevation than any other point within the right-of-way and located approximately grid-east of the grid-southeast corner of the site (i.e., opposite the COE pipeline station 282+00), a series of five 1/2 by 24 in iron rebar rods were driven into the ground 100 m apart and 10 m grid-east (upslope) of the right-of-way boundary laths. The first and highest of these rebar rods was given an OCA-labeled aluminum cap and designated as control datum A. The top of the cap of datum A was assigned an absolute elevation of 100.0 m; thus, notation of all other elevations was in meters below datum A. The remaining four rebar rods were designated B, C, D, and E, successively (Figure 2.3).

All mapping was carried out in the field using both an alidade/plane table and a transit. The alidade/plane table was used in conjunction with a metric stadia rod to establish, with azimuth and

2.1. Fairchild site, main fire-cracked rock mound group, view to the north

2.2. Fairchild site, main fire-cracked rock mound group, view to the northeast distance, the location of important points and features in the horizontal plane. Points taken included the locations of previously established COE pipeline station stakes, COE testing datum stake and excavation units, OCA control datum rods, right-of-way boundary laths, excavation units, transect units, and notched stakes representing on-site data. Recorded features included pin-flagged artifactual surface finds and fire-cracked rock scatters as well as important topographical features, such as drainages and roads. The transit and stadia rod were used in conjunction with the plane table primarily to establish the elevation of most of the above-mentioned points and features. Calculations were made in the field correcting all elevations to correspond to datum A.

Mapping with the alidade/plane table began at the grid-north end of the right-of-way over datum E and proceeded grid-south toward datum A. Approximately four or five COE stations (i.e., 100 ft segments) could be effectively mapped from each datum. Mapped-in overlaps of end stations were made between datum points in order to provide a constant cross-check of azimuth, distance, and elevation data. (Since datum C unfortunately fell near a large mesquite mound and rattlesnake nest, it was not used; all datum points within its range were recorded and cross-checked between points B and D.) Most elevations were taken with the transit and stadia rod working downslope from datum A on the final day of the project. Reserving leveling for a single operation allowed for greater accuracy and efficiency and for the inclusion of the excavation datum stakes, as well as other new or previously overlooked artifacts. On the final day the coordinates of a large pit feature exposed in an arroyo wall were also recorded in relation to datum D (Figure 2.3).

The final mapping operation of OCA's Fairchild Project consisted of proveniencing the right-of-way location itself on the USGS Deadman's Canyon 7.5-minute topographic map. This was accomplished with the transit set over datum D by taking five separate azimuth readings from recognizable topographic features nearby and triangulating them on the map.

Surface Collection

Objectives

Although concentrations of fire-cracked rock were identified and located in the initial areal survey of the right-of-way, it was impossible to determine the distribution of fire-cracked rock and artifacts between concentrations without a more detailed, systematic examination of the surface. A strategy of surface collection was developed, therefore, to discover the overall spatial patterning of material within the right-of-way and to define the covariation of different artifact types.

Method

The surface collection strategy was designed to cover 10 percent of the total right-of-way area. It was determined that systematic interval transects across the right-of-way would best achieve the objectives outlined above and would be less difficult to control and less time-consuming to execute than other, more complex strategies. A system was designed using 1 m wide transects laid across the right-of-way, perpendicular to the right-of-way orientation and 9 m apart (Figure 2.3). This would recover information on material distribution across the whole right-of-way, without bias toward the already identified surface fire-cracked rock concentrations. Within each transect, collection units were 1 by 1 m grids. Because the right-of-way was 50 ft (15.24 m) wide, it was decided that transects should overlap slightly in order to cover the whole right-of-way width. Thus, 16 m long transects were made in the form of 16 1 by 1 m grids, overlapping the west edge of the right-of-way.

Before collections were begun, the transect locations were marked on the ground using a 30 m tape and pin flags at each grid corner along the whole right-of-way from station 282+00 to station 268+00. For example, measuring from 282+00, pin flags were set at 0, 1, 10, 11, 20, 21 m, etc., thereby achieving the systematic 10 percent sample. The transects were given letter designations (A to Z and AA to TT) beginning at station 282+00 (Figure 2.3).

After all the transect corners had been marked on the ground, each transect in turn was delineated using two 30 m tapes stretched between the pin flags from east to west. It was often necessary to remove creosote and mesquite branches to ensure a straight line from corner to corner. A crew of two then covered each transect, collecting all ceramic, chipped stone, and ground stone artifacts within each 1 m sq grid collection unit. Material from each grid was collected and bagged separately. Grids were numbered 1 through 16 from east to west. A form was completed for each transect, recording the number of artifacts and fire-cracked rock pieces within each grid unit (Appendix A), the approximate vegetative cover, the presence of drainage channels and other surface disturbance, and the color of the soil within the transect by the Munsell color chart (Table 2.1). If differences in soil color could be seen on the surface within the same transect, more than one Munsell designation was recorded for that transect. Any other natural or cultural feature, such as eroded gravels and the presence or proximity of fire-cracked rock concentrations, was also noted on the forms. The fire-cracked rock was counted but not collected. It was noted whether the pieces were smaller or larger than 8 cm and, if larger, the fire-cracked rock for that grid was weighed. The number of pieces and the weights for each surface collection grid were recorded on the transect forms.

FCR Concentration 7 covered Grids 4, 5, 6, and 7 of Transect II. Since this concentration was to be investigated in detail by a 4 by 4 m excavation unit (Unit 1), the surface collection of these grids was made at the time of the excavation, although the results are included with the surface collections of other grids (Table 2.2).

Table 2.1. Munsell designations for surface-collection transects

Transect	Munsell Color	Condition
A	10 YR 5/4	Dry
B	10 YR 5/3	Dry
C	10 YR 5/4	Dry
D	5 YR 5/4	Dry
E	10 YR 5/4	Dry
F	10 YR 5/4	Dry
G	10 YR 5/4	Dry
H	7.5 YR 5/4	Dry
I	10 YR 5/4	Dry
J	10 YR 5/3	Dry
K	7.5 YR 5/4	Dry
L	10 YR 5/3	Dry
M	10 YR 5/4	Dry
N	10 YR 5/3	Dry
O	10 YR 5/4	Dry
P	10 YR 5/3	Dry
Q	10 YR 4/4	Moist
R	10 YR 5/3	Moist
S	10 YR 4/4	Moist
T	10 YR 4/4	Moist
U	10 YR 4/4	Moist
V	10 YR 4/4	Moist
W	10 YR 4/4	Moist
X	10 YR 4/4	Moist
Y	10 YR 4/4	Moist
Z	7.5 YR 4/4 (east); 10 YR 4/4 (west)	Moist
AA	10 YR 4/4	Moist
BB	10 YR 5/4	Moist
CC	10 YR 4/4	Moist
DD	7.5 YR 4/4	Moist
EE	10 YR 4/4	Moist
FF	7.5 YR 4/4	Moist
GG	7.5 YR 4/4	Moist
HH	10 YR 4/4	Moist
II	10 YR 4/4 (east); 7.5 YR 4/4 (west)	Moist
JJ	10 YR 4/4	Moist
KK	10 YR 4/4	Moist
LL	10 YR 4/4	Moist
MM	10 YR 4/4	Moist
NN	10 YR 4/4	Moist
OO	10 YR 4/4	Moist
PP	10 YR 4/4	Moist
QQ	10 YR 4/4	Moist
RR	7.5 YR 4/4	Moist
SS	10 YR 4/4	Moist
TT	10 YR 4/4	Moist

Table 2.2. Total artifact counts in surface collections

Transect	Fire-Cracked Rock	Sherds	Chipped Stone	Ground Stone
A	-	-	-	-
B	-	-	-	-
C	-	-	-	-
D	-	-	-	-
E	-	-	2	-
F	-	-	-	-
G	-	-	-	-
H	-	-	-	-
I	1	1	1	-
J	1	-	-	-
K	2	-	-	-
L	1	-	-	-
M	-	-	-	-
N	2	-	-	-
O	7	2	-	1
P	2	2	1	-
Q	-	-	-	-
R	-	-	-	-
S	-	-	-	-
T	-	-	-	-
U	-	-	-	-
V	-	-	-	-
W	1	-	-	-
X	-	-	-	-
Y	-	-	-	-
Z	3	3	1	-
AA	7	6	-	1
BB	5	5	2	-
CC	52	9	4	-
DD	3	2	2	-
EE	9	-	2	-
FF	2	2	-	-
GG	77	24	3	-
HH	104	31	5	-
II	159	11	5	-
JJ	3	5	-	-
KK	-	-	-	-
LL	2	5	1	-
MM	-	2	-	-
NN	18	4	1	-
OO	2	8	2	-
PP	6	-	1	-
QQ	24	1	-	-
RR	7	-	-	-
SS	1	-	-	-
TT	-	-	-	-
Totals	501	123	33	2

Surface Finds

During the initial sweep across the site to locate cultural features, artifacts, and fire-cracked rock concentrations, all artifacts occurring outside the surface-collection transects that might be indicative of economic activities, or be temporally sensitive, such as painted pottery, ground stone, and formal chipped stone tools, were located on the ground using pin flags of different colors. All such artifacts were numbered sequentially (SF 1-23), point-provenienced on the site map, and collected for laboratory identification and analysis. Table 2.3 lists these items.

Description of Excavations

The description of excavation units within the right-of-way is broken into two parts: one for the OCA excavations and one for the COE excavations. These excavations were performed at different times and with different recording systems. The methods are described at the beginning of each part of the description.

OCA Excavations

The strategy for excavation by OCA was outlined in the Scope of Services and modified by Sandy Rayl, Joseph Winter, and Roger Anyon in the field during the preexcavation field inspection. It was decided that the majority of excavation should be at one fire-cracked rock concentration. The feature chosen was FCR 7 (Figure 2.3), in which a 4 by 4 m excavation was to be placed as stated in the Scope of Services. This fire-cracked rock concentration was chosen for excavation because it appeared, on the surface, to be the most intact and one of the densest concentrations within the right-of-way. The objective of the excavation at FCR 7 was to attempt to locate the feature in which the fire-cracked rock had been produced.

Recording Procedures. The recording for OCA excavations followed the format outlined by LeBlanc (1976). This system was used because it was felt to be more efficient than laying a grid across the entire right-of-way. Here we present a brief outline of the unit-level-locus system; for a more detailed explanation, and justification for its use, see LeBlanc (1976).

The unit-level-locus recording system involves the use of a numerical provenience without descriptive terms (for example, Unit 1-Level 2-Locus 11 is recorded as 1-2-11). Units and loci are horizontal areas of excavation, while the level is the vertical area of excavation. The unit is the primary designation for an excavation area which contains one or more loci and one or more levels. Loci are spatially discrete areas within a unit; they can be either an arbitrarily assigned area (e.g., a quadrant in a room or a 1 by 1 m test pit) or a cultural feature (e.g., a hearth or a burial). Thus the locus is a proveniencing designation that allows for a great amount of flexibility and avoids the problems of sequentially numbering each feature type

Table 2.3. Catalog of surface finds collected from Fairchild site

Surface Find Number	Right-of-Way Station Location	Description
1	277 + 70	Retouched flake
2	268 + 03	Possible metate fragment
3	269 + 27	Core/hammerstone/chopper
4	270 + 27	Truly indeterminate Mimbres B/w sherd
5	270 + 36	Hammerstone
6	270 + 90	Core fragment
7	271 + 27	Globular core
8	271 + 39	Rectangular (?) mano fragment
9	271 + 40	Mano (?)/stone bowl fragment
10	272 + 45	El Paso Bichrome (?) sherd
11	270 + 90	Oval (?) mano fragment
12	272 + 72	Retouched flake
13	272 + 72	Rectangular mano fragment
14	273 + 67	Indeterminate Mimbres Style II/III sherd
15	273 + 72	Rectangular mano fragment
16	273 + 70	Globular core, unspecified brown sherd, truly indeterminate Mimbres B/w sherd
17	277 + 93	Five unspecific brown sherds
18	279 + 06	Two unspecific brown sherds
19	270 + 80	Retouched flake
20	270 + 85	Utilized/damaged flake
21	270 + 60	Mimbres Style III sherd
22	271 + 10	Flake uniface
23	276 + 60*	White chert projectile point

* outside right-of-way

within an excavation area and attempting to assign function to features within the numbering system. Levels are numbered within the unit from the modern ground surface downwards. Levels can be either arbitrary vertical excavation levels or they can be cultural or natural layers. Of course the excavation of cultural layers or discrete entities is a goal of excavation, but in many cases they are best divided into arbitrary levels to allow for tight provenience control.

Within each unit-level-locus there is a sequential numbering of samples (e.g., flotation and radiocarbon samples) and special artifacts (e.g., projectile points and beads) indicated after a "/" in the numbering system. Each unit-level-locus has its own independent consecutive numbering. Any type of sample or special item is given a consecutive number within that unit-level-locus. Thus there is no need for a sitewide list of each type of artifact in the field. Unless the slash-numbered item was found in the screen it was point-plotted within the level-locus.

The end result of this recording system is a unique numerical designation for each part of the site. Within each unit the proveniencing is independent of all the other units, thus allowing the excavation teams to work independently. Each unit-level-locus was recorded on a separate, preprinted form.

Vertical control was accomplished by the use of levels which were measured in with respect to a datum. The datum system also allowed independence within or among units. At the beginning of the excavation of a unit the unit crew hammered a wooden stake into the ground and notched it above the modern ground surface. This notch indicated where the line-level string was to be attached and was the point from which all vertical measurements within this particular datum were to be taken. Each datum was assigned a separate letter. The crew could use this datum without needing to know its elevation with respect to the site datum. As with the unit-level-locus system, the vertical measurements from any one datum were independent of the others. All that had to be noted on the excavation form was the datum letter. If a new datum were needed, the excavation crew simply placed a new notched wooden stake in the ground at a convenient location and the project director assigned it a letter. When the excavations were completed the mapping crew went from datum to datum and measured the elevation of each notch with respect to the elevation of the site datum.

Artifact and sample proveniencing was done with the use of the numbering system outlined above. The general provenience bags for each unit-level-locus for sherds, chipped stone, fire-cracked rock, and bone were numbered by provenience. Artifact classes from each individual unit-level-locus were bagged separately. For example, the sherds and chipped stone were placed in separate bags and were marked as such. Each bag was tagged on both the outside and inside with the necessary information: the date, site number, provenience within the site, excavators' surnames, and type of artifacts.

Samples for special analysis were taken in the following manner. Flotation samples were collected by placing at least 2 liters of soil into a large plastic bag using a clean trowel. Pollen samples were collected much more carefully than flotation because of the much greater chance of sample contamination. The location to be sampled was cleaned using a clean tool, then the sample itself was removed using another clean tool and quickly sealed inside a plastic ziplock bag. This bag was then placed inside a second bag. Radiocarbon samples were taken with a clean tool, immediately sealed in aluminum foil, and then placed in a bag.

Unit 1. Unit 1 consists of a total of 28 1 by 1 m excavation loci, of which 16 are contiguous. Each 1 by 1 m test pit is a separate locus within Unit 1 (Figure 2.4).

The objective of testing Unit 1 was to fully excavate a fire-cracked rock concentration that had not been tested by the COE. Concentration 7 was chosen because of the possibility that a hearth would be found beneath it. The chances of locating a feature containing charcoal appeared to be good because the heavy concentration of fire-cracked rock appeared to have retained its integrity (Figures 2.5 and 2.6). A 4 by 4 m excavation grid consisting of Loci 1 through 16 was placed over the concentration.

The excavation of the concentration employed the quadrant method, which provides the excavator with complete profiles through the feature while opposing quarters of the feature are removed. Excavation was in 10 cm arbitrary levels, given the lack of discernible cultural layers, and horizontal control was by 1 by 1 m loci, thereby providing complete north-south and east-west profiles of the concentration (Figure 2.7). The lack of stratigraphy beneath the first two excavated quadrants meant that there was little reason to change the strategy of excavating in 10 cm arbitrary levels in the second two quadrants. During the excavation of the first two quadrants we noticed that the vast majority of the cultural debris was within the top 5 cm. We therefore removed one locus (7) in two 5 cm levels to determine whether our intuitive observation was correct. Almost all cultural debris collected in the screen was from the upper 5 cm.

At the completion of the 16 sq m excavation there was no evidence of a hearth or burned pit beneath the fire-cracked rock concentration. At this point it was decided that the fire-cracked rock may have been prehistorically moved from the feature in which it was formed. Because the east and north sides of the FCR concentration were eroded by a small arroyo channel (Figure 2.3) [end map] we began to look along the west and south edges of the excavated area. We discussed the lack of charcoal beneath the fire-cracked rock concentration with Robert Hard and his colleagues from the Fort Bliss Environmental Protection Office. Their opinion, based on experience at similar sites in the El Paso region, was that there should be a light stain of charcoal between the fire-cracked rock concentration and the original feature (i.e., hearth), if that feature was not directly beneath the fire-cracked rock. There was, however, no stain leading from the concentration. Auger holes along the south side of FCR 7 also contained no charcoal (see below). We therefore decided that we should expand our effort along the west side of the concentration.

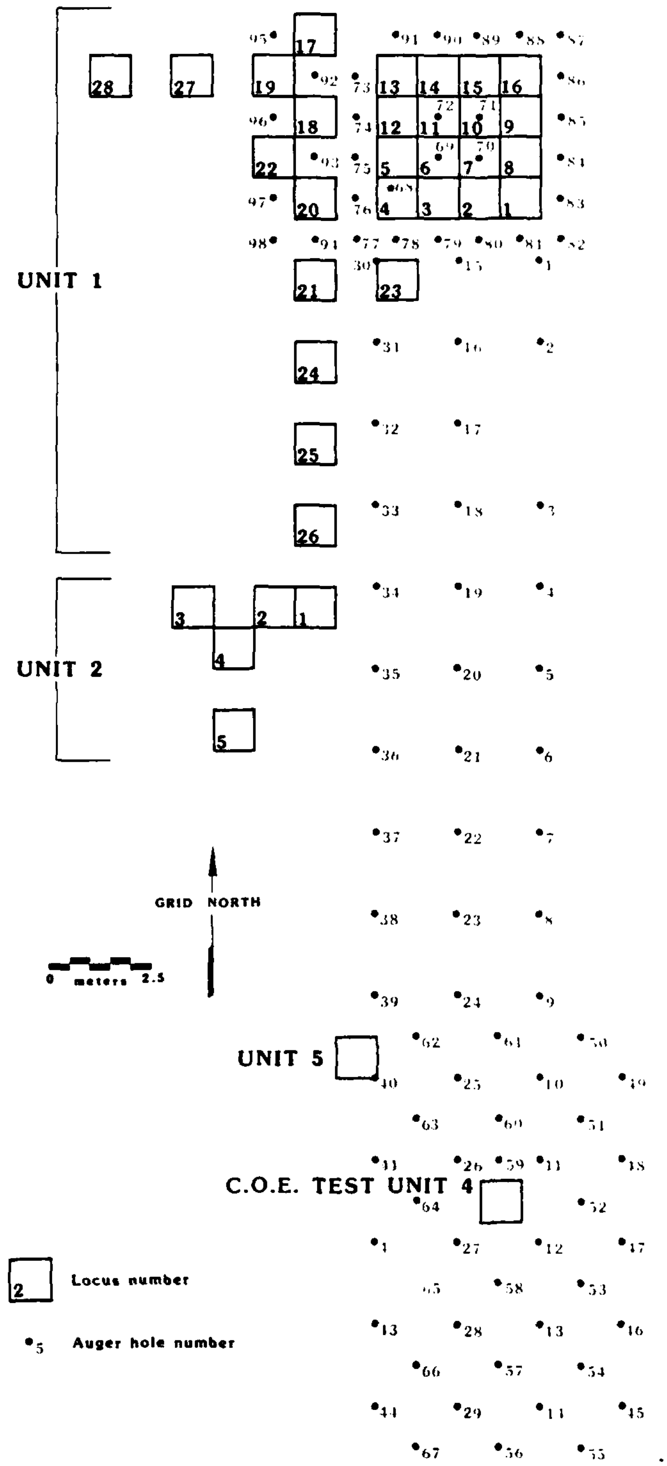
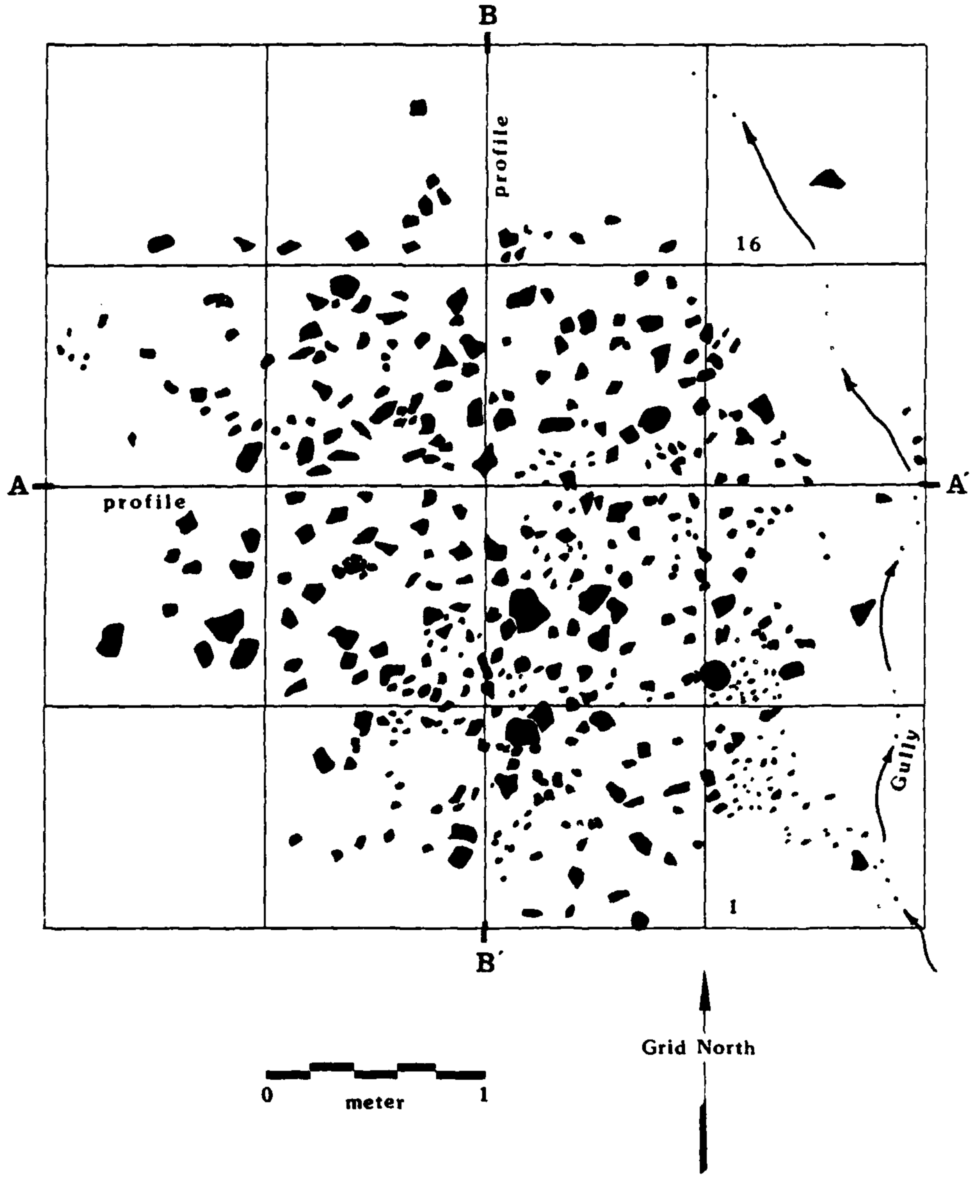
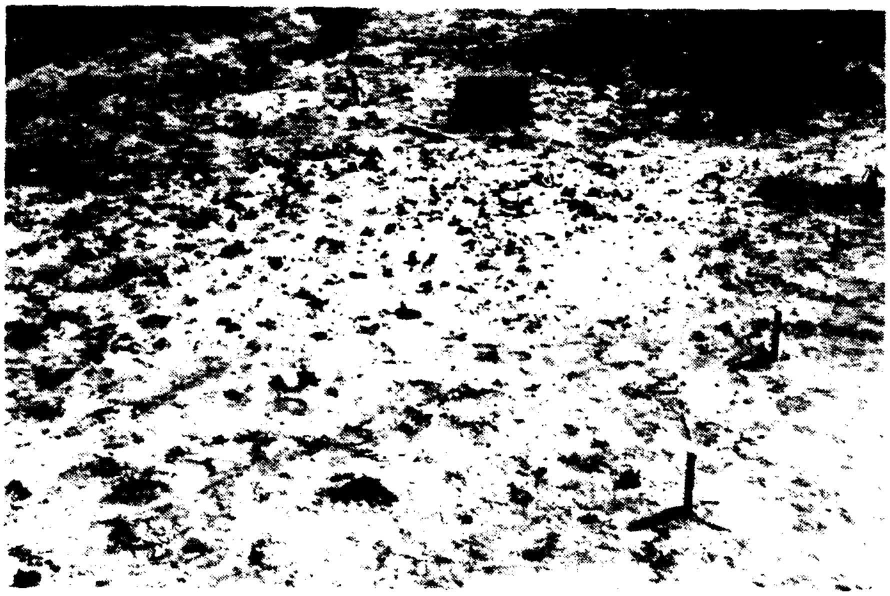


Figure 2.4. Detail of Units 1, 2, and 5, and Test Unit 4 showing loci and auger hole locations



Refer to Figure 2.4 for detail of Loci numbers 1 through 16.

Figure 2.5. Plan of Unit 1 fire-cracked rock, surface distribution, in FCR-7



2.6. FCR-7 prior to excavation, looking northeast

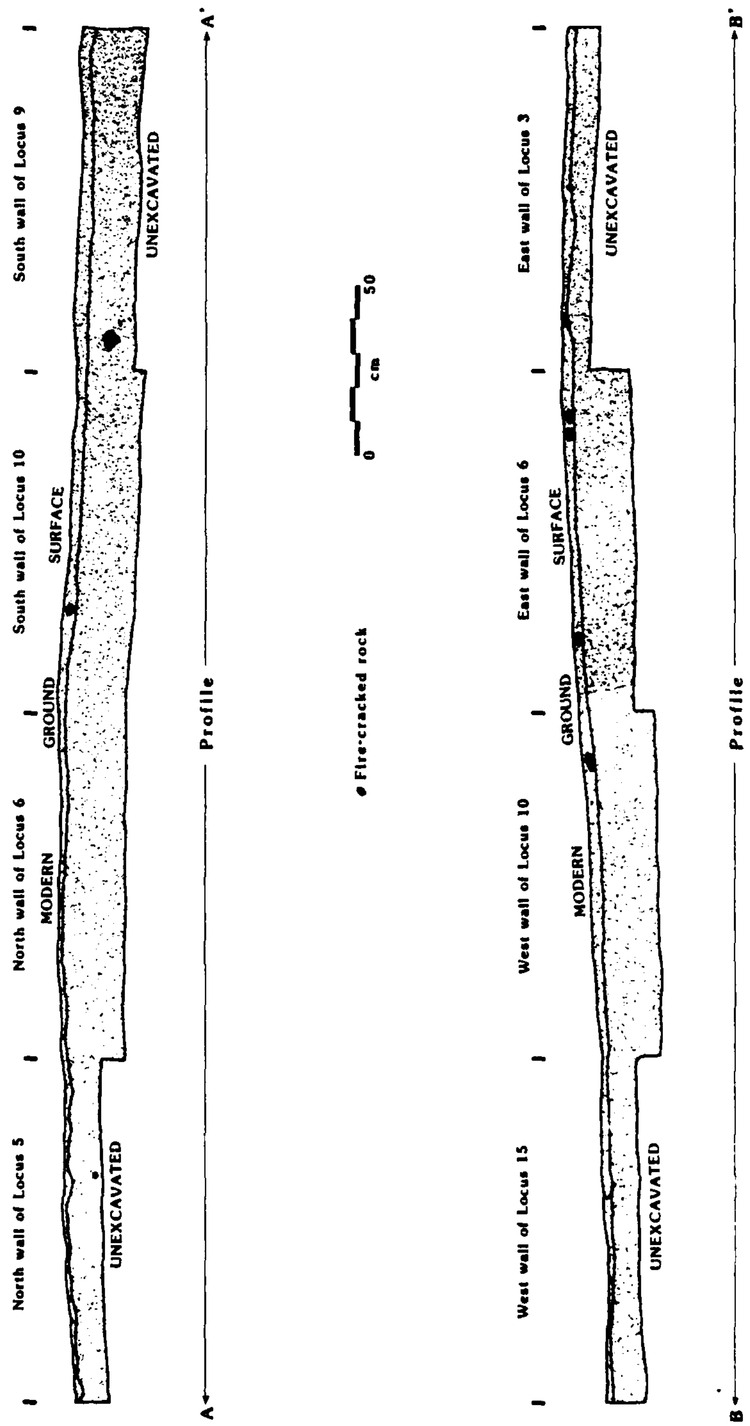


Figure 2.7. East-west (A-A') and north-south (B-B') profiles through FCR-7

The strategy we used was one of staggering 1 by 1 m test pits around the west side of FCR 7 to attempt to locate a charcoal stain or a burned feature (Figure 2.8). No features or charcoal stains were located.

All levels in Loci 1 through 16 were screened through 1/8-inch mesh. The remaining noncontiguous level-loci (Loci 17 through 28) were screened through 1/4-inch mesh. The 1/8-inch mesh was used where excavation units overlay the fire-cracked rock concentration whereas 1/4-inch mesh was used in loci outside the area of FCR-7. Before excavation the surface materials were collected.

The following description of the excavations does not describe each level-locus but presents the overall character of the unit, noting any variability within the unit. The level-loci are listed in numerical order, and basic data are provided in Appendix B.

Loci 1 through 16 contained virtually identical deposits. The upper 8 to 10 cm was a loose, fine, powdery silt/clay deposit. Below this was an identical silt/clay that became extremely compact between 8 and 10 cm below the surface. No difference in texture and color between the powdery and the compact silt/clay deposit was noted when the profiles were inspected (Figure 2.7). Virtually all cultural materials were collected from the upper 5 cm of the excavated fill. During the excavations several heavy rains at the site caused the upper few centimeters of soil to become extremely slick. When the surface dried it became a fine powder that was susceptible to aeolian erosion on dry days.

Small flecks of charcoal were occasionally noted within the upper 10 cm of excavation. These were too scattered and small to be collected as radiocarbon samples. Only in the southeast corner of Locus 11 was there enough charcoal to collect a dating sample, but even this sample was considered too small to date by Beta Analytic (see Chapter 5).

A modern, shallow water channel cut through the excavation area in Loci 1, 8, 9, and 16 (Figure 2.4). This was noted as a slightly darker stain than the silt/clay found in the other loci. In Locus 9 a rock and some charcoal flecks were noted in the base of the first 10 cm level. An additional 5 cm was excavated to determine the nature of the rock and charcoal deposit. At the base of this second level the rock was removed and it was noted the stain had disappeared. We believe that the stain and the rock were deposited by the shallow water channel running through this locus.

At the base of the first 10 cm level in Locus 4 a 10 cm diameter dark stain associated with a few charcoal flecks was noted in the north-central portion of the square. The flecks were not sufficient for a radiocarbon sample. We suspected that the stain and the charcoal were an extremely thin deposit and we therefore placed auger hole 68 through the stain (see below). The auger hole demonstrated that the charcoal and dark stain were no more than 1 cm thick, and that below the stain was the compact silt/clay deposit found throughout the excavation area. We suspect that this stain represents a rodent hole.

2.8. Staggered test pits on the west side of FCR-7, looking north

To ensure that the compact silt/clay was in fact a culturally sterile layer we excavated a second 10 cm level in Loci 6 and 10. Both loci were located beneath the heaviest surface concentration of fire-cracked rock. In the second level of both loci no change was noted in the silt/clay deposit, but artifact counts were negligible. We ceased excavation but decided that we should confirm our findings by placing auger holes in the four central loci of the 16 sq m contiguous excavation area. These four auger holes (numbers 69, 70, 71, and 72) were sunk deep (see Appendix C) to ensure that we were not excavating an alluvial deposit which covered cultural materials. The fill removed by the augering was identical to that in the upper 10 cm of the excavations.

The noncontiguous 1 by 1 m squares (Loci 17 through 28) were excavated on the west and south sides of the contiguous 16 sq m area (Figure 2.4). Each of these loci was taken down to 10 cm below the modern ground surface in one level. The stratigraphy in these loci was identical to that in the contiguous 16 sq m and consisted of a silt /clay which was very powdery in the upper 10 cm and which became extremely compact at the approximate base of the 10 cm level. Occasional flecks of charcoal were noted but they were so small and scattered that no radiocarbon samples could be taken. As in the contiguous excavation area, the vast majority of the cultural materials were recovered from the upper 5 cm of the fill.

In summary, the excavation of Unit 1 demonstrated that the cultural deposits were all located within 10 cm of the modern ground surface. By far the majority of these materials were actually from the uppermost 5 cm. No feature was located beneath the fire-cracked rock, and additional excavation units and auger holes placed around the concentration also failed to locate any cultural features.

Unit 2. Unit 2 consisted of five 1 by 1 m loci (Figure 2.4). Three of the loci were placed along surface collection transect HH, where the density of sherds and chipped stone was the highest of all surface transect grids outside the confines of a fire-cracked rock concentration (Appendix A). The loci correspond to the transect grids as follows:

Unit 2, Locus 1	Transect HH, Grid 8
Unit 2, Locus 2	Transect HH, Grid 9
Unit 2, Locus 3	Transect HH, Grid 11

Unit 2 was placed over this surface artifact concentration because we thought that it might be the location of a cultural feature. All deposits removed from unit 2 were screened through 1/4-inch mesh. Locus 1 was taken down in 10 cm levels to 50 cm below the modern ground surface. The other four loci were excavated in one 10 cm level.

Most of the cultural materials in Locus 1, such as ceramics and chipped stone, were found in the uppermost 5 cm of Level 1. The few materials collected from deeper in this locus may have been deposited there in two ways. First, a rodent burrow was present at the juncture of Levels 2 and 3. Second, a gravel deposit at the base of Level 3, from which some artifacts were recovered, appeared to be the result of alluvial wash. Apart from these deposits the majority of the fill in Locus 1 was the same fine-grained silt/clay found in Unit 1. As in Unit 1, occasional flecks of charcoal were not sufficient for a radiocarbon sample. The upper 10 cm was powdery when it was dry, and below that was the same deposit but in a very compact state.

Loci 2 and 3 had already been collected as part of Transect HH. On the other hand, Loci 4 and 5 were collected immediately prior to excavation because they did not correspond to transect collection grids. These four loci were excavated to a depth of 10 cm in one level. No features, nor any stains or charcoal lenses, were noted. Artifacts were only recovered in the upper 5 cm of the excavated fill. In each locus the fill was the powdery clay/silt noted in Unit 1.

Unit 3. Unit 3 was a 1 by 1 m square placed near the north end of the tested portion of the right-of-way (Figure 2.3) [end map]. Its location was chosen for two reasons. First, it was within a dense fire-cracked rock concentration (FCR 2); second, it was placed at the same location as surface transect QQ grid 7. It had been collected as part of the surface transect collections; the artifact counts from this grid are given in Appendix A.

The unit consisted of one locus which was excavated in three levels. The upper two levels were each 10 cm deep, while Level 3 was 5 cm deep. No artifacts were recovered in either levels 2 or 3 despite the screening of all material through 1/4-inch mesh.

Level 1 was the same fine, powdery clay/silt found throughout Units 1 and 2. An occasional root was also encountered. Levels 2 and 3 contained the compact clay/silt, and an occasional small piece of gravel and root was noted in Level 2. No gravel was found in Level 3, but roots and rodent burrows were present.

As in Unit 1, no cultural features were located beneath the fire-cracked rock concentration. In Unit 3 there was not even any charcoal. Once again the cultural materials were all located in the upper 10 cm of the deposits.

Unit 4. Unit 4 was located at the southern end of the tested portion of the right-of-way (Figure 2.3). It was a 1 by 1 m excavation unit placed within a light-density fire-cracked rock concentration (FCR 22) adjacent to surface Transect O. This location was chosen because it allowed us to test a light-density fire-cracked rock scatter situated well away from the majority of the concentrations and also from the majority of the archeological testing. The unit consisted of one locus and five 10 cm levels; all material from each level was screened through 1/4-inch mesh.

The fill in Unit 4 was different from the fill in the other units excavated in the right-of-way (Figure 2.9). As in the other units, the uppermost 10 cm was loose, fine-grained silt/clay but also contained some small gravel pebbles. The second and third levels, between 10 and

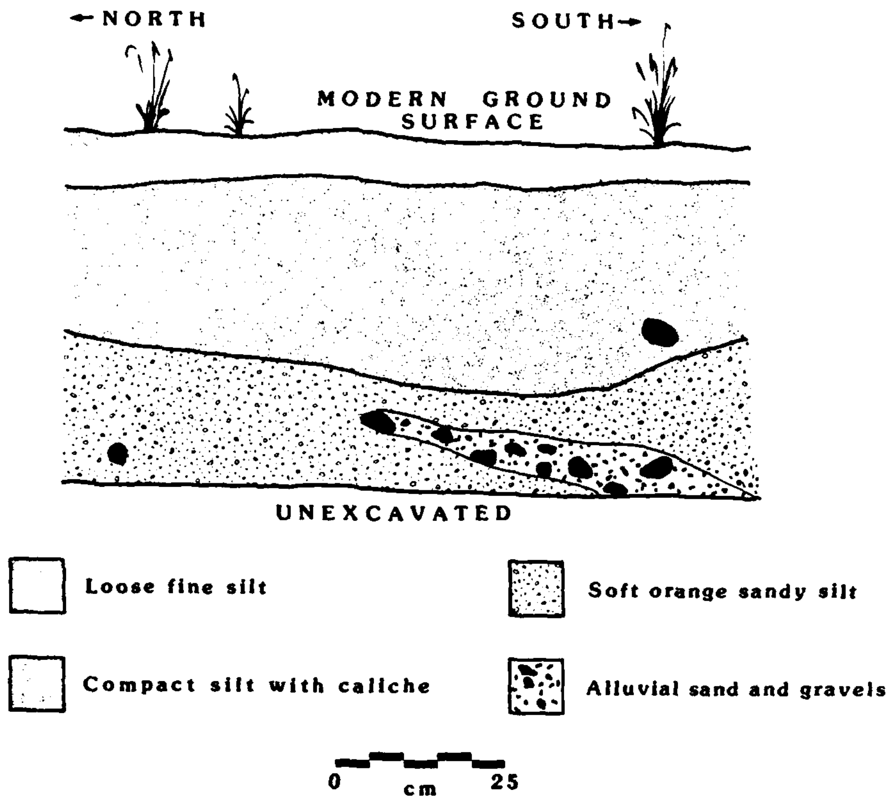


Figure 2.9. Profile of east face of Unit 4

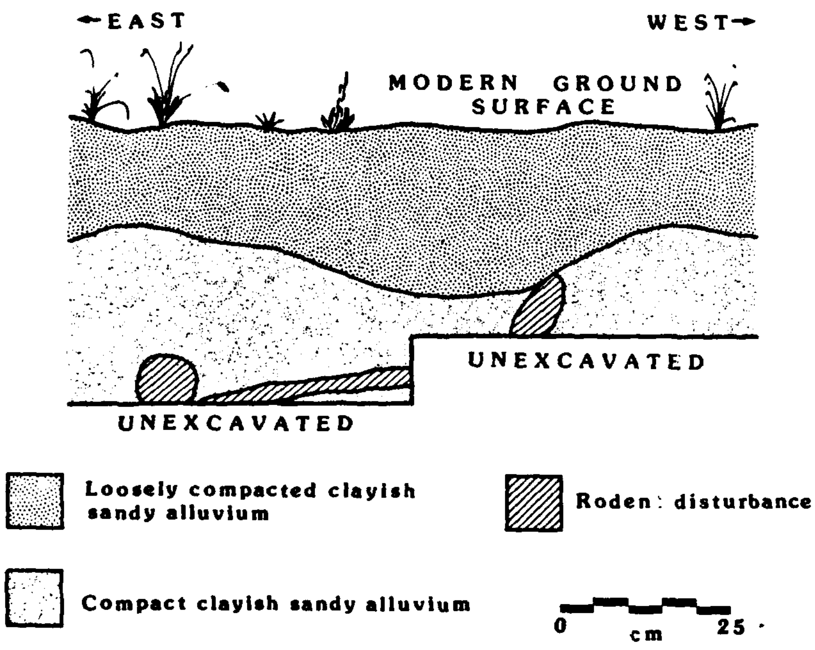


Figure 2.10. Profile of south face of COE Test Unit 3

30 cm below ground surface, were the hard, compact silt/clay found in the other units. At approximately 35 cm below ground surface an orange sandy deposit appeared with small gravel pebbles throughout. Within this deposit were a number of pieces of fire-cracked rock and other artifacts. A lens of coarser sand and gravels was located in the fifth level; it continued to the bottom of the excavation at 50 cm below ground surface. Excavations were terminated at the 50 cm mark, as called for in the Scope of Services.

The depositional sequence of the upper 35 cm in Unit 4 was similar to that of the other units in the right-of-way. Below that point the fill became quite sandy and gravelly. This lower gravel is apparently the product of materials being washed down the alluvial fan. These levels were markedly coarser than the silt/clay on the present-day surface of the alluvial fan at this location. The presence of fire-cracked rock and other artifacts in this gravel indicate that there was quite an aggradation of deposits between an earlier use of the alluvial fan and the use that produced the light fire-cracked rock concentration on the present ground surface (assuming, of course, that the present surface concentrations were not the product of natural processes).

Unit 5. Unit 5 was a 1 by 1 m square placed over auger hole 40 to determine the nature of the charcoal that was noted in the auger test. Unit 5 was excavated in four levels. The first three were each 10 cm deep, while Level 4 was 5 cm deep; all fill was screened through 1/4-inch mesh.

The upper 10 cm of fill was the typical fine-grained, loose silt/clay. The vast majority of artifacts from the unit were found within this fill. This level also contained a number of charcoal flecks -- not enough for a radiocarbon sample, but some of the fill was taken as a flotation sample. The charcoal flecks continued into the second level and another flotation sample was taken; however, no sherds or chipped stone was found in the level. Some fire-cracked rock did occur in Level 2. Roots occurred throughout Levels 1 and 2. By the time the third level had been excavated the fill had become extremely compact clay/silt with no artifacts (except for a few pieces of fire-cracked rock in the upper 5 cm of Level 3). Level 4 was the same compact fill that was found in Level 3 but contained no cultural materials.

The excavation of Unit 5 did not uncover any cultural features. The charcoal in the unit was associated with evidence of extensive root activity and is probably natural.

COE Excavations

The COE excavated five test units within the right-of-way. Test Unit 1 combined two 1 by 1 m pits (1E and 1W); the other test units were single 1 by 1 m pits. No further provenience designations other than test unit were given on the horizontal plane; vertical recording was in levels, with Level 1 being the uppermost. Vertical measurements were recorded with respect to modern ground surface in each test unit. All fill was screened through 1/4-inch mesh.

Test Unit 1. This test unit was a 1 by 2 m pit placed in FCR Concentration 17. Although the field notes for this unit were lost prior to OCA involvement in this project, a report by Sandy Rayl (1983) completed after COE fieldwork contains the following description of Test Unit 1:

> Test Unit 1 was excavated in two 1 x 1 meter units to an average depth of 40 cm below PGS. The southwest corner of unit 1W was excavated to 50 cm below PGS. Auger holes in the northeast corner of the southwest corner of unit 1W and in the northeast corner of unit 1E were placed from 50 to 78 cm below PGS. Four small lithics were retrieved from the auger hole in test unit 1W; however, they may be intrusive as considerable rodent disturbance was noted in the unit.
>
> Artifacts from unit 1E were recovered primarily from the upper 30 cm of fill. Only one lithic was recovered from Level 4 (30-40 cm below PGS). Unit 1W yielded artifacts from the surface to 50 cm below PGS. The artifacts from Level 5 (40-50 cm below PGS) may be intrusive since rodent activity was observed in the level. Below 40 cm, the artifact density declines noticeably.
>
> The soil texture and composition from unit 1 is similar to that of the other excavated units. The soil is a fairly homogeneous clayey-sandy alluvium that exhibits little change throughout. The upper 15 to 20 cm of fill is damp and is fairly easy to excavate. This upper fill contains more sand lenses than the lower. Below 20 cm, the fill is dry, much more compacted, and more difficult to excavate. This dense, compacted soil horizon continues unchanged throughout the cultural deposit, and even into the sterile levels (Rayl 1983:4).

Test Unit 2. Test Unit 2 was placed to the west of FCR Concentration 17 (Figure 2.3). It was a 1 by 1 m test pit excavated in five 10 cm levels. The northern half of the pit was taken down another 10 cm to Level 6, then the northwest quarter was excavated another 10 cm to the base of Level 7. Finally, an auger hole was placed in the northwest quarter of the pit to a depth of 25 cm below the bottom of Level 7.

The rain that fell while this pit was being excavated appears to have made the fill less compact than it was when the fill was dry. In the first three levels the fill was primarily clay with some sand mixed in, along with a number of rodent holes and roots. Below the uppermost 5cm the fill became more compact. Occasional pieces of charcoal were found throughout these levels. Levels 4 through 7 contained a dry fill which was noted as being similar to but more compact than the three levels above. The fill of Level 4 and the upper 8 cm of

Level 5 contained more fire-cracked rock and other artifacts than any other portion of the pit. The auger test below the bottom of Level 7 (to a depth of 95 cm below modern ground surface) contained fill identical to that in Level 4, except for occasional small gravel pebbles.

This test unit appears to have been placed in an area with no cultural features. The concentration of cultural materials in Levels 4 and 5 appears to be the result of alluvial processes. As with OCA Unit 4, these materials appear to be much older than the fire-cracked rock noted on the modern ground surface, and they apparently washed in from elsewhere on the site.

Test Unit 3. Test Unit 3 was a 1 by 1 m pit excavated near the center of FCR 15, a heavy surface concentration of fire-cracked rock (Figure 2.3). The test unit was excavated in four 10 cm levels (Level 4 was only taken down in the southeast quarter of the pit). An auger hole was sunk 20 cm below the bottom of Level 4. The placement of this pit was to determine whether there was any cultural feature beneath the fire-cracked rock concentration.

The upper two levels consisted of a loosely compacted, fine-grained, alluvially derived mixture of clay with some sand. At a depth of 20 cm below the modern ground surface the fill became extremely compact. It remained the same to the bottom of the test pit and the auger hole (Figure 2.10). This compact material was the same as that found in the upper two levels. No cultural materials were noted or recovered below Level 3.

The majority of the cultural materials from this pit were fire-cracked rock, and most of these were in the upper 10 cm of fill. As with the other FCR concentrations there was only a surface concentration of materials with no cultural feature beneath.

Test Unit 4. Test Unit 4 was a 1 by 1 m test pit excavated in four 10 cm levels. The lowest level was only excavated in an area measuring 60 by 100 cm. The test pit was placed near the center of FCR 13 (Figure 2.3). This was noted on the surface as a heavy concentration; however, the density of fire-cracked rock was not as high as that in FCR 7 (Figure 2.11; cf. Figure 2.5).

The uppermost 3 cm of the test pit contained an extremely loose, fine-grained clay, much the same as in Test Unit 2. Below this the fill became compact although it was otherwise identical. Levels 1 and 2 contained some fire-cracked rock and other cultural materials. Sufficient charcoal flecks were noted in Level 2 for a radiocarbon sample to be taken. There were no cultural materials in Levels 3 and 4.

Test Pit 4 failed to reveal the presence of a feature below this portion of the fire-cracked rock concentration. This lack of cultural deposits was also noted in the intense augering of this concentration during the fieldwork by OCA (see below).

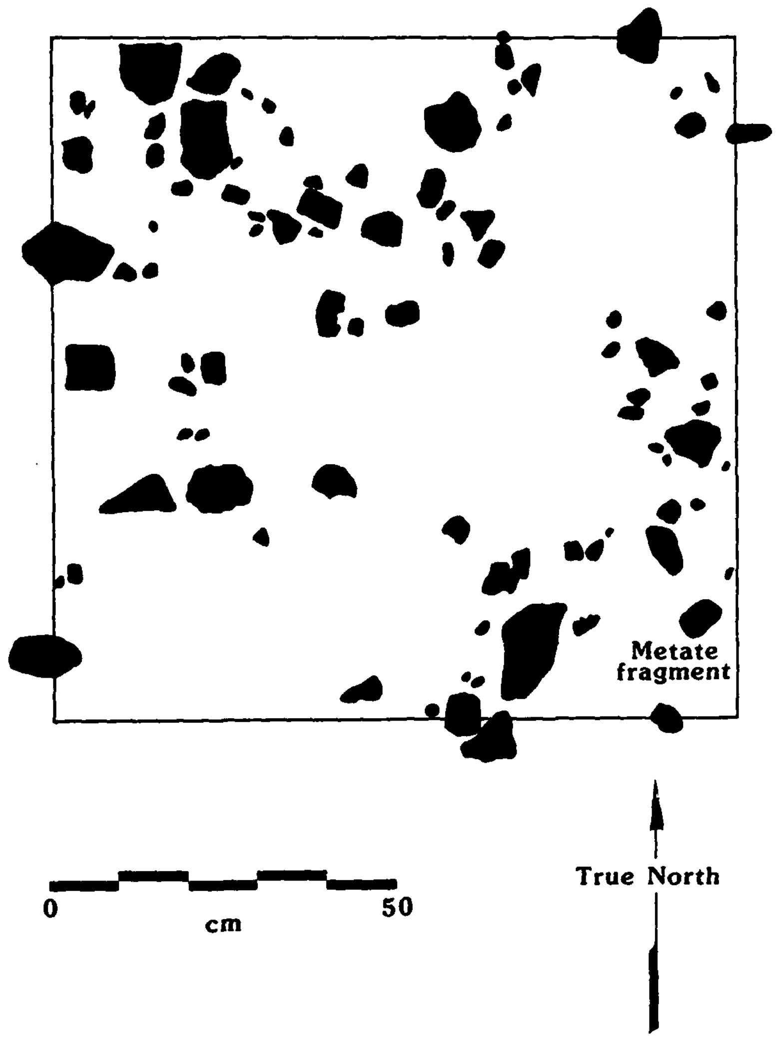


Figure 2.11. Plan of fire-cracked rock, surface distribution, in COE Test Unit 4

Test Unit 5. Test Unit 5 was placed between FCR Concentrations 9 and 10 (Figure 2.3) in an area that contained a concentration of artifacts (but not a concentration of fire-cracked rock). The test unit was a 1 by 1 m test pit excavated in four 10 cm levels.

The uppermost 2 cm contained the majority of the artifacts and consisted of the loose clay/silt fill found during the OCA excavations. There was a difference, however, in that the fill also contained small gravel pebbles throughout. Below 2 cm the fill became much more compact but was the same clay/silt mixed with small gravel pebbles.

As in most other excavated units in the right-of-way the cultural materials were all within the upper levels of this pit. The fill was similar to that in other pits except that it also contained some small gravel pebbles, probably of alluvial origin.

Auger Hole Testing

A total of 98 auger holes was placed in the area within, around, and between FCR concentrations 7, 9, and 13 (Figure 2.4). The strategy of this augering program was to supplement the OCA and COE excavations. The excavation of fire-cracked rock concentrations and areas outside these concentrations produced no evidence of cultural features even when excavated to a depth of 50 cm below the present ground surface. The augering was therefore designed to cover two excavated and one unexcavated fire-cracked rock concentrations, as well as the area between them. The area in FCR 9 and between FCR Concentrations 9 and 13 also contained a concentration of sherds, chipped stone, and two pieces of ground stone. This was expected to be a likely location of a pitstructure or hut because of the diversity and concentration of these materials. By placing our efforts in this manner we hoped to be able to identify the presence of any features associated with these three fire-cracked rock concentrations. Features were expected to be noted as either charcoal concentrations or as a dark stain in the fill.

The initial augering was at 2 m intervals from the south edge of the 16 sq m contiguous excavation in OCA Unit 1 through to the south side of FCR Concentration 13. This augering cut through the center of FCR Concentration 9. The only hole which produced any charcoal was number 40. OCA Unit 5 was excavated adjacent to this auger hole (see above and Figure 2.4), but no feature was located. The lack of any evidence for cultural features or structures (see Appendix C for a listing of the fill in the auger holes) in these 2 m spaced auger holes prompted a change in placement strategy. It was decided that FCR concentration 13 would be more intensively tested by staggering auger holes (Figure 2.4). Thus, this fire-cracked rock concentration was tested along lines of auger holes 1 m apart and staggered so that at approximately every meter throughout this concentration there was an auger hole at least 30 cm deep. No indication of a feature or structures, or even a lens of charcoal leading to a feature at a greater distance from the concentration, was located.

The final augering tests were located around FCR 7, which was excavated as OCA Unit 1. These auger holes were to check both in and around Unit 1 to determine whether or not the excavation may have missed a cultural feature. No indications of cultural materials or features were noted.

Augering intensively through three fire-cracked rock concentrations produced no evidence of cultural materials or features. This finding mirrors the results of the excavation units. There appears to be no evidence of in situ subsurface cultural deposits within the right-of-way.

The Pit in the Arroyo

While the crew visited the main fire-cracked rock mounds at the Fairchild site, they walked up the arroyo which ran through the right-of-way between stations 275+00 and 276+00. This resulted in the discovery of a large pit in profile some distance to the north of the right-of-way (Figure 2.3). A portion of the pit had collapsed into the arroyo bottom, and it is from this collapsed fill that the bone, ceramics, and chipped stone samples were collected. This sample was collected by troweling through the fill; there was no screening. The pit profile was drawn (Figure 2.12) but the profile was not cleaned or straightened prior to its being recorded.

The pit is approximately 2 m deep below the modern ground surface and has two distinct sections to its profile. The deeper section has an almost vertical west side but the east side is curved. Between 60 cm and 1 m above the base of the lower section is a different depositional layer than the lower section. The upper fill appears to contain much more cultural debris than the lower section. Most of this cultural debris (bones, ceramics, and chipped stone) is located at the base of the upper section fill (Figure 2.12). Charcoal flecks occur throughout the fill of both the upper and lower pit sections' fill.

Above the upper section fill is a small, pinched-out lens of fire-cracked rock mixed with gravels and pebbles of various sizes. Capping the whole pit is a series of finely striated silts which appear to be postabandonment alluvial deposits. This silt is identical to the fill noted in the test excavations within the right-of-way.

The nature or function of this pit cannot be determined from the data collected. Based on the homogeneous nature of the deposition within each separate section of the profile, it appears that this is not a naturally filled drainage channel but a cultural feature; however, there is no evidence of a prepared lining on either profile section. The depth and straight side to the lower section suggest that it may be a portion of a pithouse, but this must remain speculative. There was no indication of a roof fall deposit above the base of the profile. The upper section of the profile appears to represent a separate use of this locale later than the lower section. The upper section appears not to have been a structure, since none of the edges were straight. It may have been a roasting pit which had been cleared out, then later filled with trash. The edges of the upper section did

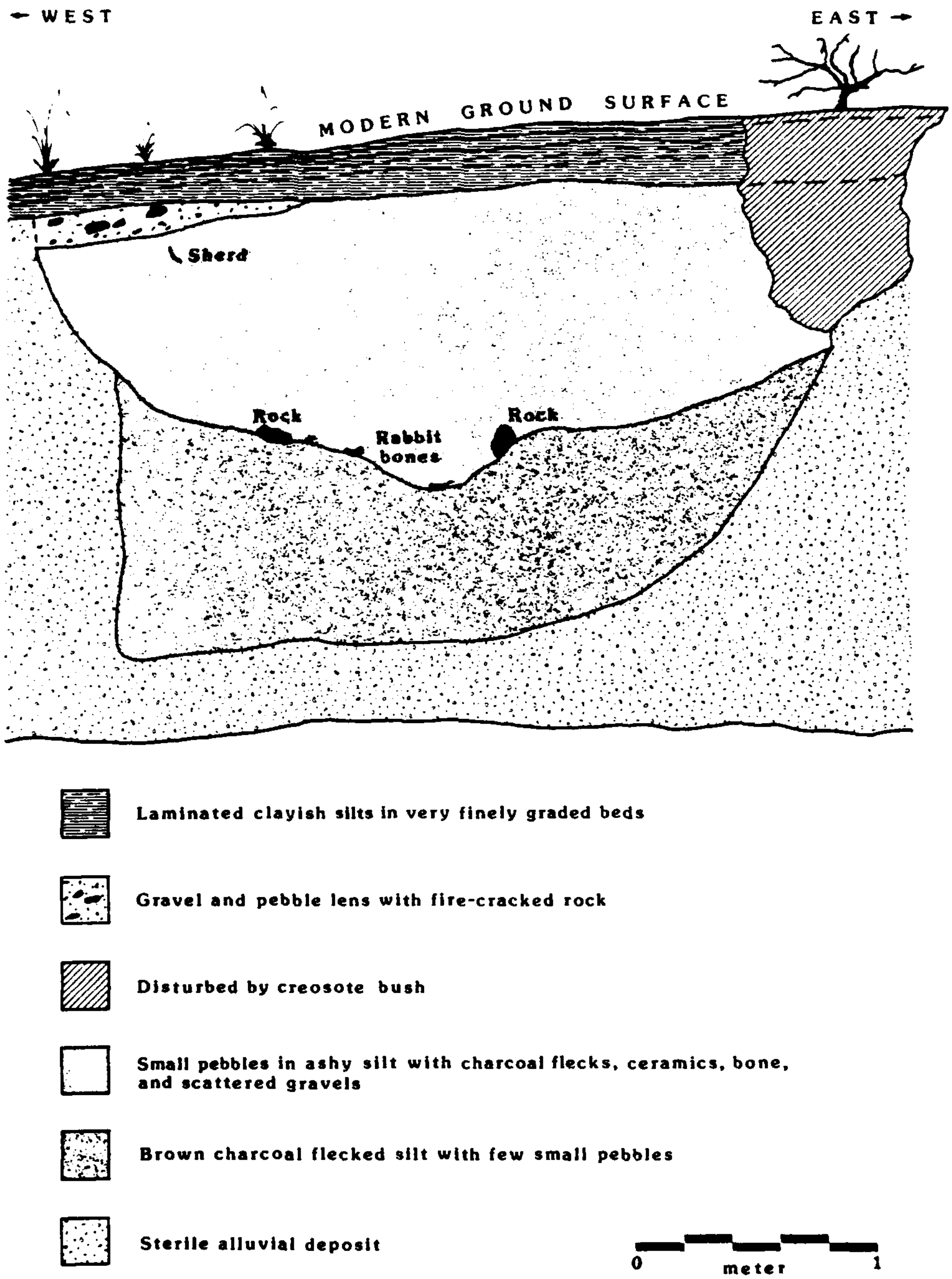


Figure 2.12. Profile of the south face of the pit in the arroyo

not appear to be burned, but if the pit were cleaned the burned material would probably have been removed, hence the lack of burning along the edges. As with the lower profile section, the interpretation of the upper section is speculative, and more fieldwork would be necessary to arrive at a more conclusive interpretation of these features.

Chapter 3

ANALYSES OF FIRE-CRACKED ROCK AND CHIPPED STONE ASSEMBLAGES

by Eric Ingbar

Introduction

The goals of the analyses undertaken here are to develop some plausible inferences concerning the use of the Fairchild site itself and, by extension, the use of the landscape in the immediate area of the site. The chipped stone and fire-cracked rock analyses focus upon probable functions of these items. Only after these functions have been examined can more synthetic statements about the right-of-way area be made. The analyses presented here are not intended to address settlement and subsistence change; such an examination goes beyond the scope of the available data collected from the site.

An initial problem that needs to be addressed is how reoccupation and reuse of the right-of-way has affected the recovered assemblage. Hypothetically, the right-of-way assemblage analyzed here could be the composite of many different occupations, each of which included performance of different activities on the site and generated different kinds of remains. The assemblage resulting from these multiple occupations would therefore be a composite, and its analysis may indicate a broader range of activities occurring (simultaneously, if one thought this were a single occupation) on the site than was actually the case. While sophisticated approaches have been successfully used to examine this problem, they largely depend upon data from many different sites (Binford 1981; Camilli 1983; Foley 1981). Instead, the approach taken here parallels that of O'Laughlin (1979, 1980) and Hard (1983a). The entire assemblage is first characterized, then the amount of diversity within it is examined. While diversity need not indicate residential usage, it is clear that a greater range of activities will create a more diverse assemblage. Thus, what is being sought is not an assessment of how much the right-of-way resembles a "little Pompeii" (Binford 1981), but how routinely and regularly activities were performed on the site during the many times it was occupied.

The lithic analyses of the right-of-way materials occurred in two steps. First, attributes of each chipped stone item and each fire-cracked rock assemblage from each level within a single (1 by 1 m) provenience were recorded. Nominal or continuous variables were recorded for each attribute of interest. The distributions of variable values within the assemblage were then analyzed. Second, the spatial distribution of various attributes was examined.

The chapter is organized into three sections. Fire-cracked rock is discussed first. The analytical procedures used are stated, and then the results of analysis are discussed. Chipped stone analyses are then presented, with analytical procedures again preceding a discussion of analysis results. Finally, the conclusions concerning the probable use of the right-of-way and its environs are discussed in a general manner. Data and analytical variables are found in Appendix D.

Fire-Cracked Rock

Analytical Procedures

Fire-cracked rock is the most conspicuous class of artifacts on the Fairchild site. It may also be one of the most informative, since it is a form of "site furniture" (Binford 1977). Items that are site furniture "stay put" in the settlement system and hence are directly related to the use of specific places or sites. This allows a broad range of statements about the Fairchild site to be made, relative to sites that do not have fire-cracked rock concentrations on them. Fire-cracked rock, however, may be even more informative than this. Different shapes, sizes, and amounts of fire-cracked rock may be produced by different kinds of heating, cooling, and handling, all of which may implicate different cooking techniques or different ways of organizing food preparation.

Fire-cracked rock is defined here as rock that has been thermally altered. The action of heat upon rock masses varies with the homogeneity of the material: homogeneous rocks tend to exfoliate in thin hard sheets; rocks of more heterogeneous composition tend to crack along bedding planes or other planes of weakness (Blackwelder 1927). Archeologically, fire-cracked rock is distinct from chipped stone by its obvious burned, oxidized, or sooted appearance; lack of flake morphology; angular intersections of fracture planes, many of which exceed 90 degrees; and in fine-grained materials the presence of "potlid" fractures where small cones (similar to Hertzian cones) have been forced off the surface of the rock by differential expansion of the material.

Relatively few systematic studies of fire-cracked rock have been undertaken, and most have been experimental (e.g., MacDowell-Loudan 1983). The Tularosa Basin and El Paso areas are notable exceptions, in that several authors have discussed fire-cracked rock in detail, starting with Wilson (1930). Whalen (1978), O'Laughlin (1979, 1980), Hard (1983a, 1983b), and Oakes (1981) have all discussed fire-cracked rock assemblages from sites that appear to be similar to the Fairchild right-of-way. The variables that they record on fire-cracked rock are material, frequency and weight, the latter measure usually being an aggregate by feature or provenience. Because item size and item weight are very strongly correlated, Hard (personal communication) has recently begun to record the mass of each rock. This allows estimations of the size distributions of rocks on the site. The analysis of the fire-cracked rock assemblages from the right-of-way uses all of the above variables except for individual item weight and size. Material type frequency, size (in two classes), and weight were recorded for the fire-cracked rock from each provenience. Morphology of fire-cracked rock is not considered since it provides the basis for separating fire-cracked rock from chipped, battered, and ground stone; therefore, it is already included as a sorting variable, as discussed above.

Material types were recorded to determine potential sources of rocks used for heating and to see if certain materials were being selected preferentially. Different kinds of rock have different thermal properties (Blackwelder 1927) that may affect their suitability for use in hearths and roasting features as well as their appearance in the archeological record. Material type determines a rock's resistance to fracture and its ability to hold heat. Fracture resistance and thermal capability may affect cultural selection of certain kinds of rock for heating. The latter effect may be minimal, since some researchers have found that the material frequencies of heated rock mimic the frequencies of locally available rocks that are 5-30 cm across (Hard 1983a; O'Laughlin 1979, 1980). On the other hand, Oakes (1981:72-73) has reported an enigmatically high proportion of certain kinds of rock, and Wilson (1930:61) noted that large fire-cracked rock middens in southwest Texas are exclusively limestone.

Material frequencies were tabulated by size class for each provenience. In the alluvial fan setting of the Fairchild site, different rock types may occur in different sizes on the fan surface because of differing resistance to erosion, leading to a correlation between rock type and rock size. Based upon descriptions by Pray (1961) of the geology of the Sacramento Mountains, only four rock types were distinguished: limestone, dolomite, chert, and other. Distinctions were made using a hand lens and a 10 percent solution of hydrochloric acid. While each of these types could have been subdivided, this would have required a much more detailed analysis of each piece (e.g., thin sectioning). Little additional information would have been gained from this detailed identification since, as will be discussed below, the local alluvial fan gravels appear to be the source of rock for heating.

The size of fire-cracked rock was recorded because it may indicate the intensity of rock use and may also indicate postdepositional processes that have acted upon the site. In general, rocks break apart with increased handling and repeated exposure to heating and cooling (MacDowell-Loudan 1983). Given relative homogeneity in the initial sizes and thermal stress resistances of the heated rocks, smaller sizes of fire-cracked rock are expected to result from more intensive use. If we consider that the activities that generated the fire-cracked rock were fairly constant, so that rock is always heated to about the same temperature and handled in the same manner, then the size of the fire-cracked rock in a scatter probably will indicate the amount of reuse of the rock.

The size of fire-cracked rocks in the Tularosa Basin and in the El Paso area is reported to range from 5-30 cm across, with the majority of rocks measuring 5-15 cm in greatest dimension (Hard 1983a; Oakes 1981; O'Laughlin 1979, 1980; Hard, personal communication 1984). Rather than measure each individual rock, fire-cracked rocks from the

Fairchild site were sorted into two size categories: greater than or equal to 8 cm in maximum dimension, and less than 8 cm in maximum dimension.

The weight of fire-cracked rock is an important indicator of the use of these artifacts. O'Laughlin (1979, 1980) has distinguished small fire-cracked rock hearths from large fire-cracked rock features on the basis of weight. The weights of fire-cracked rock in these two classes of features differ by approximately one order of magnitude. O'Laughlin attributes the difference in rock quantity to differing amounts of feature reuse but essentially identical functions for the features. Hard (1983a) thinks that the smaller features may have had a different function than the larger ones. While no resolution seems forthcoming, the weight of rock used in a feature is an important variable in the preparation of foods, since it determines the thermal mass of the oven and hence the duration and intensity of heating. Reuse of features may be indicated by inordinately large amounts of fire-cracked rock; this possibility may be evaluated by looking at the interaction between size and weight, as Hard (1983a) has discussed.

The weight of rock recovered from each provenience was recorded by size class to the nearest gram. As mentioned above, item size and item mass are highly correlated; however, because the size class information was also being taken, there was no need to weigh each individual item. Instead, an aggregate weight was taken, and a mean weight was figured for each size class. Average weights, like size, may be indicators of reuse of rock and postdepositional movement of items.

In sum, three attributes of items that morphologically are classed as fire-cracked rock were recorded. Weight is expected to be an indicator of both feature function and feature reuse. Size is expected to indicate the amount of reuse, and hence fragmentation, to which a heated rock has been subjected. Material influences both size and weight, as well as the potential uses to which the rock may have been put. Each of these variables is tabulated by provenience and by size class within each provenience (Appendix D, Tables 1 and 2).

The variables of fire-cracked rock weight, size, and material can be used to perform spatial analyses. Several authors have undertaken spatial analyses using (in part) fire-cracked rock. Oakes (1981) simply mapped the distribution of fire-cracked rock relative to features and other classes of artifacts on sites in the White Sands Missile Range. Artifact associations were evaluated visually and then discussed. O'Laughlin (1979) and O'Laughlin and Greiser (1973) used chi-square tests to seek associations among fire-cracked rock, other artifact classes, and features. Each 5 by 5 m or 4 by 4 m grid square was considered to be one statistical case. Significant associational and independent relationships were found for several classes of artifacts (O'Laughlin 1979:55-64). In a later study, O'Laughlin (1980) used the same approach but employed Pearson's *r* to evaluate the strength of linear relationships. These results then provide the basis for a factor analysis.

These analyses have been quite successful. Several patterns have been extracted that seem to hold for sites with fire-cracked rock features, regardless of their age (O'Laughlin 1980:210-211). First, positive relationships have been found between the distributions of fire-cracked rock and ceramics; ceramics and chipped stone; and among the distributions of utilized flakes, marginally retouched flakes, and bifaces. Significantly, the distribution of chipped stone is independent from the distribution of fire-cracked rock. All of these results have been generated using large numbers of contiguous areal blocks, however, either from one site or from multiple sites. Basically, these analyses have focused upon general relationships between fire-cracked rock features and artifacts. Since the Fairchild right-of-way data come from a single 16 sq m contiguous block, scattered 1 by 1 m units, and 46 systematically spaced transects of 16 1 by 1 m blocks, these data are not amenable to comparable treatment.

Instead of evaluating the general relationships between artifacts and fire-cracked rock features, spatial analysis of the Fairchild fire-cracked rock features can provide clues to the kinds of fire-cracked rock distributions that are present. For instance, an initial question about the distribution is whether fire-cracked rock features are discrete occurrences or simply "hot spots" in a generalized scatter of fire-cracked rock. To answer this, the counts, weights, and sizes of fire-cracked rock recorded during the systematic transects can be examined. Another question that may be addressed is whether the Unit 1 fire-cracked rock feature has washed down from a central lump, represents the remains of a thrown group of rocks, or simply contains items raked back from a (presumed) central heating pit. This may be examined by looking at the distribution of fire-cracked rock size and weight. If slope processes have displaced and spread the rock, then size and weight might be expected to increase with proximity to the center. Tossing of a container of rock should result in a plume of rocks that become lighter as one moves away from the origin of the toss. Raking could be evidenced by a heterogeneous size mixture or even by a reverse of the washing pattern (since large rocks might more easily be moved than smaller rocks). A third spatial analysis compares surface to subsurface distributions of fire-cracked rock. This analysis seeks patterns in size and weight that have influenced the vertical position of the items. While none of these analyses is directly comparable to those of O'Laughlin and Oakes, some points of comparison do still exist. It is possible, using the transect and the Unit 1 block data, to evaluate whether fire-cracked rock and artifact associations are present and to assess their nature (positive or negative).

Results

Limestone is the predominant raw material in the fire-cracked rock assemblage (Table 3.1; Appendix D, Tables 1 and 2). Dolomite and chert constitute minor but significant portions of the assemblage. Other materials, primarily metaquartzites, are a very small part of the fire-cracked rock assemblage. The predominance of limestone in burned rock features has been noted by several authors (Oakes 1981; Wilson 1930). It may be due to some inherent properties of the rock, or it may simply be the result of the ready availability of limestone in the site area.

Table 3.1. Frequencies of fire-cracked rock, OCA and COE collections

	Size Class					
	<8cm		>8cm		Total	
	Number	Percent	Number	Percent	Number	Percent
Limestone	1852	84.4	138	93.9	1990	85.0
Dolomite	168	7.7	8	5.4	176	7.5
Chert	167	7.6	1	0.7	168	7.2
Other	7	0.3	0	0.0	7	0.3
Total	2194	100.0	147	100.0	2341	100.0

When the fire-cracked rock assemblage is subdivided by size class, limestone clearly dominates the portion of the assemblage that is larger than 8 cm. This suggests that (a) limestone is less prone to fracturing than either dolomite or chert, given equal initial sizes for all materials; (b) limestone was preferentially selected for heating; or (c) different materials occur in different sizes and in differing frequencies within the site -- these items were simply picked up and used as found, resulting in an assemblage biased by size and material. Choosing among these alternatives would require systematic recording of breakage types in an attempt to discern relative fragmentation by material type; thorough analysis of the sizes and material types of locally available stone would also be necessary. Unfortunately, these were not done systematically; however, the impression gained during analysis of the fire-cracked rock is that the degree of fragmentation is relatively similar for dolomite and limestone, with chert usually unbroken but having a smaller initial size than items of the other materials. Examination of locally available raw materials on the alluvial fan gravels shows a range in size from 5-25 cm. Limestone cobbles are generally smaller (5-15 cm) than dolomite cobbles (10-25 cm). Chert occurs infrequently as small cobbles of less than 10 cm. These observations support the interpretation that rock to be used for heating was taken from the fan gravels near the site in the proportions in which it was found. There does not appear to have been any particular selectivity exercised.

Weights of fire-cracked rock, by provenience, give an idea of the amount of rock distributed near visible fire-cracked rock concentrations, since the excavation units were preferentially placed on or near them. If fire-cracked rock were concentrated in discrete clusters that indicate partly intact features, we might expect wide variation in the weights of fire-cracked rock recovered from different provenience units. Rock weights should diminish with distance from the centers of features, and there may be variation from one concentration to the next, depending upon the feature type and its use history. Thus, weight values for the assemblage serve as an indicator of "clumping."

Of the 104 proveniences (exclusive of surface transect collection) containing fire-cracked rock (consisting of 1 by 1 m surface collections and the 1 by 1 by 0.10 m levels below ground level), 73 contain 600 g or less of fire-cracked rock (Figure 3.1). In fact, as even a cursory examination of the distribution shows, a strong left skew is present. This indicates that fire-cracked rock is relatively homogeneous in its overall distribution, with a few provenience units having high concentrations of fire-cracked rock. All of the provenience units with very high masses of fire-cracked rock are found in OCA Unit 1 (Loci 1 through 16) and in COE Test Units 1E, 1W, and 4. These units were all placed over obvious fire-cracked rock features. Taking these into consideration, the other units indicate a fairly dispersed pattern of fire-cracked rock. This suggests that fire-cracked rock distribution consists of discrete concentrations within a (horizontally and vertically) dispersed background scatter of rock.

These results are reinforced by the fire-cracked rock distribution recorded during the 10 percent systematic surface collection of the right-of-way. Only 110 1 by 1 m units out of a total of 736 surface transect units contained any fire-cracked rock (Table 3.1). Of these 110 units, the mean frequency is 3.18 (for fire-cracked rock smaller than 8 cm). Thus, fire-cracked rock is absent on much of the site surface; where it does occur, it is fairly sparse.

The size of the right-of-way fire-cracked rock assemblage is overwhelmingly biased toward pieces smaller than 8 cm (Table 3.1). This could be the result of large pieces breaking into smaller ones; the more important fact is that much of the rock in the right-of-way may have been unsuitable for further heating. Possibly the rock comes from features whose rock is "exhausted," and any reuse of these features would require collection of unused, larger rocks. An alternative hypothesis -- that surface exposure may have weathered and thus fragmented the fire-cracked rock -- seems unlikely, since most of the broken edges of the fire-cracked rock exhibit sooting.

Finally, the overall values of mean rock weight, by provenience, can be examined as an attribute of the overall fire-cracked rock assemblage. Mean weight is calculated by dividing the number of pieces of rock by their aggregate weight. No distinction was made between material types in this study, although different size classes were held separate. Figure 3.2 presents histograms of mean weight frequencies, separated by size class. It is clear from examining the mean weight distribution of the smaller-sized items that most of the proveniences have very small pieces of fire-cracked rock, whereas relatively few units have larger mean weights. These results are consonant with the weight and size results discussed above -- they simply provide a refinement of them. The assemblage of larger-sized fire-cracked rocks follows the same pattern of having very few cases in the larger mean weight classes. When the two size class frequencies and weights are combined, and the mean weight is taken, the same pattern emerges (Figure 3.3). This points to (a) the relatively rare

Figure 3.1. Weight classes of fire-cracked rock from CCA and COE excavation units, by provenience

```
Weight
Class                                  Number of Provenience s

          |       5         10         15         20         25         30         35         40
          +-------------------------------------------------------------------------------------
   9      |XX (1)
   8      |XXXX (2)
   7      |XX (1)
   6      |XXXX (2)
   5      |XXXXXXXXXXXXXX (7)
   4      |XXXXXXXXXXXXXXXXXX (9)
   3      |XXXXXXXXXXXXXXXXXX (9)
   2      |XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX (39)
   1      |XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX (34)
          +-------------------------------------------------------------------------------------
```

Weight Classes:

1	1-200 g
2	201-600 g
3	601-1000 g
4	1001-2000 g
5	2001-3000 g
6	3001-4000 g
7	4001-5000 g
8	5001-6000 g
9	6001+ g

Figure 3.2. Mean weight classes of fire-cracked rock from OCA and COE excavation proveniences, by size class

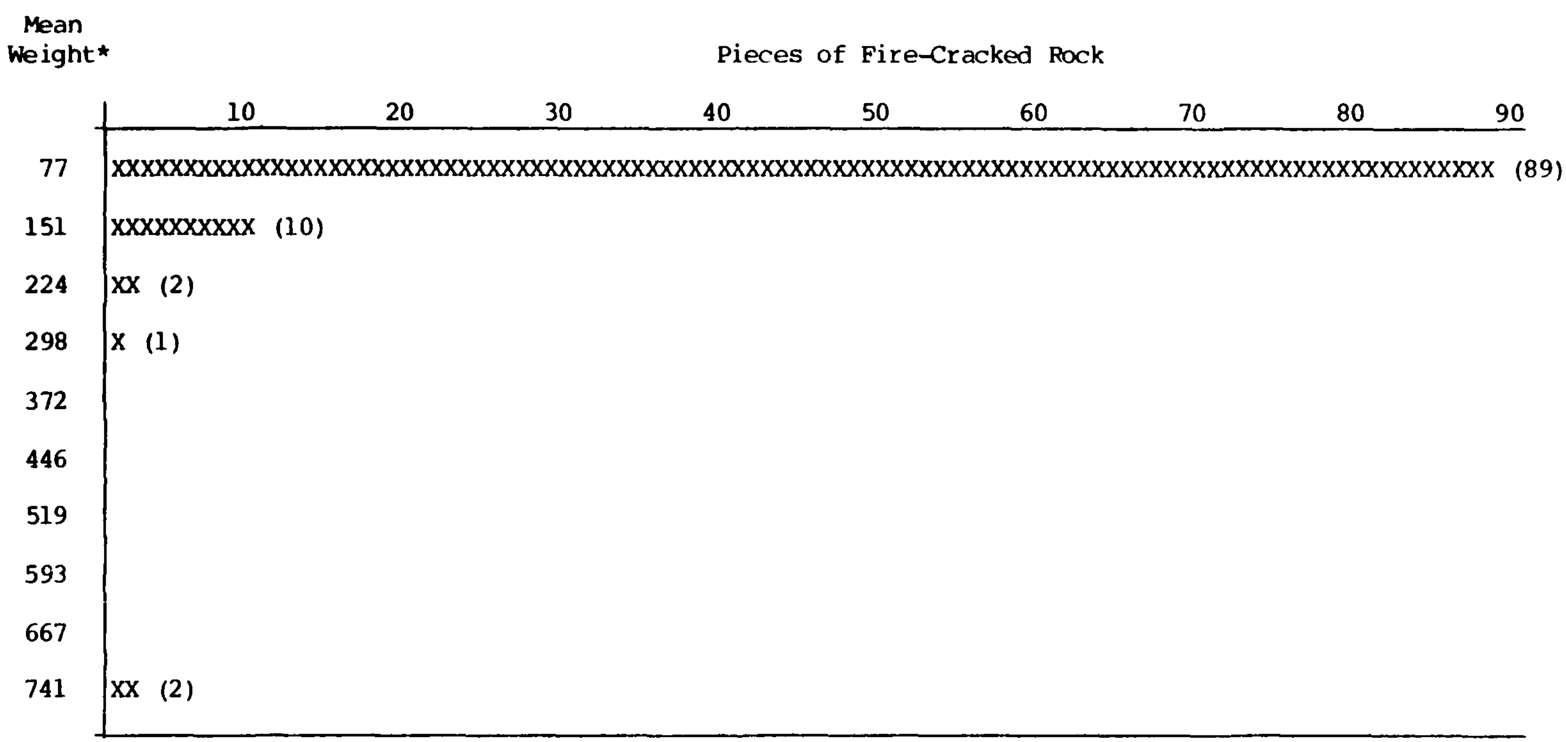
```
                                 < 8 cm
Mean
Weight
Class                   Number of Fire-Cracked Rock Pieces

           |        5         10         15         20         25         30
           ------------------------------------------------------------------
 81+ g     |XX (1)
 71-80     |XX (1)
 61-70     |XX (1)
 51-60     |XXXXXXXXXX (5)
 41-50     |XXXXXXXXXXXXXX (7)
 31-40     |XXXXXXXXXXXXXXXXXXXXXX (11)
 21-30     |XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX (24)
 11-20     |XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX (24)
  1-10     |XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX (29)
           ------------------------------------------------------------------
```

```
                          > 8 cm
Mean
Weight
Class              Number of Fire-Cracked Rock Pieces

               |        5         10         15         20
               -------------------------------------------
 1001 + g      |XX (1)
 801-1000      |XX (1)
 601-800       |
 401-600       |XX (1)
 201-400       |XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX (20)
 1-200         |XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX (19)
               -------------------------------------------
```

Figure 3.3. Mean weight of fire-cracked rock from OCA and COE excavation proveniences (total assemblage)



* Pieces of fire-cracked rock weigh as much as (but not more than) weight shown in grams.

occurrence of large fire-cracked rock within the right-of-way proveniences; and (b) a generalized scatter of fire-cracked rock in the right-of-way.

Several lines of evidence point to the action of erosion or other agents that have scattered the (presumably) once discrete fire-cracked rock concentrations. Alternatively, the right-of-way area may have been heavily used, with intensive heating of rock creating numerous small fragments, so that small fire-cracked rock fragments became ubiquitous. The presence of large fire-cracked rock in only a few places and the vertical distributions of fire-cracked rock argue against this latter interpretation, as will be discussed below.

While this general distribution of weight values and size values is informative concerning the general occurrence of fire-cracked rock in the Fairchild right-of-way area, two things must be looked at more closely. First, the vertical distribution of fire-cracked rock should indicate the degree to which features have been buried. Second, the horizontal distribution of fire-cracked rock close to known concentrations, especially OCA Unit 1, needs to be examined to evaluate post-depositional "smearing" of the arrangement of rock, either by cultural or by natural agents, as suggested above. These spatial analyses should allow some refinement of the results presented above.

The Fairchild right-of-way fire-cracked rock assemblage, unlike those reported from other sites (Hard 1983a; O'Laughlin 1979, 1980; Whalen 1978), is not concentrated near obvious burned features, nor has excavation revealed many traces of charcoal, burned earth, or other indicators of in situ features. In fact, the only indicator of heating features is the fire-cracked rock itself. The relevant question, then, is what kinds of features does this fire-cracked rock represent? Are they fire-cracked rock dumps, spatially removed from the hearth or pit in which the rock was heated? Are they simply deflated and disturbed features? Are they erosional concentrations from sheet wash and gullying? All of these possibilities must be evaluated if we are to understand the prehistoric use of the Fairchild right-of-way area. While the spatial analyses presented here must be considered preliminary, they at least indicate some likely explanations for the fire-cracked rock distribution.

The vertical distribution of fire-cracked rock may be examined in several different ways. The total weight of fire-cracked rock for each level, including surface, is the simplest. This figure would be misleading, though, because unequal numbers of loci were excavated from different levels and the volume of dirt from Level 1 within the right-of-way is therefore greater than for Level 2. A more meaningful figure is the weight of fire-cracked rock corrected by dividing the weight by the volume of sediment excavated. For this purpose, the surface proveniences may be idealized as 10 cm excavation levels, to facilitate comparison. This information is presented in Table 3.2. These aggregate weights may be further examined by using the mean weight figure discussed above, but this time by averaging these mean weights over the levels containing fire-cracked rock (Table 3.2).

Table 3.2. Vertical distribution of fire-cracked rock weight and mean weight, corrected for volume of excavation level

Depth (cm) below surface	Weight (g) per 0.1 cu m*	Mean rock weight (g) per level
Surface	1355	86
0-10	551	20
11-20	277	46
21-30	159	60
31-40	327	15
41-50	224	17

*Mean rock weight per 0.1 cu m = sum of mean weights for level/number of levels. This includes all size classes of fire-cracked rock.

The weight of fire-cracked rock per 0.1 cu m level decreases markedly below the surface. This decline may indicate that vertical displacement of the rock has occurred through agencies other than human action, resulting in a decreasing amount of rock being introduced at greater depths below surface. An additional factor may be that the surface fire-cracked rock has been concentrated by deflation. The present distribution might be the result of two different kinds of natural factors.

The mean rock weights per level shed further light upon the vertical distribution of rock weights. Mean rock weights decrease steadily below the surface, the sole exception being the 0-10 cm level. (The low mean rock weight in this level is probably the result of large, half-buried rocks protruding above the surface and being collected as part of the surface assemblage.) The presence of generally larger rocks on the surface and just below the surface argues against the more deeply buried materials being in situ. If they are in situ, why are there differences in their mean weights? Surface erosion might have concentrated rock on the surface, resulting in a greater total weight, but it should not have affected the mean sizes (measured here by mean weights).

The horizontal distribution of fire-cracked rock may best be examined in OCA Units 1, 2, and 5, which provide the most intensive areal coverage in the right-of-way. Unit 1 was centered on a concentration of fire-cracked rock, with 16 loci centered upon the concentration itself and other proveniences surrounding it. OCA Unit 2, while not centered upon an obvious concentration of fire-cracked rock, was fairly close to Unit 1. Together, the two units provide reasonably systematic coverage of the area around the Unit 1 fire-cracked rock concentration. Most of the loci were excavated to only 10 cm below the surface. It is therefore only possible to compare the surface distributions with the subsurface distributions in the 0 to 10 cm below surface level.

The distribution of the frequency of fire-cracked rocks on the site surface (Figure 3.4) and in the 0-10 cm excavated level (Figure 3.5) show a marked increase in Level 1. The 4 by 4 m block centered around the obvious fire-cracked rock concentration in Unit 1 (Loci 1-16) has an obviously higher concentration of fire-cracked rock. This concentration declines with distance from the center of the 4 by 4 m area, as one would expect on the surface. The subsurface distribution of fire-cracked rock counts shows a similar distribution that differs in quantity only. Weight of fire-cracked rock (Figures 3.6 and 3.7) follows this same pattern, but the weight decrease is more marked (with the exception of the 0-10 cm level). As discussed above, this is part of a general trend towards smaller and less frequent fire-cracked rock below the surface. Mean weight of pieces of fire-cracked rock of 8 cm or less is perhaps the most interesting way to look at the distribution of material, for item size is partly monitored by mean weight (Figures 3.8 and 3.9). Mean weights diminish between Unit 1 and Unit 2, an area of very small pieces of fire-cracked rock. Mean weights also increase in the center of the Unit 1 fire-cracked rock concentration, diminishing radially. In other words, all of the large rocks are at the center of the distribution. This at least allows for the possibility that the original form of this feature was more concentrated and that smaller pieces of fire-cracked rock have been transported into the surrounding area.

It seems probable that much of the fire-cracked rock in Unit 1 comes from a single concentration. Postdepositional processes seem to have been responsible for the dispersal of smaller pieces of fire-cracked rock. The results of the 10 percent systematic surface survey indicate that fire-cracked rock, in general, is distributed in fairly discrete concentrations and is absent within much of the right-of-way. The analysis of fire-cracked rock from the excavations units, which were intentionally placed in fire-cracked rock concentrations, indicates that most of the fire-cracked rock lies on the surface of the site. Displacement of the fire-cracked rock downwards may have resulted from bioturbation; alternatively, or in conjunction, the surface of the site may have been deflated at some time in the past, removing all traces of hearths or roasting pits.

Chipped Stone

Analytical Procedures

Chipped stone is defined here as rock that has been intentionally flaked in order to obtain a useful edge(s). Chipped stone assemblages therefore subsume both tools and debitage. Chipped stone tools and debitage are important indicators of the kinds of activities that were undertaken in a settlement and subsistence system. Although this importance has often led analysts to assume that items were used and discarded on the sites where they were found, it is important to recognize that discard of chipped stone and use of chipped stone are distinct. Chipped stone is part of an essentially portable technology, which can be discarded in places separate and distant from its location of use.

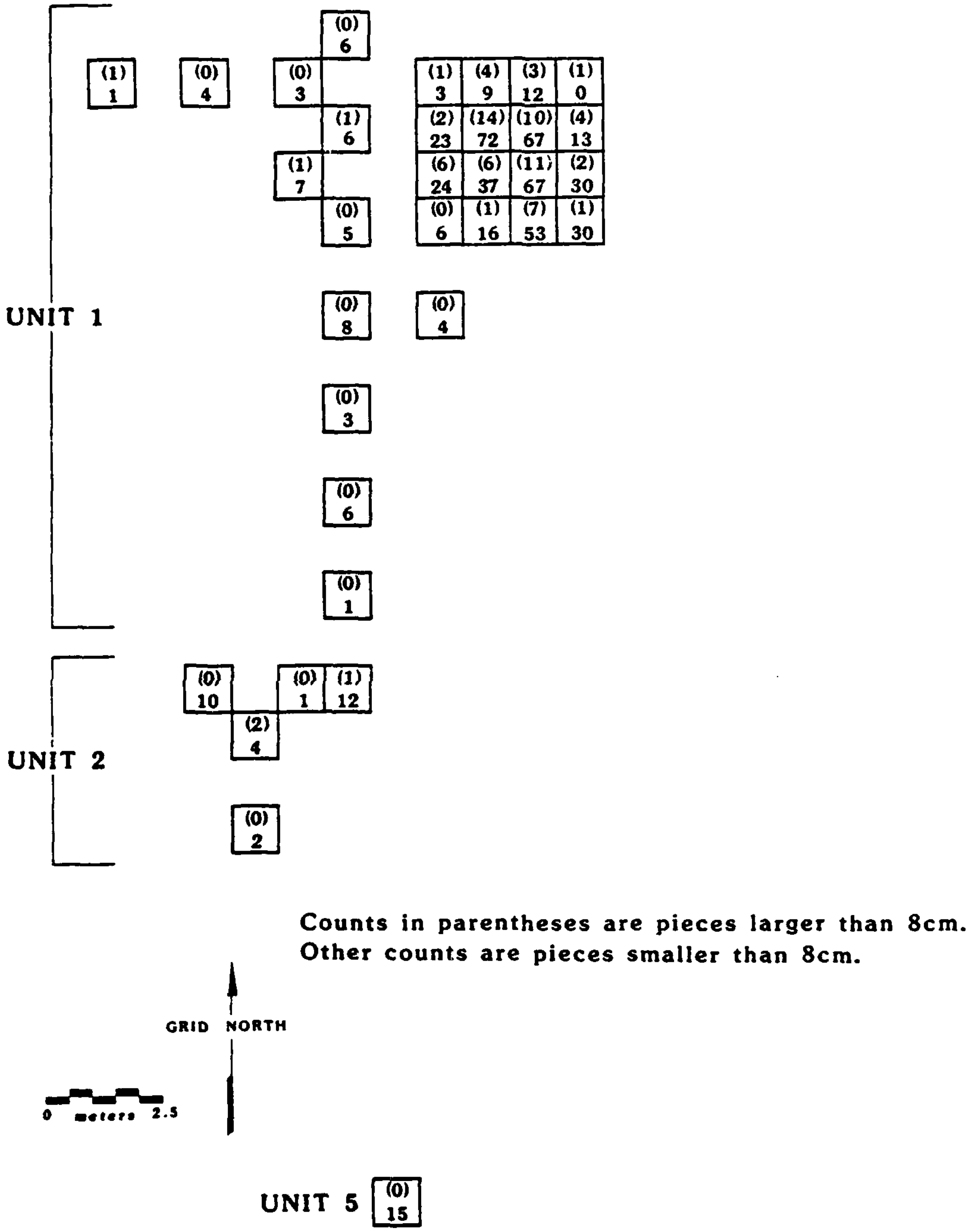


Figure 3.4. Surface fire-cracked rock counts in OCA Units 1, 2, and 5

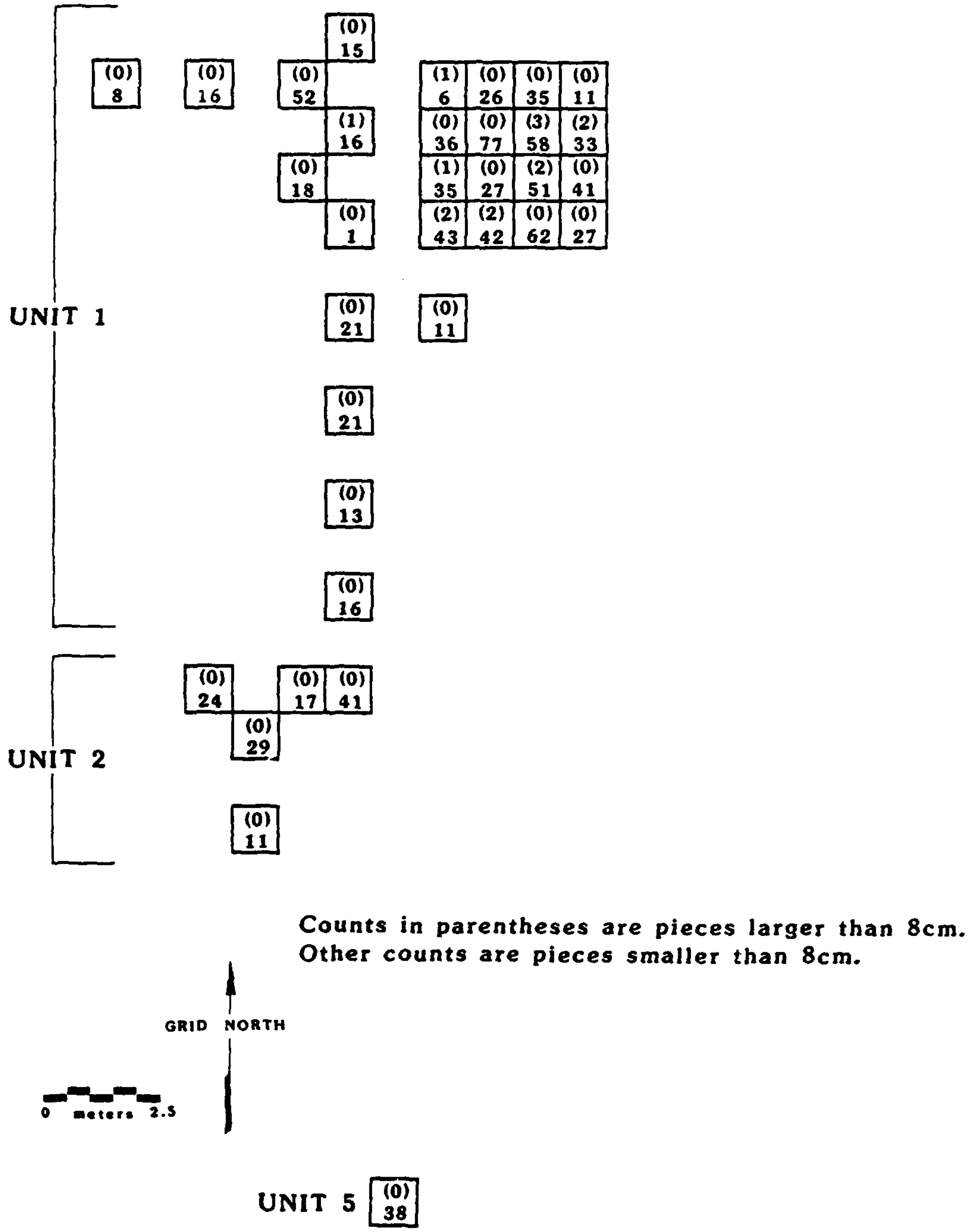


Figure 3.5. Fire-cracked rock counts 0 to 10 cm below surface in OCA Units 1, 2, and 5

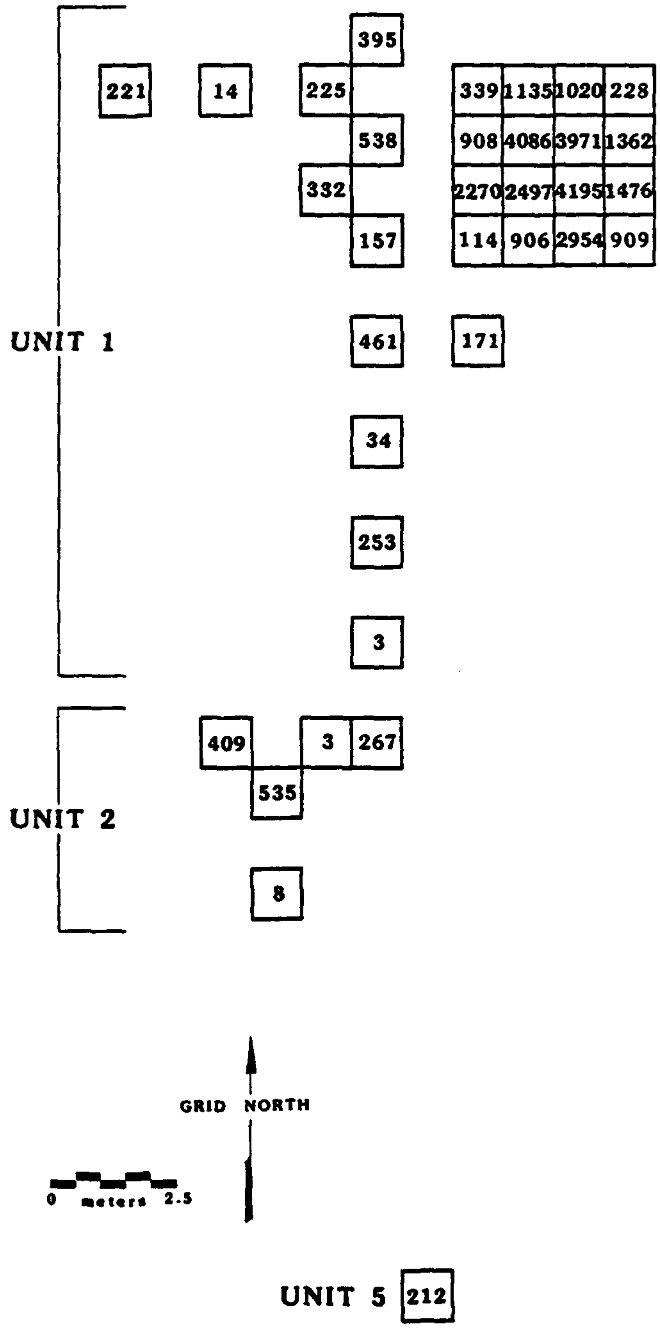


Figure 3.6. Surface fire-cracked rock weights (g) in OCA Units 1, 2, and 5

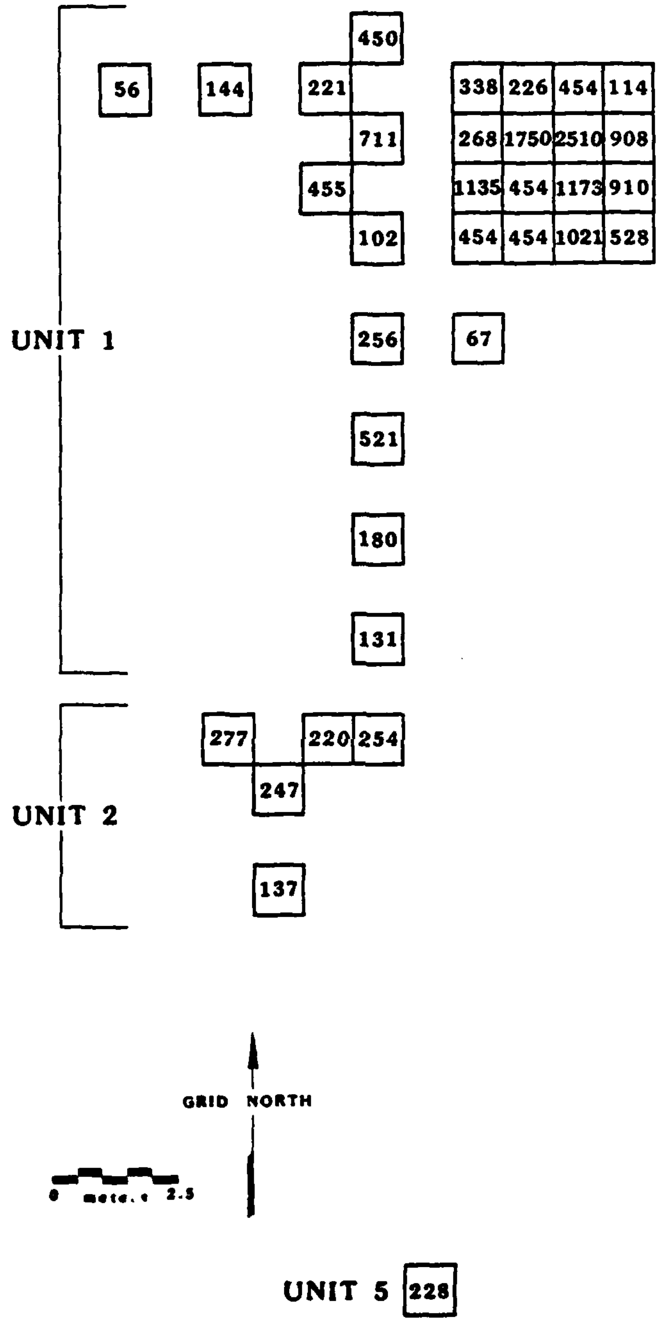


Figure 3.7. Fire-cracked rock weights (g) 0 to 10 cm below surface in OCA Units 1, 2, and 5

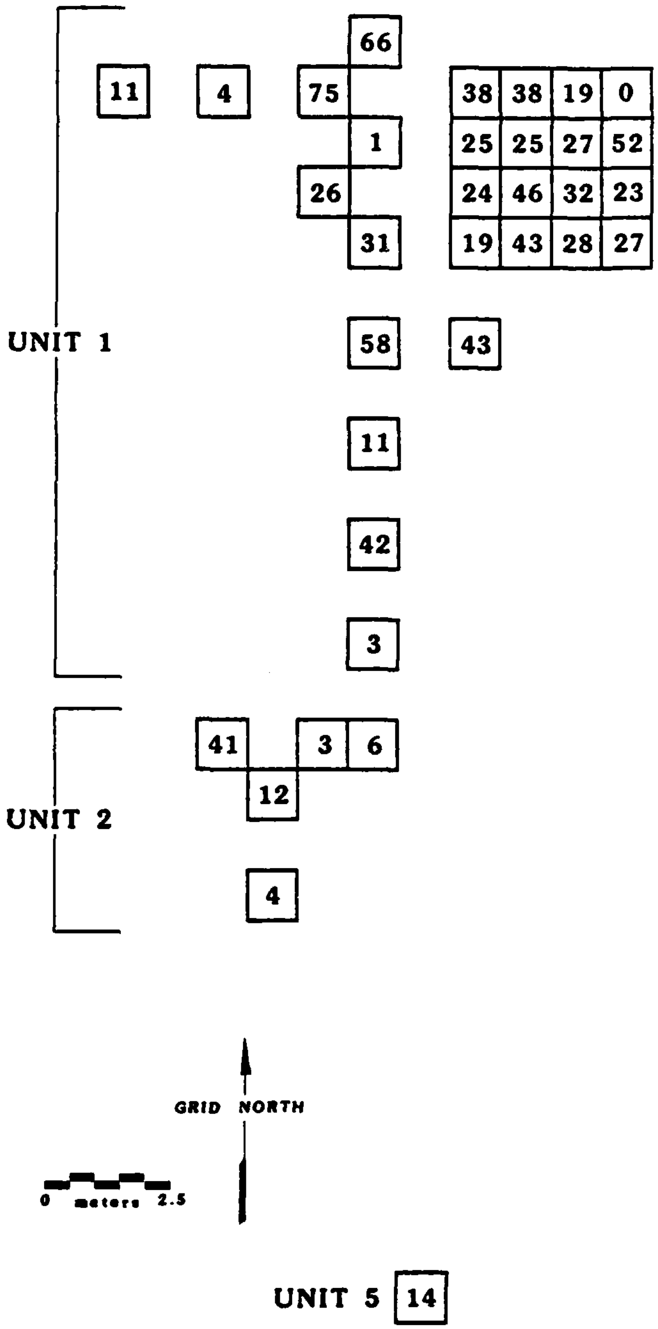


Figure 3.8. Surface fire-cracked rock less than 8 cm in diameter mean weights (g) in OCA Units 1, 2, and 5

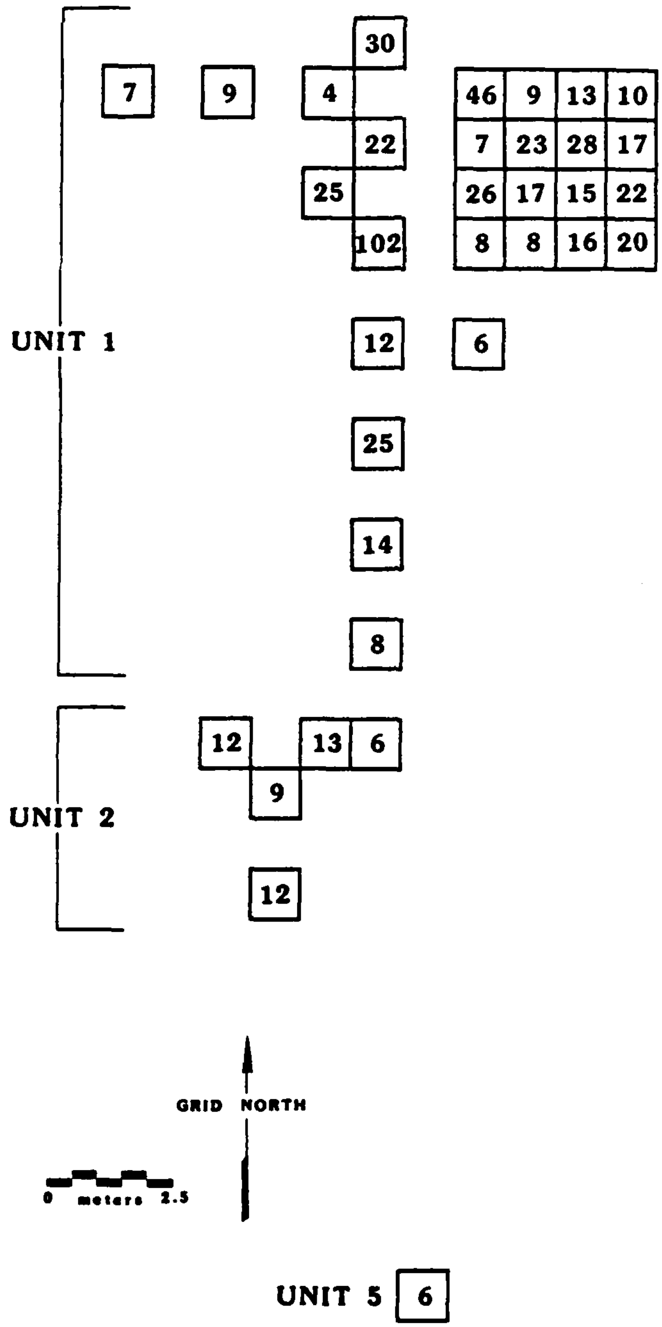


Figure 3.9. Fire-cracked rock less than 8 cm in diameter mean weights (g) 0 to 10 cm below surface in OCA Units 1, 2, and 5

As outlined in the research design, the aim of the chipped stone analyses is to identify the kinds of tools that were being produced, used, or discarded in the Fairchild right-of-way. The variables that need to be recorded for this purpose relate to three different components of lithic technology: raw material selection, reduction strategy, and tool function. Each of these basic components of lithic technology is subject to variation that may result from factors that are not site specific. In other words, there is a need for caution in any chipped stone analysis to avoid confusing "discard behavior" (Schiffer 1976) with the use and manufacture of tools.

Although controlling for these complexities is difficult, it is at least possible to track reduction of local materials, and their expedient use, by examining material types and reduction strategies used upon them. For instance, Frison (1968) was able to show through an examination of the materials represented in biface thinning flakes that on one site several bifaces must have been used but were not left there. This kind of information combining different components of a lithic technology allows the statement of synthetic ideas concerning the chipped stone assemblage's relationship to the use of a site. The variables used in the analysis of the Fairchild materials (Appendix D, Table 3) are intended to record attributes that inform on the position of an item relative to the three components of a lithic technology.

Raw materials recorded on the Fairchild assemblage are essentially descriptive. Raw material categories (Appendix D, Table 3) are based upon gross rock type (limestone, dolomite, etc.) and any distinctive features of groups within the different kinds of rocks. Most of the coarser rock types in the eastern Tularosa Basin are quite similar, and their source areas are identical -- the western scarp of the Sacramento Mountains. There seems to be little need or point in using the detailed list of fine variations presented by Schutt (1983). Rather, the more general description that was employed still allows material source, material quality, and suitability for flaking to be distinguished. Nine different material types were distinguished: three kinds of limestone, four kinds of chert, one kind of dolomite, and one kind of chalcedony (Appendix D, Table 3). These adequately capture the range of materials present in the 126 items that comprise the excavated chipped stone assemblage (Appendix D, Table 4).

Item type was recorded to allow rapid separation of utilized from unutilized debitage, and retouched items from other artifacts. The categories (Appendix D, Table 3) are essentially descriptive of item morphology, which provides a quick assessment of potential item function.

Flake platform type was recorded on all items, except cores and hammerstones where it is not applicable. Platform type records different morphologies that in turn indicate different kinds of flake removal techniques; these are often related to degree and kind of reduction. Gross platform morphology therefore provides an indicator of reduction technique and sequence.

Completeness of each item was recorded to allow assessments of breakage patterns and frequencies. These are often useful indicators of reduction techniques. Frequency of breakage in the assemblage may also illuminate postdepositional disturbance, such as trampling.

Dorsal cortex cover has been found to be an important indicator of degree of reduction. This is true not only in the gross sense of successive removals of cortex from a piece of raw materials (the familiar "primary, secondary, tertiary" flake typology), but has also proven to be one of many variables that, when combined through cluster analysis, provide a sensitive indicator to bifacial reduction sequencing (Magne 1983; Magne and Pokotylo 1981).

Edge modification was recorded on all items. Edge damage and utilization, a combined category, consists of scars less than 2 mm in length; marginal retouch has flake scars longer than 2 mm and extending over less than one-third of the face of the item. Facial flaking extends over more than one-third of the face of the item. The variable states used in this category measure the degree of control exercised by the knapper. Facial flaking of items, for example, requires greater control on the part of the flintknapper than does marginal flaking. As well, facial flaking may indicate a conscious attempt to thin a piece or to maintain a given edge-angle and form. On the other hand, edge damage may be incidental to use, and this is distinguished by the edge damage and utilization category. Especially with surface artifacts, it is very difficult to separate utilization from trampling and incidental damage. Thus, all of these flakes are considered together. Edge modification was recorded on all edges of the artifact. In no case were more than two different kinds of modification present. The location of modification was recorded for each type of modification on an item.

The shape of modified edges, in plan view, was characterized with a descriptive variable. Nelson (1981) found that edge shape is related to reduction and function. As well, on informal flake tools with marginal retouch or no retouch at all, the shape of an edge may influence the tasks for which an item is used and the suitability of an item for further use.

The angles of utilized edges, measured to the nearest 5 degrees, were recorded. Edge angle plays a very important role in tool function, and many researchers have noted the presence of edge angle modalities which they interpret as indicators of functional classes of tools (e.g., Wilmsen 1970).

Dorsal scar count and platform scar count have been found to be important indicators of biface reduction sequences (Camilli 1983; Magne 1983; Magne and Pokotylo 1981). All scars longer than 2 mm are counted. Higher counts are expected for more reduced items. High platform scar counts are expected to be present on items with carefully prepared, formally shaped platforms.

Platform width, taken to the nearest millimeter, is another indicator of the kind of reduction that produced the flake. Carefully prepared (high platform scar count), thin platforms are expected to indicate biface trimming and thinning (which may also be monitored by overall platform morphology) or at least careful working of a highly formalized core. Platform angle, the angle between the dorsal surface and the platform of the flake recorded to the nearest 5 degrees, gives some idea of the core shape from which a flake was removed. Obviously, flakes struck from large blocky cores will have larger (closer to 90 degree) platform angles than will flakes removed from biface edges. Platform angle is therefore an indicator of reduction stage (Camilli 1983; Magne 1983).

Length, width, thickness, and weight, recorded in millimeters and grams, respectively, are measures of item size. Item size has an effect upon disposal practices (Binford 1983:150-152); upon the potential for further reduction, either to shape the item itself or to derive other flakes from it; and upon the utility of an item for use, since mass may be an important consideration for some actions (e.g., chopping).

Given the frequency in the Fairchild right-of-way assemblage of fire-cracked rock that was made of the same material as the chipped stone, it is important to record whether items have been burned. In two cases, flakes were removed from limestone cobbles that had previously been heated. In other cases, flakes were probably accidentally burned.

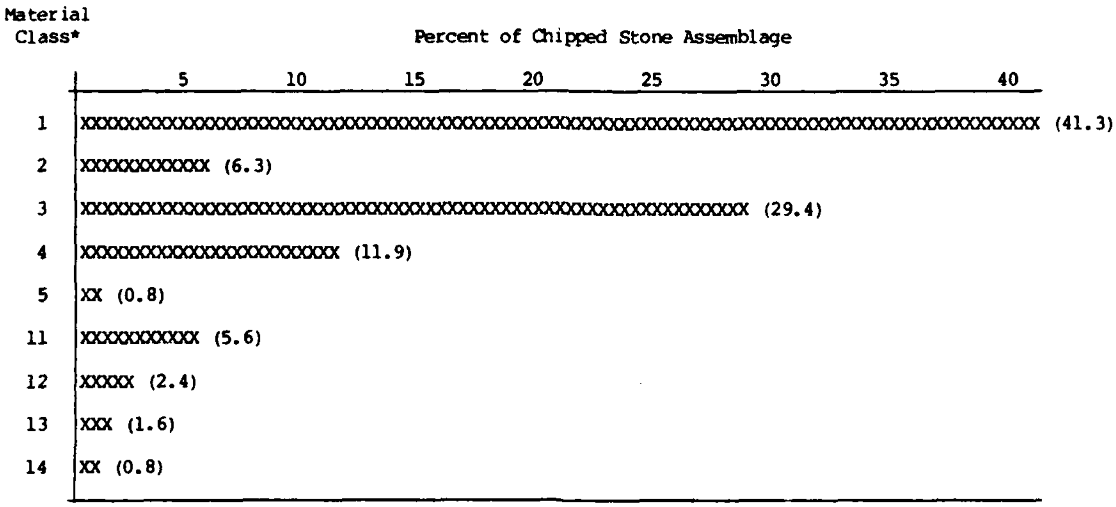
These variables were recorded on all pieces of chipped stone. Not all of the variables will be discussed, however, since in this particular chipped stone assemblage some variables simply duplicate information.

Results

Raw materials used in the Fairchild chipped stone assemblage (Figure 3.10) are dominated by fine-grained gray limestone (41 percent) and gray chert (29.4 percent). Both of these materials are available locally, either on the fan gravels close to the site or in the canyons of the Sacramento Mountains. Other local materials -- dolomite, chert, and dark gray limestone -- comprise the bulk of the rest of the assemblage. Based upon field reconnaissance in the site area, two properties of raw material seem to be maximized in this assemblage. First, raw material size and quality seem to be important factors; however, certain trade-offs may have been made in material selection to emphasize material size while still maintaining some minimum standard of tractability. For instance, chert, by far the most tractable and durable material in the area, occurs in fairly small nodules (5-10 cm range, though usually closer to 5 cm greatest dimension). Limestone, a less tractable and durable material, can be found in much larger cobbles. Dolomite, also found in large cobbles, is even less tractable. Thus, the dominance of limestone seems to represent a compromise between raw material size and raw material quality.

The dominance of limestone in the Fairchild assemblage differs somewhat from the results obtained by O'Laughlin (1979, 1980), Hard (1983a), Oakes (1981), and Schutt (1983). These authors report a dominance of chert in lithic assemblages from the El Paso area and the

Figure 3.10. Material types in chipped stone assemblage from OCA and COE excavated proveniences



* Material Classes:

01 gray limestone
02 gray, fine-grained dolomite
03 gray chert
04 black chert, vitreous appearance
05 tan/white chalcedony
11 dark gray, fine-grained limestone
12 brown, coarse-grained limestone with (dendritic?) inclusions
13 white chert
14 brown chert -- metaquartzite

western Tularosa Basin. The Fairchild assemblage differs in its extreme emphasis on limestone. All of the above researchers agree that coarser, lower quality, local materials become more predominant in chipped stone assemblages from the Archaic through the El Paso phase (Oakes 1981:59-61; O'Laughlin 1980:170). Although there is presently no way to evaluate this proposition at the Fairchild site it is possible that much of the right-of-way material comes from Mesilla or El Paso phase use of the site.

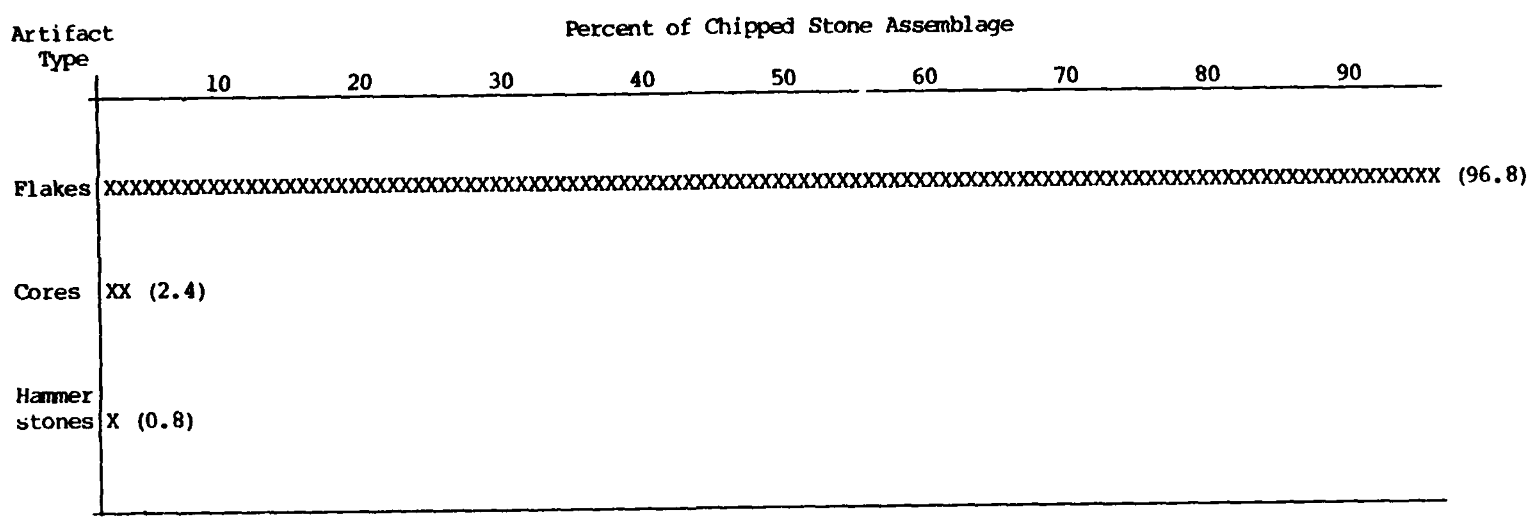
Alternatively, one can model the use of local materials as a response to defined tool needs, known in advance. Thus, there would have been little need to use higher quality raw materials if a supply of adequate (but not great) raw material were available (Hard 1983b; Torrence 1983). This could have been true during all phases in the region. Examination of the kinds of items present in the Fairchild right-of-way assemblage sheds some light upon this, for if raw material is being used expediently, then there should be few formally shaped items. This is in fact the case (Figure 3.11). Utilized/damaged, retouched, and plain flakes predominate (more than 95 percent of the assemblage); of the four other items, three are globular cores and one is a hammerstone.

Of the 122 flakes present, 110 (87.3 percent) have no edge modification, including utilization/damage. Eight flakes (6.3 percent) show utilization/damage on an edge and seven (5.6 percent) have unifacial marginal retouch. Only one flake (0.8 percent) has facial retouch. Of these 16 flakes, ten have been used along their side and six along their end (i.e., parallel and perpendicular to the axis of percussion that produced the flake). Five of the 16 show further modification (four utilization/ damage, one unifacial flaking) on a second edge (three on a side, two on an end). The 16 flakes are predominantly limestone and dolomite, with only a few chert flakes present. It may be that limestone and dolomite are more prone to edge damage, being more brittle materials; therefore, items of these materials show traces of utilization or edge damage after relatively less wear. This may also influence the need to resharpen the edge of a flake, although evidence of this activity is uncommon in the Fairchild assemblage.

Edge angles on the utilized edges range from 30-70 degrees. So few edges are present (n=19) that it is difficult to distinguish any strong modality. If edge angles are indeed related to edge function (Wilmsen 1970), then a range of functions, from cutting to scraping, seems to be indicated.

Edge shape does not seem to have a strong correlation with other attributes of the tools in the Fairchild tool assemblage. Convex and straight edges are more common on utilized flakes. These edges are generally more useful for cutting and scraping on objects of all sizes; concave edges will only touch the surface of rounded objects and are therefore more limited in their usefulness. Concave edges are, nonetheless, somewhat stronger than convex edges because a greater mass of material surrounds the edge. Chi-square tests to measure correlations between edge shape and edge angle, and edge shape and modification type, revealed no significant tendency towards

Figure 3.11. Artifact types in the chipped stone assemblage from OCA and COE excavated proveniences



grouping. This result should be considered preliminary given the small number of items (n=19).

While the 16 utilized and retouched flakes represent the obviously "functional" part of the assemblage, the other 110 pieces of chipped stone can be used in conjunction with them to learn something about the kind of lithic reduction that occurred in the Fairchild right-of-way area. Flake type provides a good initial indication of the kind of core forms and reduction techniques present in the assemblage (Figure 3.12). Flakes that do not have a platform (indeterminates) and those chipped stone artifacts for which platform type is not applicable are excluded from the following discussion. Regular percussion platforms are the dominant flake type. Crushed platform flakes and angular debris are the next most prevalent types. Only two flakes display lipping that is characteristic of flakes removed from biface or uniface edges. The platform scar counts, indicators of the degree of platform preparation, are all quite low. Fourteen flakes have cortical platforms, 77 flakes have only one platform scar, and five flakes have two platform scars. These values are extremely low. Based upon this initial information, the Fairchild lithic assemblage is largely the result of reduction of local material cores using platforms that are not highly formalized.

This evaluation can be refined further with other variables. Dorsal scar count (Figure 3.13) is also fairly low, with more than 85 percent of the flakes having three dorsal scars or less. This is an indicator of minimal reduction. Thirty-eight percent of the assemblage has cortex on it, again indicating quite early stages of reduction (Figure 3.14). Platform angle shows a normal distribution around a mean of approximately 70 degrees (Figure 3.15). This is a fairly steep platform angle, and again argues for the dominance of simple core-reduction techniques. Flake length, width, thickness, and weight (Figures 3.16 through 3.19) show quite regular distributions with strong modes. This reinforces the picture of mostly a single kind of reduction having taken place. Otherwise, one would expect a wide range of values for these variables, and a multimodal distribution of them.

Summing up the results of these analyses can be done with reference to the three components of lithic technology discussed above. Raw material selection in the Fairchild right-of-way chipped stone assemblage was dominated by the use of local materials of moderate quality available in larger sized cobbles. The reduction technology being used on these raw materials is quite simple -- regular flakes, from 1 to 10 cm in length, were struck from relatively unprepared cores. All materials other than limestone were reduced in the same way. These same regular flakes were then used, usually without being retouched, for a variety of tasks. At least some heavy tool-use is indicated by the steep edge angles. Cutting and slicing use may or may not have occurred, since a narrow edge may be used for heavy cutting/ scraping too. All three components -- material selection, reduction technology, and tool use -- indicate expedient tool use. As mentioned above, one can model the conditions under which expedient tool use occurs in a variety of ways, a topic that will be returned to below.

Figure 3.12. Flake types in the chipped stone assemblage from OCA and COE excavated proveniences

```
Flake                      Percent of Chipped Stone Assemblage
Type
        |        10         20         30         40         50         60
        +--------------------------------------------------------------------------
   1    |XXXXXXXXXXXX (11.9)

   2    |XX (1.6)

   4    |XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX (62.7)

   7    |XXXXXXXXXX (10.3)

   8    |XXX (3.2)

   9    |XXXXXXXXXX (10.3)
        |
        +--------------------------------------------------------------------------
```

Artifact Types: 1 = angular debris
2 = lipped
4 = regular percussion flake
7 = crushed platform
8 = not applicable
9 = indeterminate

Figure 3.13. Dorsal scar counts in the chipped stone assemblage from OCA and COE excavated proveniences

```
Number
 of
Dorsal              Percent of Chipped Stone Assemblage
Scars
      |         5          10          15          20          25
     -+--------------------------------------------------------------------
   0  |XXXXXXXXXXXXXXXXXXXXXXXXXX (12.7)
   1  |XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX (27.8)
   2  |XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX (27.0)
   3  |XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX (19.8)
   4  |XXXXXXXXX (4.8)
   5  |XXXXXX (3.2)
   6  |XXX (1.6)
 n/a  |XXXXXXX (3.2)
      |
     -+--------------------------------------------------------------------
```

n/a = not applicable

Figure 3.14. Dorsal cortex cover in chipped stone assemblage from OCA and COE excavated proveniences

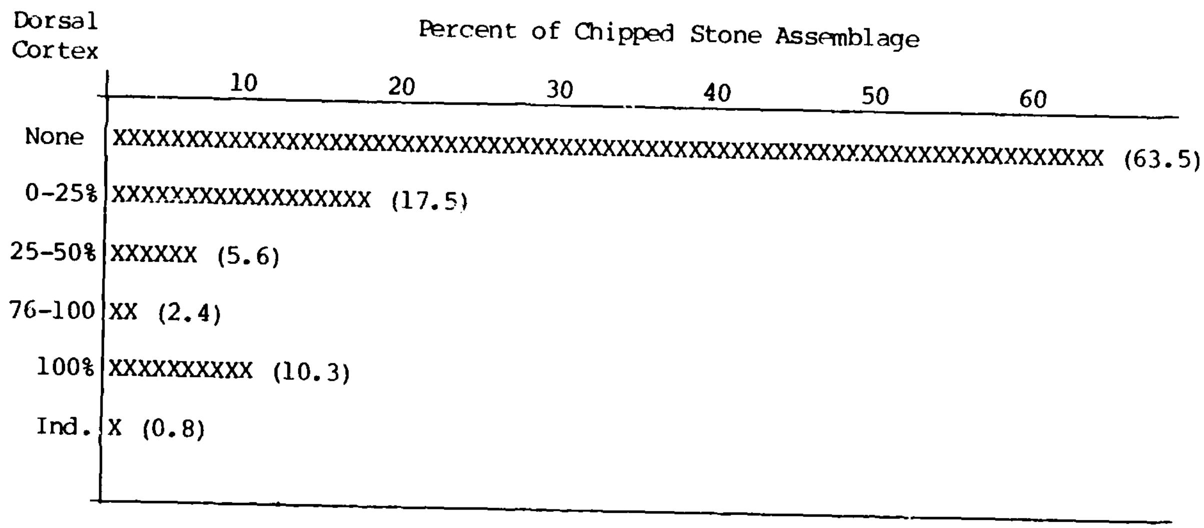


Figure 3.15. Platform angles (using 5 degree increments) in chipped stone assemblage from OCA and COE excavated proveniences

```
Platform                          Percent of Chipped Stone Assemblage
 Angle*
              5         10         15         20         25         30         35
        ___________________________________________________________________________

  --   |XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX (34.9)

  40   |X (0.8)

  45   |XXXXX (2.4)

  50   |XXXXXXXX (4.0)

  55   |XXX (1.6)

  60   |XXXXXXXXXXXXXXX (7.9)

  65   |XXXXXXXXXXXXXXXXX (8.7)

  70   |XXXXXXXXXXXXXXXXXXXXXXXX (11.1)

  75   |XXXXXXXXXXXXXXX (7.9)

  80   |XXXXXXXXXXXXXXX (7.9)

  85   |XXXXXXXX (4.0)

  90   |XXXXXXXXXX (4.8)

  95   |XX (0.8)

 100   |XX (0.8)

 105   |XXX (1.6)

 115   |XX (0.8)
       |___________________________________________________________________________
```

* -- = platform not present; platform angles are as large as (but not larger than) amounts shown

Figure 3.16. Length of artifacts in chipped stone assemblage from OCA and COE excavated proveniences

```
Length*                              Percent of Chipped Stone Assemblage

         |         1         2         3         4         5         6
         ------------------------------------------------------------------
     7   |XXXXXXXXXXXXXXXX (1.6)
     8   |XXXXXXXX (0.8)
     9   |XXXXXXXX (0.8)
    10   |XXXXXXXX (0.8)
    11   |XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX (4.0)
    12   |XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX (4.8)
    13   |XXXXXXXXXXXXXXXXXXXXXXXX (2.4)
    14   |XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX (4.0)
    15   |XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX (4.8)
    16   |XXXXXXXXXXXXXXXXXXXXXXXX (2.4)
    17   |XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX (4.8)
    18   |XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX (3.2)
    19   |XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX (6.3)
    20   |XXXXXXXXXXXXXXXXXXXXXXXX (2.4)
    21   |XXXXXXXXXXXXXXXXXXXXXXXX (2.4)
    22   |XXXXXXXXXXXXXXXXXXXXXXXX (2.4)
    23   |XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX (5.6)
    24   |XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX (3.2)
    25   |XXXXXXXX (0.8)
    26   |XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX (4.8)
    27   |XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX (4.0)
    28   |XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX (4.0)
    29   |XXXXXXXXXXXXXXXX (1.6)
    30   |XXXXXXXXXXXXXXXXXXXXXXXX (2.4)
    31   |XXXXXXXX (0.8)
    32   |XXXXXXXXXXXXXXXX (1.6)
    33   |XXXXXXXXXXXXXXXXXXXXXXXX (2.4)
    34   |XXXXXXXX (0.8)
    35   |XXXXXXXXXXXXXXXXXXXXXXXX (2.4)
    36   |XXXXXXXXXXXXXXXXXXXXXXXX (2.4)
    37   |XXXXXXXXXXXXXXXX (1.6)
    39   |XXXXXXXXXXXXXXXX (1.6)
    42   |XXXXXXXXXXXXXXXX (1.6)
    44   |XXXXXXXX (0.8)
    47   |XXXXXXXX (0.8)
    49   |XXXXXXXX (0.8)
    50   |XXXXXXXXXXXXXXXXXXXXXXXX (2.4)
    52   |XXXXXXXXXXXXXXXX (1.6)
    54   |XXXXXXXX (0.8)
    55   |XXXXXXXXXXXXXXXX (1.6)
    57   |XXXXXXXX (0.8)
    83   |XXXXXXXX (0.8)
   111   |XXXXXXXX (0.8)
         ------------------------------------------------------------------
```

* Rounded to the nearest millimeter

Figure 3.17. Width of artifacts in chipped stone assemblage from OCA and COE excavated proveniences

Width*	Percent of Chipped Stone Assemblage
6	(0.8)
7	(0.8)
8	(2.4)
9	(3.2)
10	(4.8)
11	(3.2)
12	(4.8)
13	(1.6)
14	(4.0)
15	(6.3)
16	(7.1)
17	(2.4)
18	(5.6)
19	(4.0)
20	(1.6)
21	(4.8)
22	(4.8)
23	(2.4)
25	(2.4)
26	(4.8)
28	(1.6)
29	(1.6)
30	(1.6)
31	(0.8)
32	(2.4)
33	(1.6)
34	(1.6)
35	(1.6)
36	(0.8)
37	(0.8)
38	(2.4)
39	(0.8)
41	(1.6)
43	(0.8)
47	(0.8)
49	(2.4)
50	(1.6)
51	(0.8)
53	(0.8)
55	(0.8)
68	(0.8)
120	(0.8)

* Rounded to the nearest millimeter

Figure 3.18. Thickness of artifacts in chipped stone assemblage from OCA and COE excavated proveniences

Thickness*	Percent of Chipped Stone Assemblage (5 — 10 — 15)
2	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX (8.7)
3	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX (12.7)
4	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX (16.7)
5	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX (12.7)
6	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXX (7.9)
7	XXXXXXXXXXXXXXXXXXXXXXXXXXX (7.1)
8	XXXXXXXXXXXXXXXXXXXXXXX (5.6)
9	XXXXXXXXXXXXXXXXXXXXXXXXXXX (7.1)
10	XXXXXXXXX (2.4)
11	XXXXXXXXX (2.4)
12	XXX (1.6)
13	XXXXXXXXX (2.4)
14	XXXXXXXXX (2.4)
15	XXX (1.6)
16	XX (0.8)
17	XX (0.8)
18	XXXXXXXXX (2.4)
19	XX (0.8)
21	XX (0.8)
22	XX (0.8)
25	XX (0.8)
36	XX (0.8)
55	XX (0.8)

* chipped stone artifacts are as thick as (but not thicker than) measurements shown in mm

Figure 3.19. Weight classes in chipped stone assemblage from OCA and COE excavated proveniences

```
Weight                             Percent of Chipped Stone Assemblage
Class*
        |       10        20        30        40        50        60        70        80
        ------------------------------------------------------------------------------------
   12   |XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX (81.7)
   24   |XXXXXXXX (8.7)
   36   |XX (1.6)
   48   |XXX (3.2)
   60   |XXX (3.2)
        .
        .
        .
  263   |X (0.8)
        .
        .
        .
  598   |X (0.8)
        ------------------------------------------------------------------------------------
```

* Chipped stone artifacts weigh as much as (but not more than) weight shown in 0.10 g

Before discussing the spatial distributions of chipped stone and some of its attributes, it is relevant to discuss briefly the systematic surface-collection assemblage and the assemblage of items, principally tools, picked up in the right-of-way as "special finds." The 29 items in the surface-collection assemblage are almost all plain flakes (Appendix D, Table 5). These flakes display the same attributes as those from all levels of the excavation units (including surface). The "special finds" chipped stone assemblage, on the other hand, is composed almost entirely of tools (Appendix D, Table 6). Many of these items are of much higher quality material than the excavated assemblage. This does not necessarily mean that excavation "missed" the important tool use or discard areas. Rather, the occurrence of these items is extremely rare. While they are undoubtedly an important part of the site's chipped stone assemblage, they are also somewhat incidental to the preponderantly expedient tool production, use, and discard that occurred on the site.

An initial way to look at the spatial distribution of chipped stone is simply to tabulate its vertical occurrence. Chipped stone should show the same patterns of vertical dispersal as fire-cracked rock if similar (noncultural) agents have acted to disperse them. This is the case (Figure 3.20). When volume of excavated areas is used to adjust these figures, however, there is no decline in the quantity from subsurface levels. This interpretation needs to be viewed with caution, since only a few units went lower than 10 cm below surface.

Comparing surface to 0-10 cm below surface densities provides some information on the relative visibility of items on the surface (biasing their collection) and the relationship between surface and subsurface occurrences. Surface densities range from 0 to 4 items per square meter. The mean number of surface items, given 6 COE and 36 OCA 1 by 1 m excavation proveniences, is 0.57 items per square meter. Subsurface densities range from 0 to 12 items per 0.1 cu m. Mean density of items in the 0-10 cm level is 1.57 items per 0.1 cu m, or about 16 items per cubic meter. While it is hard to compare surface and subsurface figures directly, it seems apparent that the chipped stone density in the 0-10 cm level is considerably greater than on the surface of the site itself. This same phenomenon was observed with the fire-cracked rock; it is probably due to the effect of small items going unobserved during surface collecting because they are completely covered with loose sediment.

The density figures presented above can be revised with respect to OCA Units 1, 2, and 5. Part of Unit 1 was intentionally placed over a fire-cracked rock concentration. This 16 sq m area has a mean surface density of 0.88 items per square meter. The subsurface density in this same area is two items per 0.1 cu m or 20 per cubic meter. (Again idealizing the surface proveniences as equivalent to the subsurface proveniences,) Unit 2, which was not placed in an obvious large fire-cracked rock feature, had only one piece of chipped stone on its surface (0.20 items per square meter) and six subsurface items in the 0-10 cm level (1.2 items per 0.1 cu m, or 12 per cubic meter). Unit 5 has no surface artifacts; the two subsurface items result in a density of 2 per 0.1 cu m. The proportions of surface to

Figure 3.20. Chipped stone artifacts from OCA and COE excavated proveniences, by level

```
 Level              Percent of Chipped Stone Assemblage
 (cm)
           |         10         20         30         40         50
          -+---------------------------------------------------------
surface    |XXXXXXXXXXXXXXXXXXX (19.0)
 0-10      |XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX (49.2)
11-20      |XXXXXXXXXXXX (11.9)
21-30      |XXX (3.2)
31-40      |XXXXXXXXXXX (11.1)
41-50      |XXXXXX (5.6)
           |
          -+---------------------------------------------------------
```

subsurface frequencies appear to be consistent; however, the absolute numbers vary.

Horizontal distributions of chipped stone for the surface and for the 0-10 cm levels of Units 1, 2, and 5 are shown in Figures 3.21 and 3.22. The obvious pattern is the clumping of chipped stone around the south edge of the fire-cracked rock concentration in Unit 1. Other than this, the distribution seems to be inconclusive. The locations of utilized and damaged flakes do not show any obvious pattern; they are scattered throughout the units.

The spatial patterns in chipped stone vertical distribution, minimal as they are, differ from the vertical distribution of fire-cracked rock. O'Laughlin (1980) also found that the two distributions are different, but beyond this there is little similarity. O'Laughlin, working with a much larger area of surface collection, was able to evaluate the different distributions statistically. Such treatment is not possible here, unfortunately; large contiguous blocks are necessary for this type of analysis. By comparison, the results presented here seem inconclusive. The utility of this result is discussed below.

Discussion

The fire-cracked rock and chipped stone analyses have pointed out several attributes of the right-of-way:

(1) FCR is distributed mainly on the surface;

(2) relative to the amounts of fire-cracked rock reported by other researchers, the single completely excavated fire-cracked rock concentration at Fairchild (OCA Unit 1) may have been an eroded "small fire-cracked rock hearth," a larger, eroded pit roasting feature with minimal reuse (Hard 1983a:121-123; O'Laughlin 1979:14-20, 1980:108; Whalen 1978:24), or a dump of rock from the latter kind of feature;

(3) fire-cracked rock occurs as a scatter over the right-of-way, horizontally and vertically, forming a low-frequency background which contrasts markedly with the "hot spot" concentrations of fire-cracked rock;

(4) the chipped stone assemblage is dominated by flakes from expedient production techniques using locally available limestone, and other materials to a lesser extent;

(5) flake frequencies tend to be higher in the levels below the surface; and

(6) flake frequencies may associate positively with fire-cracked rock concentrations.

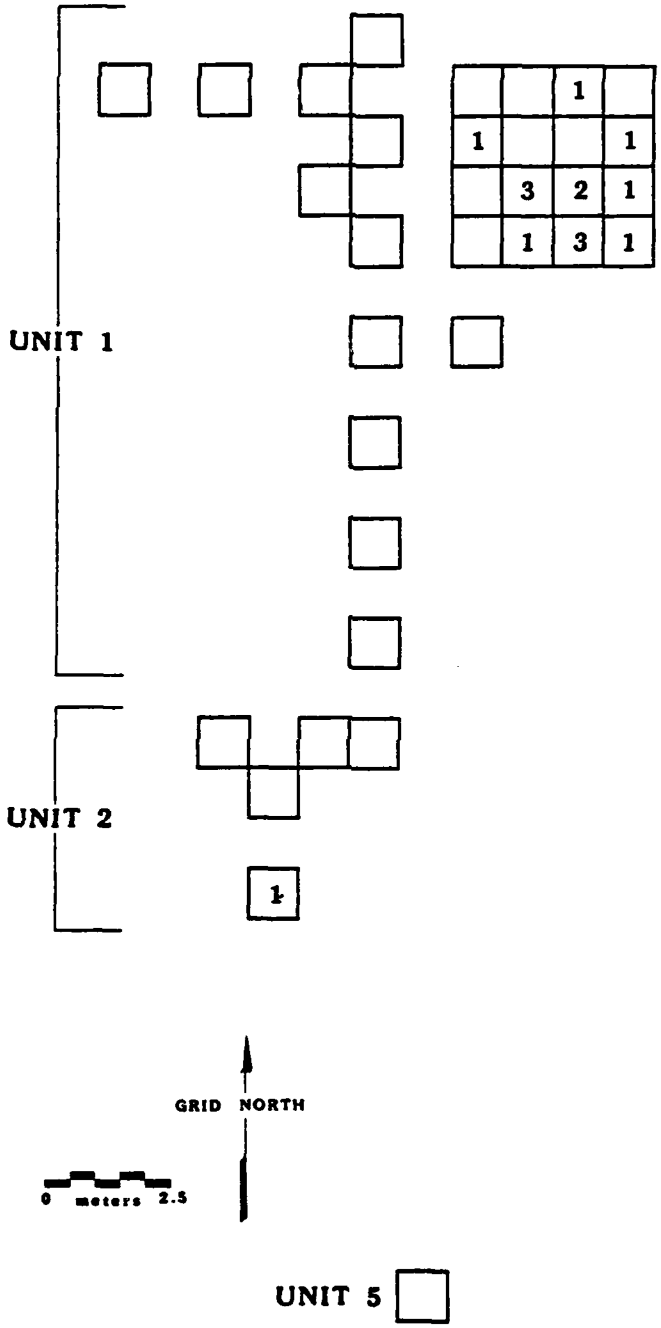


Figure 3.21. Surface chipped stone frequencies in OCA Units 1, 2, and 5

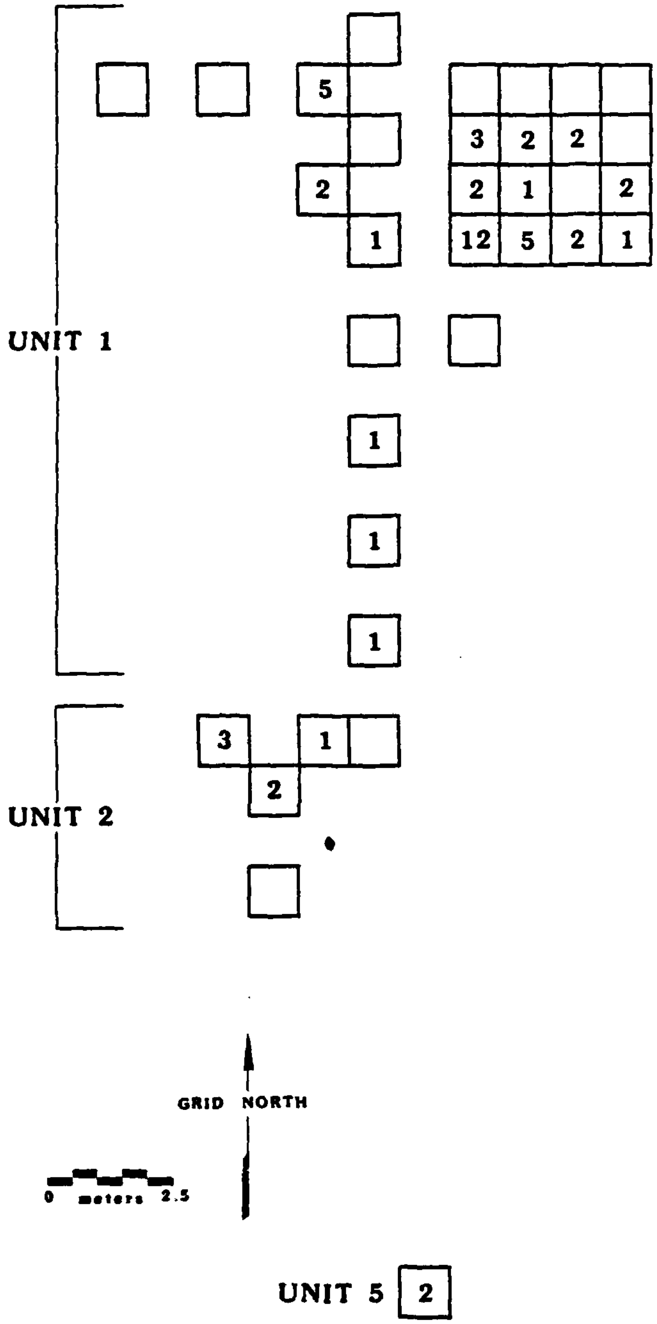


Figure 3.22. Chipped stone frequencies 0 to 10 cm below surface in OCA Units 1, 2, and 5

1-1-11/1

(actual size)

SF-23

Figure 3.23. Projectile points from the Fairchild site

The general similarity of the Fairchild right-of-way area to other fire-cracked rock sites is obvious. Perhaps due to local variation in materials, few differences are noted; however, there seems to be little reason to see the right-of-way area as anything but a location where succulents were processed for consumption and storage. This accords well with the archeological information from many other sites in the region. The chipped stone was found to be associated with fire-cracked rock instead of distinct from it, as O'Laughlin (1980:210) reports for the Keystone Dam and Northgate sites. This rather inconclusive pattern may indicate a somewhat less "segregated" organization of activities around fire-cracked rock features than was found at other sites. This remains a very tentative suggestion.

The two projectile points (Figure 3.23) found during the investigations are indicators of hunting but do not necessarily imply hunting at the Fairchild site itself. They are both manufactured from raw materials found at the Fairchild site as well as the entire western escarpment of the Sacramento Mountains. Point SF-23 is made from white chert and point 1-1-11 is made from grey limestone (Appendix D). These points may therefore have been brought to the site, or may have been manufactured at the Fairchild during succulent roasting, for future use elsewhere. Both points are from different contexts, the small one (1-1-11/1) being from within a fire-cracked rock concentration, while the larger one (SF-23) was from the present ground surface away from other artifactual materials.

Dating of the Fairchild features, based upon the lithic assemblage, is rather unreliable. The form of the projectile points suggest different phases. The small size, deep corner notches that form a tang and barbs, and serrated edges of one point (1-1-11/1) are typical of the El Paso phase (O'Laughlin 1979:46, 1980:195). The other projectile point (SF-23) appears similar to the Livermore type illustrated by Suhm and Jelks (1962:279) which is suggested to date to the Mesilla phase. Whether all, some and not others, or none, of the features are El Paso phase obviously cannot be determined.

In closing, the lithic assemblages found in the investigation of the Fairchild right-of-way are broadly similar to those of other sites in the region. The predominance of limestone in the chipped stone assemblage, however, does not coincide with other sites. The preponderance of expediently produced and utilized edges on rather poor raw materials does not necessarily mean that the lithic assemblage was unplanned. It does imply that expedient tools can be used when the kind of activity, and therefore the tool needs for it, are known, along with the location of the activity relative to sources of raw material (Hard 1983b; Torrence 1983). This gives one an important indication that the Fairchild site was used in a redundant fashion. This is consistent with models of scheduled mobility (Binford 1980, 1981; Camilli 1983; Hard 1983b; Kelly 1980). It may also indicate that the use of resources on the west slope of the Sacramento Mountains was an important and regular part of the annual schedule of the groups using the area.

Chapter 4

CERAMICS

A total of 457 ceramics was recovered during archeological testing at the Fairchild site. The vast majority are plain brownwares, although a few pieces are painted or slipped. This assemblage composition is similar to sites in the El Paso area (Aten 1972; Fields and Girard 1983; Hard 1983a; O'Laughlin 1979, 1980; O'Laughlin and Greiser 1973) and also in the Tularosa Basin (Oakes 1981). In general these ceramic assemblages have been used as temporal indicators to date feature use in the absence of chronometric dates, or as indicators of feature function. Because it is difficult to determine whether most of the brownwares are portions of jars or bowls, it is often difficult to determine ceramic vessel form.

This chapter is divided into four parts. First a discussion of previous research on assemblages from the surrounding area is presented. This previous research is the basis for the attributes and analyses used in this chapter. The ceramic type descriptions and other attributes used in the present analysis are presented in the second part of the chapter. The results of the analyses of the Fairchild ceramics constitute the third portion of this chapter, and the final portion is a summary of the ceramic analyses.

Previous Research

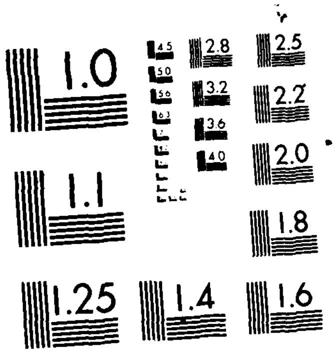
Previous research has involved two primary goals: temporal placement of a site or feature, as well as function of the ceramics and their relationships to features. Determining temporal variability within and between ceramic assemblages is often difficult due to the generally undiagnostic character of the brownwares, therefore much reliance is placed on the slipped and painted types (for example, Mimbres Black-on-White).

The culture history of the region is dependent, to a large degree, on interpretations of the changes in ceramic types (Lehmer 1948; Marshall 1973). Diagnostic ceramic types have been assigned to each phase (see discussion in Chapter 1). During the Early Mesilla phase (AD 200-750) the diagnostic ceramic type is El Paso Brown. During the Late Mesilla phase El Paso Brown continues to be the dominant ceramic type but Mimbres Black-on-white styles appear. By the time of the El Paso phase, Mimbres Black-on-white is no longer part of the ceramic assemblage, and types such as El Paso Polychrome, Chupadero Black-on-white, Playas Red Incised, and Chihuahuan Polychromes appear.

Previous ceramic analyses on sites with large concentrations of fire-cracked rock in the Tularosa Basin and near El Paso have primarily used ceramics as indicators of the temporal span over which a site was used. In general this approach relies on a very small percentage of the overall sherd assemblage because of the predominance of plain brownwares at these sites (Fields and Girard 1983; Hard 1983a;

AD-A174 024 ARCHEOLOGICAL TESTING AT AT THE FAIRCHILD SITE (LA 45732) OTERO COUNTY NEW MEXICO(U) NEW MEXICO UNIV ALBUQUERQUE OFFICE OF CONTRACT ARCHEOLOGY R ANYON 2/3

UNCLASSIFIED 11 MAY 85 I85214A F/G 5/6 NL



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

O'Laughlin 1979, 1980; Whalen 1977, 1978). Often less than 10 percent of the total ceramic assemblage at these sites is temporally diagnostic.

Whalen (1978, 1980) has developed a tentative relative chronology for El Paso Brown and Polychrome rim forms as a supplement to using sherd types to determine chronological placement. His study is based on rims from two sites in the Hueco Bolson which have been radiocarbon dated. One of these sites produced dates from the Early Mesilla phase, while the other site yielded dates from the Late Mesilla phase. The rim forms at the two are notably different from each other and from rims at other sites that have been chronometrically dated to the early and late parts of the El Paso phase. In general, Mesilla phase brownware rims are pinched; this attribute is more pronounced in the early than late Mesilla phase rims. During the early El Paso phase, rims become slightly thicker and flattening becomes common, while late El Paso phase rims are even more flattened and some are wedge-shaped. Whalen also suggests that sherd thickness may be a temporal indicator between early and late Mesilla phase ceramics (Whalen 1978:58-70), but in his later study (Whalen 1980:31-44) he found that this observation was not confirmed by further testing.

Apart from the chronological characteristics of ceramics, the analyses in the El Paso area have also attempted to determine the spatial relationships of ceramics to features at sites with fire-cracked rock concentrations. In cases where such spatial analysis has been done there is a marked tendency for ceramics to be associated with fire-cracked rock concentrations (Fields and Girard 1983; Hard 1983a; O'Laughlin 1980). At White Sands, Oakes (1981) notes that sherds tend to be associated with hearths and pits, and with other artifact groups in situations where burning is not present. These spatial analyses apparently show that the distribution of ceramics with respect to features and other artifact classes is not random.

The function of ceramics is often interpreted on the basis of vessel form and presence or absence of sooting. Hard (1983a) noted that secondary use of sherds is common and that many exhibit abraded edges. He has also noted that 23 percent of the sherds from the Castner Range sites and 16 percent of those from the Transmountain Campus sites have abraded edges, on both painted and plain sherds. Many of the abraded sherds from the Castner sites were burned, and 21 of the 31 abraded sherds were associated with roasting pits. He suggests that these sherds may have been scoops used either to construct or to clean out the pits.

Procedures

This portion of the chapter presents the ceramic typology, and describes other attributes used in the analysis of the Fairchild ceramics. The rationale behind the selection of these analytic categories is also presented. These categories are compared to those that have been used in previous ceramic analyses from other sites in the Tularosa Basin and near El Paso.

Ceramic Typology

The ceramic typology used in this analysis is based to a large degree on typologies used in the El Paso area (e.g., Hard 1983a; Whalen 1978, 1980). Sherds recovered from the Fairchild are primarily plain brownwares, with occasional painted pieces of Mimbres Black-on-white, El Paso Bichrome, and El Paso Polychrome.

Brownwares have been typed in different ways by archeologists working in the various branches of the Mogollon (e.g., Haury 1936; Lehmer 1948). In the Jornada branch, plain brownwares have been divided into Jornada Brown and El Paso Brown, mainly on the basis of temper size and surface finish. The distinction between the two is, however, not entirely clear (Table 4.1).

Table 4.1. Distinguishing attributes of Jornada and El Paso Brown

Ceramic Ware	Attribute	Reference
	Temper Size	
El Paso	Fine -- 1.5 mm	Lehmer 1948:94
	Fine -- 3.0 mm, average 1.4 mm	Runyan and Hedrick 1973:21
	Fine -- 1.5 mm	Human Systems Research 1973:331
Jornada	Very fine -- 1.6 mm, average 0.8 mm	Runyan and Hedrick 1973:23
	"same as El Paso brownware but somewhat finer"	Human Systems Research 1973:329
	Surface finish	
El Paso	Smooth matte, very variable smoothing, occasional grass striations.	Lehmer 1948:94
	Smooth matte, temper protrudes through the surface, very variable smoothing, occasional grass striations, no slip.	Runyan and Hedrick 1973:22
	No slip, very variable, smoothed, occasional grass striations.	Human Systems Research 1973:331
Jornada	Smooth and semipolished, often has striations, very variable surface.	Runyan and Hedrick 1973:24
	Semipolished, smooth polish finish on interior and exterior.	Human Systems Research 1973:329

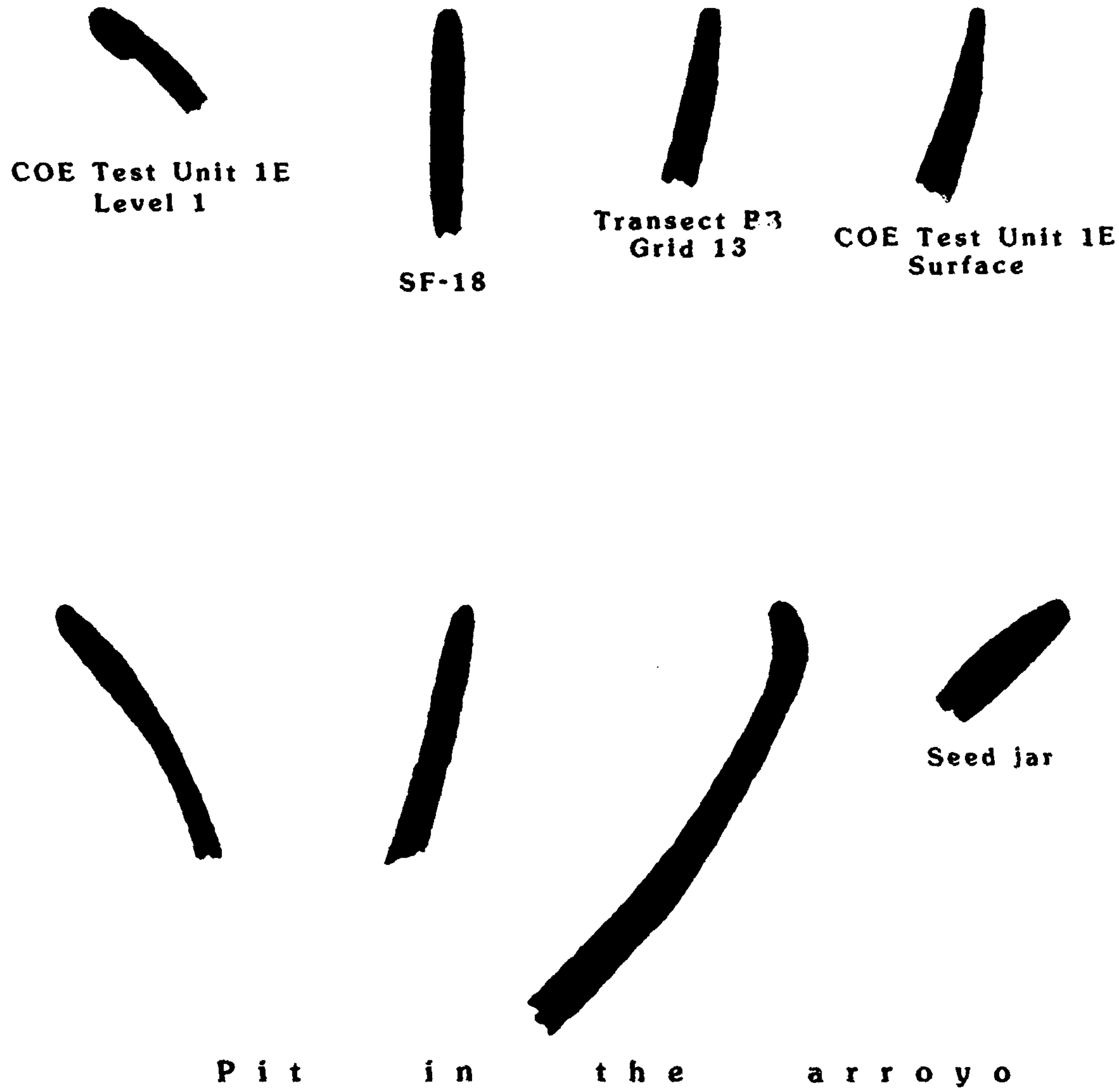
The general consensus is that Jornada Brown has finer temper and a better surface finish than El Paso Brown. Depending on the assemblage, and the particular ceramic type description, major differences are likely to occur in the frequencies of Jornada and El Paso Browns. If an identical assemblage is analyzed using different type descriptions, the proportions of El Paso and Jornada Brown could vary quite radically. No distinction is made in this analysis between Jornada and El Paso Brown.

Another problem with the plain brown sherds is determining whether a body sherd is from a plain brownware, an El Paso Bichrome, or an El Paso Polychrome vessel. The criteria used to distinguish these types are the presence or absence of paint and the paint color. Plain brownware has no paint, and only the upper portion of El Paso Bichrome and Polychrome jars has paint on them. A large, unpainted sherd from a bichrome or polychrome vessel is indistinguishable from plain brownware and can cause major interpretative problems. Because plain brownware is the local diagnostic of the Mesilla phase, if all the unpainted sherds are classified as plain brownware, the temporal placement of a site can be skewed. This problem has been addressed by using the term "undifferentiated brown" (Aten 1972) or "unspecific brown" (Hard 1983a; Whalen 1977, 1978, 1980) for unpainted brownware body sherds. Rim and neck sherds are treated differently. An unpainted rim or neck is treated as a plain brownware, whereas a painted rim or neck is classified as El Paso Bichrome or Polychrome, depending on the paint colors (Hard 1983a; Whalen 1980).

In the present analysis the unspecific brown category has been used for all plain brownware sherds, regardless of their surface finish or temper size. A prominent characteristic of many sherds from the right-of-way is that their surfaces are heavily eroded. In some cases only a trace of paint was noted on a heavily weathered surface. The unspecific brown category therefore includes all the rims and necks without paint (Appendix E, Table 1). These rims and necks may be either plain brownware, El Paso Bichrome, or El Paso Polychrome. To attempt to distinguish temporal factors the rims are profiled (Figure 4.1). This may aid in determining a relative ceramic date based on Whalen's (1978, 1980) tentative rim chronology.

The distinction between El Paso Bichrome and Polychrome is made following Runyan and Hedrick (1973:25-28). The bichrome is distinguished by the presence of either red or black paint, whereas the polychrome has the two paint colors on the same vessel. This can lead to potential typing problems, because a small piece of polychrome may only exhibit one of the paint colors but be classified as a bichrome. Thus, the distinction between the bichrome and polychrome may not always be accurate.

Occasional sherds found in the Fairchild right-of-way exhibit a red slip on the surface of a brownware vessel. It is unclear if these sherds are all the same type or represent different types. They could occur during any of the phases from Mesilla through El Paso, as San Francisco Red or Playas Red, for example. All of them are well smoothed and none are eroded. They are classified as "red-slipped" in Appendix E, Table 1.



Transect BB is El Paso Polychrome, all others are unspecific brown.

INTERIOR ⟶ (all profiles actual size)

Figure 4.1. Profiles of various rim sherds collected at the Fairchild site

The only other sherd types noted from the right-of-way are various styles of Mimbres Black-on-white (Appendix E, Table 1). The system of differentiating between three styles incorporates the types formerly called Boldface Black-on-white (Haury 1936) and Classic Black-on-white (Cosgrove and Cosgrove 1932). This system allows for more refined sherd typing (Scott 1983) and chronological control (Anyon and LeBlanc 1984). Some of the Mimbres Black-on-white sherds identified within the right-of-way are Style III; others may be either Style II or III, and still others are what is termed truly indeterminate. This latter category includes any Mimbres Black-on-white sherd that cannot be determined to be any specific style.

Other Attributes

The vast majority of the sherds recovered from the Fairchild right-of-way are unspecific brown body sherds. Other ceramic attributes that we are interested in monitoring include what portion of the vessel is represented, what form of vessel the sherd is from, whether sooting is present, whether the sherd is abraded, and whether it is modified in any other way (Appendix E, Table 2). These attributes primarily provide functional information. The sherds that are listed in Appendix E, Table 1 are not necessarily included in Appendix E, Table 2. While all sherds can be typed (Appendix E, Table 1), a large number of them do not exhibit the attributes tabulated in Appendix E, Table 2. For example, an unspecific brown body sherd, with no sooting or cultural modification could be from a bowl or a jar and thus would be classed as indeterminate in the vessel form column. Listing it in Appendix E, Table 2 would provide no more data than is already given in Appendix E, Table 1; thus, any sherd that does not appear in Appendix E, Table 2 is a body sherd without sooting or cultural modification, and its vessel form cannot be determined.

Vessel portion is listed as body, rim, or neck sherd. Ceramic forms consist of jars, bowls, seed jars, and indeterminate form. Decorated jars have a slip or paint on their exterior whereas bowls have slip on their interiors or both their interiors and exteriors. Clearly, unspecific brown sherds should not be arbitrarily assigned a form on the basis of fineness and smoothness of interior or exterior finish, for two reasons. First, heavy weathering has eroded the original finish from most of the sherds from the Fairchild right-of-way. Second, as far as we know the assumptions that a bowl should have a finer finish on the interior than its exterior, and that the reverse is true for a jar, have not been adequately demonstrated from a study of complete vessels. Basing the analysis of the ratios of jars to bowls, and the subsequent interpretations of site or feature function, on "common sense" is inadequate methodology.

Sooting is the presence of a carbonized residue on a vessel surface. Abrading is a wear pattern that produces a smooth, nonrim sherd edge. Mend holes are small holes drilled from both sides of a sherd.

Results

The results of the ceramic sorting and analysis are limited because of the nature of the sampling strategy along the right-of-way and the nature of the ceramic assemblage that was recovered. The sampling strategy was different for the surface transect collection and the subsurface excavation (see Chapter 2). The surface transects represent a 10 percent, linear interval sample of the right-of-way area (Figure 2.3). Unlike surface collections in the El Paso area, which have been done in contiguous blocks over large portions of sites (Fields and Girard 1983; O'Laughlin 1980), the nature of the right-of-way corridor and the scope of work precluded such an approach. Thus, in some respects the surface collection data are not comparable to other surface collections.

The excavation data from the Fairchild right-of-way also presents interpretive problems. The major contiguous excavation was a 4 by 4 m unit covering FCR 7, accompanied by a series of 1 by 1 m noncontiguous squares (see Chapter 2). Once again the large-scale stripping that has been the method of excavation at similar sites in the El Paso area was not performed at the Fairchild, and there are problems with the comparability of the data from the Fairchild right-of-way and those from similar sites in the El Paso area. Despite these problems, some analyses do provide information about the distribution of materials in the right-of-way, and some general comparisons with assemblages from other sites can be made.

Chronology

Ceramic types represented in the right-of-way collection are unspecific brown, red-slipped, three styles of Mimbres Black-on-white, El Paso Bichrome, and El Paso Polychrome (Appendix E, Table 1). These types span the period from AD 200 to 1400 (Table 4.2).

Table 4.2. Sherds collected from right-of-way, by type and date range

Type	Date Range (AD)	Number
Unspecific brown	200 - 1400	387
Red-slipped	600 - 1400	7
Mimbres Black-on-white,		
indeterminate Style II/III	850 - 1150	1
Style III	1000 - 1150	2
truly indeterminate	750 - 1150	8
El Paso Bichrome	1100 - 1200	1
El Paso Polychrome	1200 - 1400	1

More than 95 percent of the ceramics are unspecific brown and cannot be assigned a more specific date than AD 200-1400. The remaining 5 percent of the ceramics are more temporally diagnostic. Red-slipped pottery appears in the southern Mogollon area at around AD 600, but between 750 and 1150 it becomes a minor part of the ceramic assemblage (Anyon and LeBlanc 1984; Anyon et al. 1981). Between AD 1150 and 1400, red-slipped ceramics become more common again as types such as Playas Red (Di Peso 1974) begin to appear in the assemblages. Because the sherds from the Fairchild right-of-way are so small and weathered, it is impossible to determine exactly what type of red-slipped ceramic they represent. The tightest date we can place on the red-slipped sherds is anywhere between AD 600 and 1400.

The 11 Mimbres Black-on-white sherds (2.7 percent of the total) can be more tightly dated than the unspecific brown and red-slipped pottery. Mimbres Black-on-white has been sorted on the basis of style (see above). The eight truly indeterminate sherds date between AD 750 and 1150, the one indeterminate style II/III sherd was made between 850 and 1150, and the two Style III sherds date between 1000 and 1150 (Anyon and LeBlanc 1984). These sherds date the use of some portions of the Fairchild right-of-way to the Late Mesilla phase.

El Paso Bichrome is dated between AD 1100 and 1200; it is believed to be the stylistic predecessor of El Paso Polychrome, which is dated between 1200 and 1400 (Carmichael 1983; Whalen 1980, 1981b). El Paso Bichrome is noted as the diagnostic ceramic type of the Doña Ana phase. Because chronometric dates from good contexts are lacking for this phase, we have decided not to use the Doña Ana phase in this report (see Chapter 1). The single El Paso Polychrome sherd from the Fairchild right-of-way indicates that the site was used during the El Paso phase.

The ceramics recovered from the right-of-way suggest that the use of this portion of the Fairchild site occurred between AD 200 and 1150, during the Early and Late Mesilla phases. Even though unspecific brown sherds may be from plain brownware, El Paso Bichrome, or El Paso Polychrome vessels, we should expect more than two painted El Paso sherds (in relation to the 387 unspecific brown sherds) if there was an intensive El Paso phase use of the site.

These results of the temporal distribution of ceramics in the Fairchild right-of-way are the same as commonly noted on sites in the El Paso area and at White Sands (Table 4.3). In general the assemblages are dominated by plain brownwares, which in no instance represent less than 90 percent of the total. In fact, the brownwares in the Fairchild right-of-way assemblage (95.1 percent of the total) falls at about the middle of the range for the other sites. On the basis of the ceramic assemblages, we suspect that use of the Fairchild right-of-way was, to a large degree, contemporary with the use of these other sites.

Whalen's (1978, 1980) rim typology may provide an independent means of dating unspecific brown rim sherds from the Hueco Bolson. The rims in the Fairchild collection (including those from the pit in the arroyo) that are large enough to profile are shown in Figure 4.1.

Table 4.3. Ceramic types at selected sites near El Paso and White Sands

Reference		Brownware*	Mimbres Black-on-white	El Paso Bichrome	El Paso Polychrome	Other**	Total
Hard 1983a:168	Number	125	7	2	1	2	137
	Percent	91.2	5.1	1.5	0.7	1.5	
O'Laughlin 1979:34	Number	433	6	0	8	12	459
	Percent	94.3	1.3	0	1.7	2.6	
O'Laughlin and Greiser 1973:35	Number	1845	33	5	27	29	1939
	Percent	95.2	1.7	0.3	1.4	1.5	
Fields and Girard 1983:202	Number	96	0	0	0	0	96
	Percent	100.0	-	-	-	-	
Oakes 1981:46	Number	1826	0	0	0	0	1826
	Percent	100.0	-	-	-	-	

* Brownware includes unspecific brown, El Paso brown, and Alma Plain

** Other includes Chupadero Black-on-white, Three Rivers Red-on-Terracotta, Playas Red, Ramos Polychrome, and Tucson Polychrome

They include both pinched and flattened rims, although the majority appear to have profiles that Whalen would place in the Mesilla phase. It must be stressed that this is a tentative method of dating sherds and many more chronometric dates must be collected in good context with rims before rims can be used as an independent method of dating sites or features. Also, the Fairchild site is distant from the Hueco Bolson sites where Whalen developed the concept; therefore, factors other than chronology may be responsible for the differences in rim form between the two areas.

Sherd types other than unspecific brown are not evenly distributed across the collected portions of the right-of-way (Appendix E, Table 1). There is a concentration of red-slipped and Mimbres Black-on-white sherds in the GG and HH surface-collection transects. These transects are located adjacent to or within FCR Concentrations 9, 10, 11, and 12. Other sherds, which are not unspecific brown, occur near FCR Concentrations 7, 17, and along transect BB (Figure 2.3). However, given the uneven sampling strategy, it is not possible to distinguish the dates of use of specific FCR concentrations based on the presence or absence of certain ceramic types.

Horizontal and Vertical Distribution

The horizontal distribution of sherds across the Fairchild right-of-way exhibits some general patterns that are similar to distributions noted at other sites in the El Paso area. On an intrasite level, the surface-transect data and excavation data also exhibit similar patterns of ceramic distribution.

Ceramics collected as part of the transect sample tend to cluster in the areas of the densest fire-cracked rock concentrations. Transects O and P are adjacent to the less-dense fire-cracked rock concentrations south of the arroyo (Figure 2.3). The density of ceramics drops to the north of Transect P and then increases at Transect Z (Table 4.4), at the point where the fire-cracked rock concentrations begin to appear in large numbers (Figure 2.3). The slight drop in the density of ceramics in Transects DD, EE, and FF coincides with an area that has recently been trampled by cattle (Figure 2.3). Directly north of the cowpaths, the occurrence of fire-cracked rock concentrations and the density of sherds increases noticeably. The majority of the surface-transect sherds occur in close proximity to the greatest density of fire-cracked rock concentrations.

Despite the close correlation in the distribution of surface-transect ceramics and fire-cracked rock concentrations, individual concentrations did not necessarily contain ceramics (Table 4.5). Of the 123 sherds recovered from the surface, only 25 (20.3 percent) were collected from within the boundaries of a fire-cracked rock concentration. Even though the surface-collected sherds tended to be most numerous near fire-cracked rock concentrations, they did not occur within fire-cracked rock concentrations. It is important to remember that usually only a small portion of a fire-cracked rock concentration was contained within a surface transect. Thus, there may be some bias in these numbers and distributions.

Table 4.4. Density and distribution of sherds collected on surface transects

Transect	Total Number of Sherds	Number of Grids with Sherds	Average Density of Sherds Per Collected Grid	Average Density of Sherds Per Transect Grid
I	1	1	1.0	0.06
O	2	2	1.0	0.12
P	2	2	1.0	0.12
Z	3	3	1.0	0.19
AA	6	3	2.0	0.37
BB	5	4	1.25	0.31
CC	9	9	1.0	0.56
DD	2	2	1.0	0.12
FF	2	2	1.0	0.12
GG	24	10	2.4	1.50
HH	31	10	3.1	1.94
II	11	8	1.4	0.69
JJ	5	2	2.5	0.31
LL	5	4	1.25	0.31
MM	2	2	1.0	0.12
NN	4	3	1.33	0.25
OO	8	4	2.0	0.50
QQ	1	1	1.0	0.06

Table 4.5. Sherds collected from fire-cracked rock concentrations in surface transects

Transect	Grid	FCR Number	Number of Sherds
N	11, 12	23	0
O	4 - 6	21	1
O	8 - 10	22	1
AA	1 - 5	17	5
GG	13, 14	11	2
HH	3 - 7	9	13
HH	14 - 16	10	0
II	4 - 7	7	3
NN	1, 2	3	0
QQ	7 - 10	2	0
RR	8 - 10	1	0

To check the relationship between surface-transect sherd densities from the FCR concentrations and from the area around them, we calculated sherd densities from excavations in and around fire-cracked rock concentrations. OCA Units 1, 2 and 5 are the best examples for looking at the horizontal distribution of excavation materials because they provide the only sample from an intensively investigated area in the right-of-way. Ceramics collected from the surface and from the upper 10 cm of fill in the excavation units are used.

A lighter density of sherds occurs in FCR 7 (in the 4 by 4 m contiguous excavation area) than in the proveniences outside the fire-cracked rock concentration (Figure 4.2, Table 4.6). In fact, outside the FCR concentration the average density of sherds within each 1 by 1 m provenience within Units 1, 2, and 5 is an average of 2.5 times greater than inside the FCR concentration. This relationship between surface and subsurface ceramics is identical to the correlation noted in the surface transect data. When the data from the COE-excavated proveniences are treated in the same manner as the OCA excavation units, however, the relationship between ceramics and fire-cracked rock concentrations is reversed. There are several problems with the COE data. The units in the COE excavations do not have the close spatial integrity of the OCA test pits, nor do they contain as many excavation proveniences (Table 4.6). Another problem is that the test units in fire-cracked rock concentrations were placed in locations where the return of artifacts was expected to be greatest. We should be careful in interpreting the relationship between ceramics and fire-cracked rock concentrations as noted in the COE excavations, but the COE data do caution us not to place too much interpretive value in the relationship between ceramics and fire-cracked rock concentrations noted from the OCA surface transects and the testing of one fire-cracked rock concentration and noncontiguous 1 by 1 m proveniences near that concentration.

Table 4.6. Horizontal distribution of sherds from 1 by 1 excavation proveniences (surface and 0-10 cm levels combined)

Location	Number of Sherds	Number of 1 by 1 Units	Average Number of Sherds/Unit	Range of Sherds/Unit
<u>OCA Units 1, 2, and 5</u>				
FCR concentrations	39	16	2.4	0- 7
Other proveniences	109	18	6.0	0-18
<u>COE Excavation Units</u>				
FCR concentrations	74	4	18.5	1-42
Other proveniences	21	2	10.5	1-20

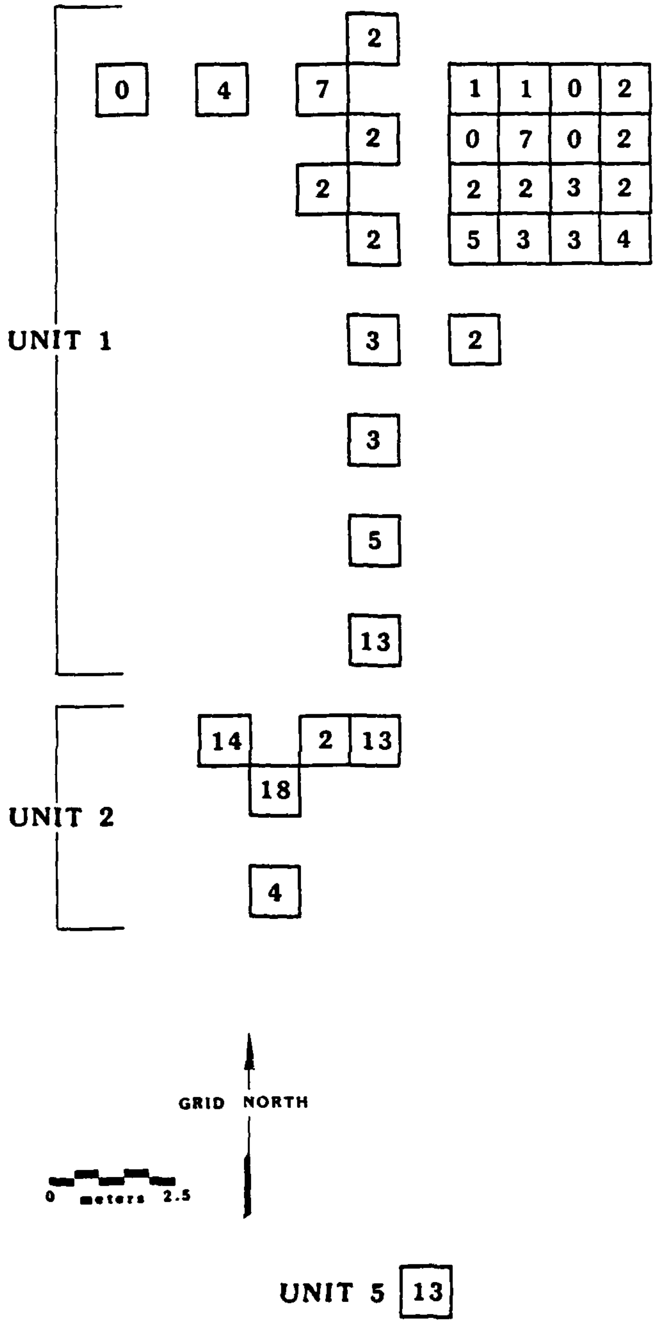


Figure 4.2. Sherd frequencies in Units 1, 2, and 5 (OCA), surface level and 0 to 10 cm deep combined

The distribution of sherds near fire-cracked rock concentrations in the Fairchild right-of-way is similar to distributions at other sites. O'Laughlin (1980) notes that sherds from surface collections at Keystone Dam Sites 33 and 34 were concentrated near fire-cracked rock features and that a similar distribution occurred at the Castner and Transmountain Campus sites. Collections from Keystone Dam Site 32 showed that 44 percent of all the sherds were associated with one fire-cracked rock concentration (Fields and Girard 1983). Ceramics at the White Sands sites excavated by Oakes (1981) tended to be associated with hearths and pits, and sherds in unburned areas tended to be associated with other artifact classes. Such associations of features and sherds are common to all these sites.

The vertical distribution of sherds within the right-of-way has been calculated primarily to determine whether or not the pattern were similar to that of fire-cracked rock (see Chapter 3). If the pattern is similar, the vertical distribution of sherds can be used as another measure of the natural processes affecting the distribution of artifacts within the right-of-way. The vertical distribution of ceramics is therefore dealt with in a similar manner to that of the fire-cracked rock: sherd counts are used in contrast to the mean rock weight used in analyzing the vertical distribution of fire-cracked rock (Table 3.2). As in the fire-cracked rock distribution the surface collection is assumed to be the equivalent of a 10 cm level. Thus each 1 x 1 m provenience can be taken to represent 0.10 cu m of fill.

From the figures in Table 4.7 it is clear that the density of sherds per 0.10 cu m of fill is greatest in the 0-10 cm level. Interestingly the density drops dramatically in the 11-20 cm level, then picks up slightly in the next two levels and finally increases to the second highest density in the level between 41 and 50 cm. This is surprising in that we would expect the density to fall off in the lower levels as does the mean weight of fire-cracked rock. The cause of this increase in sherds in the lowest level of excavation is not known, and further subsurface excavation would be required to determine what mechanism is responsible for this vertical ceramic distribution.

In summary, the types and distributions of ceramics in the Fairchild right-of-way are those we would expect given the findings at similar sites in the El Paso area and near White Sands. The ceramic types suggest that the right-of-way was utilized at least between AD 200 and 1400, with the majority of use during the Mesilla phase (prior to 1150). The horizontal distribution of the sherds suggests that, while they are associated with fire-cracked rock concentrations, they are more commonly near the FCR concentration than within it. The vertical distribution of sherds is, on the whole, different from the vertical distribution of fire-cracked rock in the right-of-way.

Table 4.7. Vertical distribution of sherds from OCA and COE excavations

Depth Below Surface	Number of Sherds	Number of Collection Proveniences with Sherds	Average Number of Sherds/ Proveniences with Sherds	Number of Excavated Proveniences	Average Density of Sherds/ 0.1 cu m of fill
Surface*	63	20	3.2	42	1.5**
0-10 cm	184	34	5.4	42	4.4
11-20	5	2	2.5	13	0.2
21-30	9	2	4.5	10	1.1
31-40	8	2	4.0	9	1.1
41-50	14	2	7.0	6	2.3

* Includes only those surface transect collections that also represent the surface level of excavation proveniences. Surface volume is assumed to be equivalent to a 10 cm level (see Chapter 3).

** The surface level is assumed to have an equivalent volume to a 10 cm deep level (see Chapter 3).

Other Attributes

Other attributes noted on the Fairchild sherds are vessel form, portion of the vessel, and presence/absence of sooting, abrading, and mend holes (Appendix E, Table 2). The sherds recovered from the pit in the arroyo are included in these analyses.

The proportion of jars to bowls is often used as an indicator of the range or types of activities pursued at a site. For example, a site that lacks structures and has a ceramic assemblage consisting primarily of jars may be interpreted as a limited activity site. To make this interpretation it is necessary to be able to identify the vessel form that the majority of the sherds represent. This identification cannot be made for most Fairchild sherds because of the difficulty in determining the vessel form of unspecific brown body sherds (see above).

Of the 35 sherds for which vessel form can be identified, 15 are jars, 19 are bowls, and 1 is a seed jar (Table 4.8). Very little about the function of various parts of the right-of-way can be inferred from vessel form, given that only 7.6 percent of the total sherds are identifiable. Perhaps the more interesting figures in Table 4.8 are that all ceramic types represent both jars and bowls (except El Paso Polychrome, which is represented by only one jar sherd). The Mimbres sherds are mainly bowl fragments, a finding that is expected because Mimbres Black-on-white bowl sherds far outnumber jar sherds in the Mimbres Valley (Anyon and LeBlanc 1984).

Table 4.8. Vessel form by sherd type

	Jar	Bowl	Seed Jar	Total
Unspecific brown	5	3	1	9
Mimbres Black-on-white	3	12	0	15
Redware	4	3	0	7
El Paso Bichrome	2	1	0	3
El Paso Polychrome	1	0	0	1
Total	15	19	1	35

Sooting is taken as evidence of a vessel being used for cooking (if the sherd was not found within a burned feature or structure). At the Fairchild site the erosion on the surface of many sherds may have obliterated evidence of sooting; indeed, only 22 sherds exhibited sooting. All were unspecific brown sherds, and 20 were sooted on the exterior while two were sooted on the interior. Soot on the interior probably results from activities other than cooking. Twenty of the sooted sherds were body portions of vessels of indeterminate form. Two sherds with sooted exteriors were identified to form: one jar and one seed jar.

Abrading has been noted as common at sites in the El Paso area with an abundance of fire-cracked rock (Aten 1972; Hard 1983a; O'Laughlin 1980). Abraded sherds at these sites tend to occur in association with fire-cracked rock features. Hard (1983a) has demonstrated that abraded edges are quickly produced by using sherds to scoop out sand pits. He interprets the association of sherds and fire-cracked rock features, in conjunction with his experiment data, to be an indication that these sherds were used as scoops for digging or cleaning out roasting pits. Only two of the 457 sherds collected from the Fairchild site exhibited abraded edges. Both were unspecific brown body sherds, and one had a sooted exterior. Only one was from a fire-cracked rock concentration. This finding of so few sherds with abraded edges is not what we would expect given the numbers of abraded sherds in ceramic assemblages from sites in the El Paso area.

Two sherds from the Fairchild collection had broken mend holes, both of which are unspecific brown body sherds. While the absence of mending on painted and slipped sherds is of interest the sample of these sherds is so small that no further analysis is attempted here.

Summary

Ceramics from the Fairchild right-of-way, and the pit in the arroyo, date the use of the site between AD 200 and 1400. The majority of the painted sherds appear to date to the Late Mesilla phase (750-1150). This is similar to the ceramic time range noted on sites with concentrations of fire-cracked rock in the El Paso area. The horizontal distribution of sherds within the right-of-way indicates that while they associate with the areas of the maximum density of fire-cracked rock concentrations, they tend to be associated with the areas around the concentrations and not within them. This type of horizontal distribution has also been noted in the El Paso area sites. The vertical distribution of ceramics is different from that of the fire-cracked rock in the Fairchild right-of-way. Even though the greatest density of ceramics is between 1 and 10 cm below the modern ground surface as with fire-cracked rock the sherd density is unexpectedly high between 41 and 50 cm below modern ground surface. Because of small sample sizes the monitoring of other attributes was not too informative; however, the lack of sherds with abraded edges is surprising given their relative abundance on similar sites in the El Paso area.

Chapter 5

OTHER ANALYSES

This chapter is a compilation of a number of analyses on various artifacts and other remains from the Fairchild right-of-way, including ground stone, fauna, flotation, pollen, radiocarbon and ceramic petrographic analyses, as well as the results of pipeline construction monitoring. The scope of the analyses is limited because of the small number of artifacts and samples recovered.

Ground Stone

Nine pieces of ground stone were recovered from within the Fairchild right-of-way (Table 5.1). All are fragments: six manos, one possible metate, and two composite artifacts (a mano/bowl and a mano/ metate). Although the possible metate fragment has the correct shape, the presence of a grinding surface has not been positively identified.

All ground stone on the surface of the right-of-way was collected. Each of the ground stone pieces was pin-flagged during the initial sweep of the right-of-way, when the fire-cracked rock concentrations were demarcated. The ground stone was left in place until the surface transects had been completed to ensure that any ground stone in those transects was collected as part of the 10 percent sample. The pieces that did not fall within the transects were then collected as individual surface finds (see Chapter 2).

The attributes identified in this analysis are form, shape, dimensions, weight, material, nature of the grinding surfaces, and nature of the edges (Table 5.1). The form of the ground stone is indicated by its curvature and by evidence of grinding. A convex grinding surface is taken to be that of a mano, a concave grinding surface that of a metate. A flat grinding surface could be either a mano or metate. To determine if there were striations on the grinding surface, each surface was examined with a 10-power hand lens.

The majority of the ground stone from the Fairchild right-of-way are mano fragments. Two of these were dual purpose artifacts. One was pecked on the side opposite the ground side to form a shallow basin; it may have been a small stone bowl (Figure 5.1). The other had a convex grinding surface on one side, indicating its use as a mano, but the other side was a ground concave surface, indicating its use as a metate, probably a hand metate (Figure 5.1). Both artifacts were made from dolomite.

Both rectangular and oval mano fragments are represented in the collection, although in some cases the assignment of shape is questionable due to the fragmentary nature of the piece. They are manufactured from a range of raw materials, all of which are locally available in the alluvial fan gravels. Finished ground stone artifacts or raw materials to make them do not appear to have been transported to the Fairchild right-of-way from other localities. Despite the fact

Table 5.1. Ground stone attributes

Provenience	Form	Shape	Portion	Length (mm)	Width (mm)	Thick-ness (mm)	Weight (g)	Material	Side 1			Side 2			Edge Modifi-cation
									Curvature	Grinding	Striations	Curvature	Grinding	Striations	
SF-2	Metate	—	Fragment	110*	73*	69*	725	Limestone	—	Unclear	—	—	—	—	None
SF-8	Mano	Rectangular?	Fragment	74*	59*	42	285	Quartzite	Convex	Yes	None noted	Convex	Yes	None noted	Pecked
SF-9	Mano/Bowl?	Oval	Fragment	70*	42*	34	111	Dolomite	Concave	No	None	Convex	Yes	None noted	Pecked, ground
SF-11	Mano	Oval?	Fragment	83*	73*	40	271	Meta-quartzite	Convex	Yes	None noted	Side almost completely broken			Pecked
SF-13	Mano	Rectangular	Fragment	70*	70*	35	226	Quartzite	Convex	Yes	None noted	Convex	Yes	None noted	Pecked, ground
SF-15	Mano	Rectangular	Fragment	49*	91	26	189	Crystalline dolomite	Convex	Yes	None noted	Convex	Yes	None noted	Pecked
Transect O, Grid 7	Mano	Oval?	Fragment	73*	65*	31	226	Limestone	Flat	Yes	None noted	Convex	No	—	Pecked
Transect AA, Grid 2	Mano	Rectangular?	Fragment	53*	49*	58	289	Meta-quartzite	Convex	Yes	Parallel to each other	Convex	Yes	Parallel to each other	Pecked
Test Unit 1W, surface	Mano/Metate	Rectangular	Fragment	100*	52*	50	391	Crystalline dolomite	Convex	Yes	Parallel to width	Concave	Yes	None noted	Pecked

* Represents size of fragment, not size of original artifact

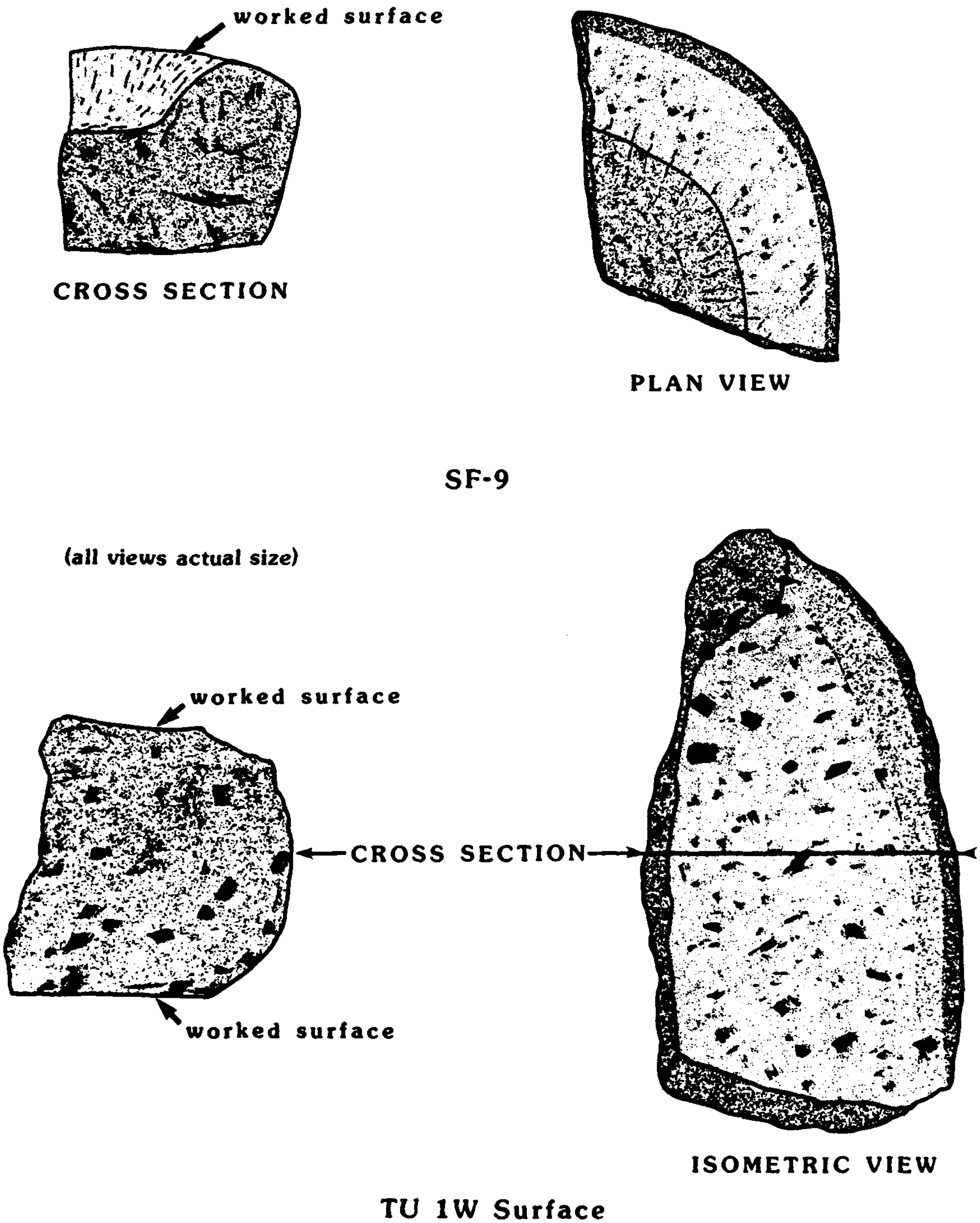


Figure 5.1. A sample of ground stone fragments collected from the project right-of-way

that all the ground stone was fragmentary, it was still evident that the pieces had not been worn down to the point where they were no longer usable. Using Hard's (1983a) terminology one would classify them as lightly used. None of the pieces exhibited any evidence of burning or fire-cracking.

The horizontal and vertical distribution of the ground stone is strongly patterned. Seven of the pieces were located within fire-cracked rock concentrations: three in FCR 17, two in FCR 9, one in FCR 7, and one in FCR 14 (Figure 2.3 [end map]). The two pieces not actually within fire-cracked rock concentrations were in close proximity to them. One was between FCR Concentrations 21 and 22, which were only 1 m apart, and the other was between FCR Concentrations 1 and 2 (Figure 2.3). Thus, there is a clear association of ground stone with fire-cracked rock concentrations. As for the vertical distribution, all pieces were found on the modern ground surface; no ground stone artifacts were recovered during the excavations.

Ground stone from similar sites in the El Paso area and White Sands are in many ways like those from the Fairchild right-of-way. At Keystone Dam Sites 33 and 34 (O'Laughlin 1980) and Site 32 (Fields and Girard 1983) ground stone was associated with fire-cracked rock features. This association was also noted at the Transmountain Campus sites (O'Laughlin 1979), the Northgate site (O'Laughlin and Greiser 1973), the White Sands sites (Oakes 1981), and also to some degree at the Castner Range sites (Hard 1983a). No evidence of ground stone reuse as hearth stones was noted at Keystone Dam Sites 33 and 34 or at the Fairchild right-of-way. At the White Sands and Castner Range sites, however, a large portion of the ground stone pieces had been used as hearth stones. At the White Sands sites this should be expected because all the rock had to be brought in from the San Andres Mountains; therefore, broken or exhausted ground stone would have provided a potentially valuable source of hearth stones. The same conditions do not apply at the Castner Range sites, which are portions of the location also named Transmountain Campus and Northgate. This entire site area is located on alluvial fan gravels.

Raw material selection also shows some variability. Of course, the raw material at the White Sands sites was brought in from other localities. Locally available raw material was in plentiful supply at the other sites--they were all located on alluvial fan gravels. At Keystone Dam Sites 33 and 34 and at the Transmountain Campus sites most of the ground stone was made of sandstone. This material is not locally available but can be obtained in the nearby Franklin Mountains. At the Castner Range sites four of the 17 ground stone pieces were manufactured from nonlocal material. These four artifacts exhibited much greater wear than those made from locally available raw material. In the Fairchild right-of-way all of the ground stone artifacts were manufactured from local raw materials and all exhibited light wear.

The functions of the artifacts in the ground stone assemblages from all these sites are not known. Were they used to process wild foods, corn, or both (and if both, in what proportions)? Oakes (1981) has addressed these questions and cites Riddell and Pritchard (1971) concerning ethnographic use of ground stone. Based on ethnographic evidence it is generally assumed that oval one-hand manos and basin metates were used for processing wild seeds (see also Goodyear 1975), whereas rectangular manos and trough metates were used for corn processing. If these assumptions are correct, we may expect that the presence of both rectangular and oval manos in the Fairchild right-of-way indicate that wild seeds and domesticates were processed at this location. Given the sample size, however, we have no indication of the relative importance of these activities at the Fairchild right-of-way.

Analysis of Faunal Materials

by Jack B. Bertram

Thirty fragments of 24 pieces of bone from six proveniences at the Fairchild site were analyzed. Forms definitely identified were Lepus ref californicus (blacktail jackrabbit), Antilocapra americana (pronghorn), and probable Odocoileus ref hemionus (mule deer). Forms possibly present were Sylvilagus sp. (cottontail) or Cynomys sp. (prairie dog). All forms showed evidence of human processing.

Methods

All remains were diagnosed to the limits of reliability using the comparative collections of the Museum of Southwestern Biology, University of New Mexico. Observations are detailed in the following sections by provenience and standard taxonomical/anatomical sequence.

All specimens were compared with materials whose identification is known; the reliability of identification of the archeological specimens depended on their condition and character. In this report, definite identifications are shown without comment. Very probable identifications are indicated by the word "ref" (referred to) prefixed to the less-than-certain term. When species could not be determined, the identification is given as the genus followed by "sp." (species uncertain). When genus was not determinable, the identification is given with the word "indeterminate" prefixed to the taxonomic label.

Very uncertain identifications were shown by specifying an approximate size or size range. "Small mammals" are smaller than an average mature jackrabbit; "large mammals" are at least as large as a small mature domestic sheep (Ovis aries), and "medium mammals" are intermediate. In the Southwest, large mammals seem generally to be referable to Artiodactyla.

If sufficiently fragmented, larger forms will produce some fragments that could be mistakenly classified in a smaller size category; this is especially likely if very young animals are considered. The different texture of bone from very young mammals generally suggests its appropriate inclusion in a larger size category than is implied by size and morphology of the element alone.

Wherever fragments could be reassembled, they are reported as one piece. All pieces were described exhaustively, reporting (where determinable) skeletal element, portion of that element represented, and laterality of the element. Size, relative to appropriate specimens from the Museum of Southwestern Biology collections, and epiphyseal fusion are reported where determinable. If possible, each piece was characterized by the percentage of Full Tube Section (FTS) represented. This measurement is the percentage (relative to 360 degrees) indicated by a radius vector rotated around the apparent shaft center of the bone from one lateral extreme edge of the fragment to the other in a plane apparently perpendicular to the axis of the greatest curvature of the piece.

Burning was characterized in detail by hardness, color, and completeness. Where burning was incomplete or mild, or where color and texture changes so indicated, roasting was reported.

Condition of specimens is reported in detail. Evidence of definite gnawing (by agent), scatological smoothing and rounding, the color and texture changes induced by groundwater leaching, and the diagnostic effects of root etching and surface exposure were noted. Where more specific textural or structural changes were noted, specimens have been characterized as weathered, eroded, or friable. Human modifications are noted as well.

Description

Provenience: Test Unit 1E, surface (1 piece). This shaft fragment is from an indeterminate large mammal; it is 15 mm long, 4 mm thick, and has a relative FTS of 25. It was roasted; subsequent leaching and surface exposure are evident. The fragment is exfoliated and chalky. Breakage occurred both before and after burning; spiral fractures suggest processing for marrow followed by disposal in hot ashes.

Provenience: Test Unit 1E, Level 1 (4 pieces). A proximal articulator fragment of a *Lepus* ulna (side undetermined) shows evidence of roasting (it is tan brown) and possible leaching. A distal femur fragment from an indeterminate small mammal and a cancellous fragment from an indeterminate form are in the same condition as the *Lepus* piece. A portion of a distal 1st medial phalanx (front?), ref *Antilocapra*, was split longitudinally before roasting, which suggests marrow recovery. This fragment is also in the same condition as the first bone from this provenience.

All pieces from this provenience exhibit the same color and surface character; no exposure or root etching is evident. All are well preserved and in good condition. In each case, breakage occurred before burning.

Provenience: Test Unit 1W, Level 4 (1 piece). A medial shaft fragment of a tibia, ref *Sylvilagus* sp., is triangular prismatic and 19 mm long, with a compactum thickness of 1 mm. Relative FTS measures 25 percent. This piece has been heavily roasted; it is hard and gray brown grading to dark brown. No leaching was noted. The piece was broken prior to excavation and probably prior to burning.

Provenience: 1-1-3, (1 piece). This tubular section of a medial shaft fragment, which approximates the size of *Sylvilagus* femur, is 8 mm long and has a compactum thickness of 1 mm. Relative FTS measures 20 percent. It has been roasted/burned heavily, is slightly porous and light gray brown. Probably broken before burning, this piece was well protected after deposition as little leaching is evident.

Provenience: pit in arroyo, (16 pieces, as reconstructed). (1) This distal portion of the right scapula from a *Lepus* is fused and full-sized. No burning is evident. Leaching and root etching are present on this specimen, which was probably exposed on the surface for some time prior to burial. Breakage occurred before excavation.

(2) This mature and rugose *Lepus* right humerus lacks the proximal end. No burning is evident. Very mild root etching and leaching were noted. Breakage occurred before excavation.

(3) Some 28 mm of the distal shaft of a right *Lepus* humerus is in a condition similar to the specimen (1) described above. This fragment is from a mature animal that was possibly lightly boiled or roasted with meat still attached to the bone.

(4) This distal portion of a left *Lepus* humerus is 15 mm long. It is from a mature animal and in similar condition to the fragment (1) described above. A possible cut mark was noted on the shaft, and breakage occurred prior to excavation. This bone is not from either of the individuals represented by specimens (2) and (3).

(5) At least four shattered pieces of the shaft of a left proximal *Lepus* ulna were noted. The proximal epiphysis had fused but was broken prehistorically during processing. The condition of this bone is similar to that described for specimen (1) above.

(6) A right innominate from an old *Lepus* is missing the pubis; it was probably broken during disarticulation. The ilium and ischium have been gnawed off, perhaps during human consumption. No burning was evident. This bone appears rather fresh; its condition is comparable to specimen (2) above.

(7) The distal end and one-half of the shaft of a left femur is from a large juvenile *Lepus*, quite comparable to Specimen 14050 from the Museum of Southwestern Biology collection (perhaps a week younger). The juvenile porosity of the piece made diagnosis unreliable, but it appears to have been lightly roasted or stewed. The bone is quite leached; breakage occurred before processing for food.

(8) The shaft of a right *Lepus* tibia whose proximal end was broken during excavation appears to be very similar in condition, size, and porosity to specimen (7). The distal end has been gnawed away.

(9) The distal end of this shaft of a right *Lepus* tibia has been gnawed away, but its size and rugosity suggest a mature animal. A possible cut mark was noted on the transverse midshaft. The bone's condition is similar to specimen (1) above.

(10) Shattered in four pieces, this portion of the midshaft of a right *Lepus* tibia comes from a fairly mature animal (but not the same individual represented by specimen [9]). Possible cut marks were noted at the distal break. Condition is comparable to specimen (2) above.

(11) This left calcaneum from a mature Lepus had been burned hard black gray. Leaching occurred only at the posterior extremity.

(12) This distal and shaft portion of a Lepus metatarsal with unfused epiphyses probably represents the same individual as specimens (7) and (8) above.

(13) The proximal rib fragment from an artiodactyl, ref (?) Odocoileus sp., had been burned black and may have been broken during burning. This piece exhibits no leaching or evidence of surface exposure.

(14) A vertebral fragment from an indeterminate large mammal, probably from the cervical series of a medium artiodactyl, may have been lightly roasted or stewed. It was smashed prehistorically during processing. No leaching or etching was noted.

(15) At least two cancellous fragments from an indeterminate large mammal have calcined white exteriors but gray black interiors. All breakage was probably postdepositional. No leaching was noted.

(16) A shaft fragment from an indeterminate large mammal, very heavily roasted after breaking, may represent disposal of refuse from marrow processing as all breaks appear to be spiral fractures.

At least two (probably three) mature jackrabbits are represented in this sample from the pit in the arroyo; one young individual is comparable to a specimen in the Museum of Southwestern Biology collection that was taken in late June. Caution should be exercised in using this similarity to make seasonal inferences, however -- animals of this age (approximately 2+ months) may be encountered in southern New Mexico at any time of the year, although they are especially found between late spring and early winter. The conditions of the pieces in this collection generally suggest that the individuals were in good health, so kills from late winter into spring are perhaps less likely (especially for specimens [2], [6], and [10]).

Conclusions

Of the 24 bones analyzed, all but eight were from the arroyo pit sample. Consequently, no inferences relating to depositional reconstruction or processing were attempted for proveniences other than the arroyo pit and Test Unit 1E, Level 1, which contained four pieces. Every provenience examined produced evidence either of roasting, stewing, or disposal of noxious waste by burning. Artiodactyl material was heavily processed, including the salvaging of relatively unrewarding resources such as phalangeal marrow. Jackrabbit and cottontail material dominated the assemblage of remains of small and locally obtainable forms. These observations would suggest the relatively weak inference that the residents at the Fairchild site engaged in logistic foraging in an area which retained at least some large game and would imply either that local human population density was relatively low (for a sedentary agricultural system) or else that long-range logistical foraging into an underpopulated hunting area was important (cf. Bertram and Draper 1982).

At least some proveniences may reflect site curation and systematic disposal of garbage. The presence of multiple-species disposal assemblages may be taken to imply either the occupation of the Fairchild site by more than one household/consumption group or else site curation and disposal of a rather unintensive sort.

Of the two samples having sufficient material to support depositional inference, only the arroyo pit sample was depositionally or taphonomically heterogeneous. It is likely that this sample represents more than one dumping episode, especially if the more leached and etched pieces were recovered from beneath the more intact specimens (2, 6, and 10). At least some of the Lepus materials had been subjected to rapid acidic leaching and attack by rootlet mineral scavenging. The same may be true of the large mammal pieces; however, the burning of this material would tend to resist root attack. The lack of leaching and etching in the large mammal remains can probably be used to infer rapid and deep, sealed deposition; stratigraphic data should be used to confirm this inference.

Analysis of Flotation Sample*

by Mollie S. Toll

The single analyzed flotation sample from the Fairchild site was from beneath the surface of FCR Concentration 7 (OCA Unit 1). It produced nothing in the way of reliable cultural botanical materials. Modern roots and insect or rodent feces were abundant, and insect skeleton and pupal cases were also present throughout the sample. Four small white snails were recovered: a *Pupoides*-type and three possible immature *Pupilla*-types. The single seed recovered was damaged, unburned, and a type of little economic importance (*Euphorbia* sp., or spurge). All material recovered points to considerable biological activity in the soil, indicating a high level of disturbance and poor preservation.

Charcoal (Table 5.2) represents a wide variety of types. The bulk (90 percent by number, and more by weight) is nonconiferous and largely shrubby types (saltbush, a composite shrub, creosote bush). A possible mesquite fragment was also present, as well as two tiny pieces that were clearly coniferous. All charcoal was very fragmentary and distorted (indicating that the wood was burned green and/or in a hot fire).

Table 5.2. Charcoal recovered from the Fairchild site, OCA Unit 1

		Number of Pieces	Weight (g)
Unknown coniferous		2	+
Nonconiferous:	*Atriplex*	3	+
	Compositae	2	0.1
	cf. *Larrea*	5	0.3
	cf. *Prosopis*	1	+
	Other/unknown	7	0.1
	Total nonconiferous	18	0.5
Total		20	0.5

+ less than 0.05 g

*Castetter Laboratory for Ethnobotanical Studies Technical Series 124

Analysis of Pollen Samples*

by Karen H. Clary

Five soil samples containing pollen were submitted to the Castetter Laboratory for Ethnobotanical studies for pollen analysis from a portion of the Fairchild site. The pollen samples were collected in an attempt to detect the fossil pollen of plants that may have been utilized in the context of the fire-cracked rock.

Two pollen samples (FS 299 and 300) were collected from the modern ground surface outside the right-of-way and away from any cultural materials, to serve as control samples. They define the present-day pollen assemblage and are used to compare with the fossil pollen. One pollen sample (FS 303) was taken from the modern ground surface in FCR 7. Another sample (FS 297) was taken at a depth of 10 cm beneath the modern ground surface of FCR 7. The other sample (FS 39) was taken from the fill 50 cm beneath the modern ground surface in FCR 17.

Methods

The samples were processed using a modification of the method described by Mehringer (1967). A 25 g soil sample was taken from the bag and weighed on a triple-beam balance. The sample was washed through a 180 mi mesh brass screen with distilled water into a 600 ml beaker. Tablets of fresh, quantified *Eucalyptus* pollen were dissolved in each sample to serve as a control for pollen degradation or loss during the process and to calculate absolute pollen sums to determine whether or not sufficient pollen was available per sample for data interpretation (Stockmarr 1971). Carbonates were removed by adding 50 ml of 40 percent hydrochloric acid (HCl) to each beaker. When effervescence ceased, each beaker was filled with distilled water and the sediments were allowed to settle for at least 3 hours. The water and dilute HCl were carefully poured off after settling, leaving the sediments and the pollen behind in the beaker. Each beaker was filled again with distilled water, stirred, and allowed to settle for 3 hours before pouring off.

Beakers were filled one-third full with distilled water and stirred with clean stirring rods, without creating a vortex, to suspend sediments and pollen. Three seconds after stirring stopped, the lighter soil particles and pollen grains were poured off into a second clean beaker, leaving the heavier sand particles behind in the first beaker. The procedure was repeated several times to separate the heavier sand from the lighter sediments and pollen grains.

Silicates were removed by adding 50 ml of hydrofluoric acid (HF) to each beaker. The beaker was allowed to sit overnight and the HF was poured off. Distilled water was added twice to rinse the samples. The sediments were then transferred to 50 ml test tubes.

* Castetter Laboratory for Ethnobotanical Studies Technical Series 127

Organics were removed by rinsing the samples with 30 ml of glacial acetic acid, centrifuging, and pouring off the liquid. A fresh acetolysis solution was prepared of 9 parts acetic anhydride to 1 part sulfuric acid. Thirty milliliters were added to each test tube, stirred, and then the tubes were placed in a hot water bath for 10 minutes. Tubes were removed and cooled, then centrifuged, the liquid was poured off, and rinsed with glacial acetic acid, centrifuged, and poured off. The centrifuge tubes were filled with distilled water, stirred, centrifuged, and poured off. This was repeated twice.

Droplets of the pollen-bearing sediment were placed on microscope slides and mixed with glycerine. A cover slip was placed on each slide and the slides were sealed with fixative. The slides were examined using a Nikon microscope under 200-, 400-, and 1000-power magnification. Pollen identification was made using Kapp's Pollen and Spores (1969) and the comparative collection of Southwestern pollen types in the ethnobotany lab. An attempt was made to reach a count of 200 pollen grains for each sample in order to derive relative pollen frequencies for the interpretation of the pollen record (Barkley 1934).

When the slides were scanned with the microscope, it was found that the samples were still laden with humic debris and charcoal, making the location and identification of pollen very difficult. As a consequence, the debris was "floated" from the samples using a dispersant (Calgon in a 5 percent aqueous solution) followed by successive rinses with distilled water. As a result, concentrations of pollen two to three times greater were achieved.

The pollen was counted and the absolute pollen ratio was computed (Stockmarr 1971). The absolute pollen ratio is the ratio of fossil pollen to the known quantity of *Eucalyptus* pollen.

$$\text{Absolute pollen ratio} = \frac{\text{Number of fossil grains} \times \text{number of exotic grains}}{\text{Number of exotic grains} \times \text{total grams in sample}}$$

The ratios indicated that pollen was poorly preserved in all the prehistoric samples and well preserved in the two modern samples.

Modern Pollen

Plant taxa represented by pollen in the modern control samples are locally abundant species that produce copious amounts of pollen (Table 5.3). For example, the dominant pollen types are the Cheno-Ams, a group of largely herbaceous or shrubby plants that produce a relatively large amount of pollen. They may influence the pollen rain even in locations where they are not abundant. Plants that comprise these taxa are members of the goosefoot family, or Chenopodiaceae, and the genus *Amaranthus*, in the Amaranthaceae. Because pollen of the different species of this group are very similar morphologically, they are not easily distinguished using light microscopy and are thus placed in a single category. Common taxa that grow at low elevations are herbs such as pigweed, or amaranth (*Amaranthus* sp.), goosefoot

Table 5.3. Results of pollen analysis of the Fairchild site samples

	PERCENTAGE			ACTUAL COUNT	
	Modern Ground Surface			1-2-7/1	Test Unit 1W SW 1/4, Level 5
	FS 299	FS 300	FS 303	FS 297	FS 39
Arboreal Pollen					
Pinus sp. (pine)	7	14	12	3	8
Juniperus sp. (juniper)	2	2	3	-	-
Picea sp. (spruce)	<1	-	-	-	-
Quercus sp. (oak)	2	-	2	-	-
Prosopis sp. (mesquite)	4	4	9	3	1
Salix sp. (willow)	-	-	1	-	-
Ulmus sp. (elm)	-	<1	-	-	-
Carya sp. (hickory/pecan)	-	-	1	-	-
Nonarboreal Pollen					
Gramineae (grasses)	2	5	6	4	1
Cheno-Ams (chenopodium/ amaranth)	56	53	41	44	25
High-spine composites	2	3	3	-	1
Low-spine composites	6	5	7	3	1
Ephedra sp. (Mormon tea)	<1	1	<1	-	1
Artemisia sp. (sage)	-	-	-	-	1
Sarcobatus sp. (greasewood)	1	-	2	-	-
Larrea tridentata (creosote bush)	12	10	19	3	5
Fouquieria splendens (ocottillo)	<1	-	1	-	-
Sphaeralcea sp. (globemallow)	-	-	<1	-	-
Liliaceae (lily family)	<1	-	-	-	-
Leguminosae (legume family)	-	-	<1	-	-
Unidentified	4	6	2	2*	2
Total pollen grain count	208	221	216	62	46
Absolute number of grains per gram of soil	14,387	9,674	13,010	7,638	8,906

Percentages are used to describe samples with 200 or more grains of pollen (those taken from modern surface); actual counts are used to describe the samples with less than 200 pollen grains (those from subsurface proveniences).

* includes cf. Cactaceae (cactus family)

(Chenopodium sp.), and shrubs such as winterfat (Eurotia lanata) and saltbush (Atriplex sp.).

The pollen of grasses (Graminae) and herbaceous plants in the sunflower family (notably an Ambrosia type, or ragweed) are also present. Pollen of creosote bush and mesquite reflect the on-site shrub and tree vegetation. Small amounts of Mormon tea (Ephedra sp.), greasewood (Sarcobatus vermiculatus), and ocotillo represent taxa from the low elevations near the site. Tree species consist of pine, juniper, oak (Quercus sp.), and spruce (Picea sp.) from the nearby mountains. The pollen record reflected by the taxa encountered indicate that pollen from both locally abundant taxa and taxa growing at a distance to the site (e.g., pine) are present and that the occurrence is differential. That is, not all plant types growing in the site area are represented. This information is useful because the fossil record may be examined with these limitations in mind.

A comparison of the samples from inside and outside the right-of-way shows little variability. The same taxa dominate -- Cheno-Ams, pine, creosote bush, and mesquite -- and the frequencies of the other pollen types are similar (Table 5.3). Rather than indicating prehistoric economic activity, the surface pollen represents the modern flora.

Fossil Pollen

Although no thermal features or charcoal concentrations were noted beneath the fire-cracked rock concentrations, much microscopic charcoal was found in the samples. In fact, charcoal was abundant in the fossil samples to the extent that it was not possible to concentrate enough pollen to ultimately obtain a 200-grain count, even after flotation of charcoal in a dispersant. As well, preservation was poor. The fossil pollen was considerably more weathered in appearance than the modern pollen and, in comparison, fewer taxa were present. This indicates that the fossil pollen is differentially preserved. Decay-resistant pollen, such as that of the Cheno-Ams, remains while more fragile pollen (e.g., juniper) has deteriorated. All but two of the fossil taxa occur in the modern samples (Table 5.3), suggesting that the presence of the pollen is due to the natural pollen rain rather than to human disturbance or importation of plants bearing distinctive pollen. The examination of the pollen from the fire-cracked rock scatters gives no indication of the possible function of the features; however, the pollen does consist of some of the plants that grew in the vicinity of the site, or at least at a distance to it, and were available for exploitation by the people who used the area. Based on ethnographic analogy, plants of potential utility include the following:

- Cheno-Ams -- food and fuel (Elmore 1944; Hough 1897; Stevenson 1915; Swank 1932; White 1944)
- Grasses -- food and fuel (Elmore 1944; Murphey 1959; Whiting 1966)
- Pine -- food and fuel (Jones 1930; Stevenson 1915; Swank 1932; Whiting 1966)

Sunflower family -- food, fuel, and dyes (Castetter 1935; Elmore 1944; Heiser 1951; Robbins et al. 1916)

Mormon tea -- beverage (Balls 1970; Murphey 1959)

Sage -- medicine and food (Elmore 1944; Fewkes 1896; Robbins et al. 1916)

Creosote bush -- medicine (Castetter and Underhill 1935; Curtin 1949; Jones 1930; Russell 1908)

Mesquite -- food and fuel (Elmore 1944; Havard 1895; Newberry 1887)

Cactus family -- food (Castetter and Underhill 1935; Elmore 1944; Havard 1895)

As well, several exploitable plant resources are located within a short distance of the Fairchild site. The nearby mountains could provide acorns, juniper berries, and piñon nuts, among other things. Deciduous trees in riverine canyons, such as Dog Canyon, could provide more acorns, hickory/ pecan, and walnuts. Yucca fruits, leaves, and hearths; mesquite beans; and cacti fruit from plants growing on the alluvial slope would have been available as well. The ethnographic literature reveals that most of these plants could be gathered in quantity and heat-treated as a means of processing to consume readily, to parch as a means of preservation, to reduce in quantity in order to concentrate, or to remove toxins. It seems likely that the fire-cracked rock concentrations are the residue of food-processing activities. It may be difficult to discern a specific function because the area may have been used repeatedly for the processing of different plant foods. Variations in pit depth, heat source (rocks or coals), and amount of foodstuffs processed would affect the ultimate appearance of the fire-cracked rock scatters.

For example, oaks are extremely productive wild tree crops. A large tree can produce 500-1000 lbs of acorns. The California Indians were known to collect large quantities of acorns during the autumn bearing season and to store them for winter use. To rid the acorns of tannin and to render them palatable, they were heat-treated.

> The most common method was to remove the acorn hull, grind the interior "meat" into a flour in a stone mortar or on a flat grinding slab (metate) and then pour warm water repeatedly over the flour to leach out the tannin. A shallow concave pit was dug in the earth, lined with grass or conifer needles, and the acorn meal was put in the pit. The water was heated in a basket by dropping in hot stones that had been placed in a fire, and it was gently poured over the meal. Several such applications of warm water percolating through the meal sufficed to rid it of the bitter taste. The leached meal was next mixed with water in a watertight basket and boiled by dropping hot stones, usually about fist size, into the gruel. The cooked mush was then edible, and was either drunk or eaten with a spoon made of half a bivalve shell, or carved of wood or antler [Heizer and Elsasser 1980:92-93].

Heizer and Elsasser calculated that a family of five, working 8 hours a day for 14 days, could collect 33,600 lbs of acorns in a good bearing year (oaks bear abundantly every two or three years), enough for several years' storage (Heizer and Elsasser 1980:95-96).

Mesquite beans, one of the most important dietary items for the desert-dwelling Pima, were sometimes prepared by separating the beans from the pod and parching them by tossing them up in a pan of live coals. They were then eaten or ground into a meal (Russell 1908:44-45). Screwbean mesquite (*Prosopis pubescens*) was prepared for storage by placing the bean harvest in a pit lined with the green leaves of arrowweed (*Pluchea sericea*). In some cases the pits were 15 ft across and 4-5 ft deep. The beans were generally placed in layers between leaves of arrowweed or cocklebur (*Xanthium* sp.). Sometimes water was sprinkled in the beans and when the pit was filled it was banked with earth and left to cook (Balls 1970:22-23).

Piñon nuts, another food staple, were gathered in great quantities and stored for winter use. They were toasted to enhance the flavor and to preserve them (Stevenson 1915:70). The Apache would gather the seed-bearing cones and burn the nuts out, either at the gathering location or after their return home. In the process of charring the cones the nuts were roasted, then beaten out of the cones (Reagan 1928:146).

The Coahuilla of southern California would cook the buds (young fruit) of cactus (*Opuntia basilaris*) by steaming them with hot stones in a pit for 12 hours or more (Barrows 1977:67). Fruits of *Opuntia versicolor* were prepared by the Pima by roasting in pits (Castetter 1935:36-37). The flower buds of the cholla (*Opuntia* sp.) and the fleshy joints were pit-baked by the Papago. According to Castetter and Underhill, the women went out in parties to gather the crop. The buds or joints were collected in coiled basket bowls and brought to a central point. When the picking ended, a pit was dug and stones were placed in it and heated. A mesquite fire was used since creosote bush, another fuel source, burned too quickly. When the stones were hot they were removed and the pit was lined with inkweed (*Dondia nigra*) or with grass. Next a layer of cactus buds or joints was placed in the pit, the stones were replaced, and the pit was filled with alternate layers of inkweed or grass and covered with earth. The Papago would camp all night while the cactus baked (Castetter and Underhill 1935:16). Yucca hearts were baked in a similar manner.

Conclusions

Although the analysis of pollen from the fire-cracked rock concentrations gives no indication of plant foods used directly by site occupants, it indicates that certain plant resources were available for exploitation in the area. Many of these plant foods, such as piñon nuts, cactus fruits and pads, acorns, and mesquite beans, were prepared by pit-baking, a possible function of what today may be the remains of this activity -- fire-cracked rock scatters. The lack of large charcoal pieces, a clue to heat processing, may be due to weathering, disturbance, and/or erosion; however, a great quantity of microscopic charcoal was noted. In the analysis of the few charcoal remains from FS 309 in the previous section of this chapter, Toll notes that the charcoal was very fragmentary and distorted, indicating that wood (both coniferous and nonconiferous) was burned green or in a hot fire.

Analysis of Radiocarbon Samples

The lack of charcoal in large enough quantities to sample for radiocarbon dating has limited our ability to obtain chronometric dates for the excavated proveniences. Six radiocarbon samples were submitted to Beta Analytic Inc.; however, only one was large enough to date. This sample was a combination of FS 11 and FS 27, both of which were collected from Level 2 in COE Test Unit 1. Even this combined sample required extended counter time.

> [The] charcoal was pretreated by first picking out any rootlets that might be present. The sample was then given a hot acid wash to eliminate carbonates. It was repeatedly rinsed to neutrality and subsequently given a hot alkali soaking to take out humic acids. After rinsing to neutrality, another acid wash followed and another rinsing to neutrality. The following benzene synthesis and counting proceeded normally. The sample was small; we obtained only 0.5 gram carbon for the counter. As requested, it was given extended counter time (four times the normal amount) to reduce the statistical error as much as practical [Tramers letter to Anyon, 17 September 1984].

The sample obtained from the combination of FS 11 and FS 27 (Beta-10248) produced a date of 1090 BP ± 90. No corrections have been made for DeVries effect, reservoir effect, or isotope fractionation in nature. This date converts to AD 860 ± 90, a late Mesilla phase date.

Petrographic Analysis of Ceramic Technology

by Dale R. Rugge

The research goals of ceramic petrographic analysis at the Fairchild site are twofold. First is to determine whether unspecific brown and El Paso painted wares have similar or different temper and technology than the Mimbres Black-on-white ceramics. This is tied to identifying the source areas of tempering materials and determining whether or not the Fairchild ceramics were of local or nonlocal manufacture. Second, this analysis is a step towards establishing whether or not Mimbres Black-on-white ceramics were traded into the Tularosa Basin from manufacturing locations in the Mimbres Valley as is often believed to be the case (e.g., LeBlanc and Whalen 1980). This petrographic analysis of ceramics from the Fairchild site should be regarded as a pilot study within the context of further analyses of ceramics in the Tularosa Basin and the Hueco Bolson (Rugge 1977, 1985a, 1985b). A regional perspective is essential given the perceived nature of prehistoric adaptations in south central New Mexico.

Methods

The Fairchild sample consists of 16 unspecified brownware sherds, one El Paso Polychrome sherd, one El Paso Bichrome sherd, and 12 Mimbres Black-on-white sherds. A thin section of standard thickness (30 microns) was cut from each sherd and mounted in cross section. Each sherd was impregnated with epoxlite before mounting to minimize the effects of plucking during the grinding procedure and to insure that the problem of open areas in the thin section would be negligible during analysis. The mounting medium had an index of refraction of 1.56. Sherds used in this analysis are identified by their FS number (see Appendix F). If more than one sherd were analyzed from any FS number each sherd is identified by a consecutive suffix number (e.g., FS 293-3).

Analysis was performed on a Zeiss stereo petrographic microscope, equipped with five objective lenses and a scaled ocular, provided by the University of New Mexico Geology Department. Each thin section slide was put on a point-count stage and transects were made at intervals predetermined by the stage settings until 200 individual observations were made (Chayes 1956). Whatever material was present directly in line with the cross hairs was recorded for each observation. The entire thin section was considered the universe for the area of the sample transects, thus the point count data allowed for a quantification of temper and matrix proportions present in each thin section. An effort was made not to record observations near the slipped or polished surface of a sherd to avoid biasing data in favor of the clay matrix. During each point count information on 24 attributes was recorded. These attributes are specimen number, ceramic type, proportion of matrix, proportion of temper, maximum temper particle size, temper particle angularity, size sorting characteristics, 16 minerals, and a rock category. Two types of comments are noted, one specifically for the presence of mineral categories not recorded during the point count and the other for general comments about the sample allowing for the description of rock types and the addition of information relevant to other attributes.

By performing point counts, the analyst is obliged to identify whatever falls beneath the cross hairs. This is occasionally not possible because temper fragments or grain sizes may be too small to observe or alteration may mask mineral characteristics. In the Fairchild thin sections less than one percent of the point counts contained unidentified materials as a result of this problem. Minerals and rocks recorded in these circumstances were noted as unidentified fragments. Despite the problems involved in performing point counts, it is suggested that this method is essential to create a large quantitatively comparable data base (Rugge 1984).

Unspecific Brownwares

All the unspecific brownware sherds sampled are tempered with a Granite (Tables 5.4, 5.5). This Granite approaches a gneissic texture, but most of the temper fragments are too small to make an interpretation of the parent rock's overall texture. Nevertheless, a xenomorphic granular texture is notable for this Granite since most Granites are hypidiomorphic. The angularity of the temper particles suggests that the Granite was being crushed in preparation for use as tempering material. In addition, the predominance of a bimodal distribution of particle size (Table 5.4) would not be expected if sands or natural temper were used. This temper technology is nearly identical to that found for the brownwares at the Three Rivers site (Rugge 1977).

Two distinct mineralogical associations are defined for the granitic temper noted in this study. The first, Granite A, is characterized by Microperthite dominating over Quartz. In Granite A the Microperthite is moderately to heavily altered and other minerals indicative of alteration are present (predominantly Allanite and Epidote). The second, Granite B, is characterized by Quartz and Microperthite occurring in nearly equal amounts or Quartz dominating. In Granite B, the Microperthite is only lightly to moderately altered and other minerals indicative of alteration are less common than in Granite A or nonexistent. Fourteen of the 16 unspecific brownware sherds fit well into one of these two categories (Table 5.6). Figure 5.2 shows the separation of the two temper categories based on the relative abundance of Microperthite and Quartz.

Table 5.4. Data for unspecific brownwares (U.B.), El Paso Bichrome (E.P.B.), El Paso Polychrome (E.P.P.)

Specimen Number	Ceramic Type	Estimated volume % from point count: Matrix*	Temper*	Maximum Grain Size (mm)	Temper Shape Angularity	Temper Particle Size Distribution: Sorting	Mineral* and Rock** Presence as Percentage of Total Point Count Sample: Qrtz	Mcpth	Orth	Mcln	Plag	Epid	Alnt	Sphe	Opaq	Biot	Chal	Musc	Calc	RK1	RK2
FS 3	U.B.	70.0	30.0	1.3	Angular	Bimodal	2.5	13.0	-	-	-	-	0.5	1.0	0.5	-	-	-	-	12.0	-
FS 21	U.B.	58.0	42.0	1.4	Angular	Bimodal	9.0	15.0	-	-	0.5	-	0.5	0.5	1.5	-	-	-	-	15.0	-
FS 170	U.B.	67.5	32.5	1.4	Angular	Bimodal	9.0	10.5	-	-	1.0	-	1.0	0.5	2.5	-	-	-	-	8.0	-
FS 171	U.B.	64.0	36.0	1.5	Angular	Bimodal	8.0	15.5	-	0.5	-	-	-	-	0.5	-	-	-	-	11.5	-
FS 174	U.B.	59.5	40.5	1.5	Angular	Bimodal	5.5	17.0	-	-	1.5	-	0.5	-	0.5	-	-	-	-	15.5	-
FS 234	U.B.	70.0	30.0	1.8	Angular	Bimodal	14.5	7.5	-	-	0.5	-	-	-	-	-	-	-	-	7.50	-
FS 235	U.B.	64.5	35.5	1.7	Angular	Bimodal	7.0	9.0	-	-	0.5	1.5	1.0	-	-	-	-	-	-	16.5	-
FS 244	U.B.	67.0	33.0	1.0	Angular	Seriate	11.5	16.0	-	-	1.0	-	-	-	-	-	-	-	-	4.5	-
FS 265-2	U.B.	65.5	34.5	1.1	Angular	Bimodal	10.5	10.0	-	-	-	-	-	-	-	-	-	-	-	14.0	-
FS 269	U.B.	64.0	36.0	1.2	Angular	Bimodal	14.0	15.0	-	-	0.5	-	-	0.5	-	-	0.5	0.5	-	4.5	-
FS 287	U.B.	70.0	30.0	1.6	Angular	Bimodal	14.5	9.5	-	-	1.5	-	-	-	-	-	-	-	-	4.5	-
FS 293-5	U.B.	64.5	35.5	1.6	Angular	Bimodal	19.0	11.5	-	-	0.5	-	-	-	-	-	0.5	-	-	4.0	-
FS 293-6	U.B.	65.0	35.0	1.2	Angular	Bimodal	5.0	17.0	-	-	1.5	0.5	0.5	-	0.5	-	-	-	-	9.5	0.5
FS 293-7	U.B.	66.5	33.5	1.8	Angular	Bimodal	2.0	11.5	-	-	-	-	1.5	-	0.5	1.0	-	-	-	17.0	-
FS 312	U.B.	75.5	24.5	1.3	Subangular	Seriate	5.5	6.5	-	-	0.5	-	-	-	-	-	1.0	-	-	11.0	-
FS 319	U.B.	73.0	27.0	1.3	Angular	Bimodal	8.0	7.0	-	-	-	-	-	0.5	-	-	0.5	-	-	11.0	-
FS 293-4	E.P.B.	58.5	41.5	2.0	Angular	Bimodal	5.0	15.0	-	-	1.5	-	1.0	-	1.0	-	0.5	-	-	16.5	1.0
FS 258	E.P.P.	59.5	40.5	1.6	Angular	Unimodal-Normal	4.5	13.0	-	-	0.5	-	0.5	-	0.5	-	-	-	-	21.5	-

* Key: Qrtz = Quartz
Mcpth = Microperthite
Orth = Orthoclase
Mcln = Microcline
Plag = Plagioclase
Epid = Epidote
Alnt = Allanite
Sphe = Sphene
Opaq = opaque minerals
Biot = Biotite
Chal = Chalcedony (mineral)
Musc = Muscovite
Calc = Calcite
RK = rock

** for a description of each particular rock see Table 5.5

Table 5.5. Comments for unspecific brownware (U.B.), El Paso Bichrome (E.P.B.), and El Paso Polychrome (E.P.P)

Specimen Number

FS 3

Muscovite present.
Rock #1 is a fine-to-medium grained xenomorphic granular granite composed largely of heavily altered Microperthite with lesser amounts of Quartz, and minor accessory Sphene, Allanite and opaques.

FS 21

Microcline present.
Rock #1 is a fine-to-medium grained xenomorphic granular granite composed of moderately altered Microperthite, lesser amounts of Quartz, a little heavily altered Plagioclase and minor accessory Sphene and opaques.

FS 170

Microcline and granophyre present.
Rock #1 is a fine-to-medium grained xenomorphic granular granite composed of approximately equal amounts of lightly to moderately altered Microperthite and Quartz. A little Plagioclase is present and minor amounts of Biotite, Allanite and opaques are present. Several rounded fragments of a carbonaceous were present in this slide (limestone or dolomite).

FS 171

Sphene and a little Antiperthite present.
Rock #1 is a fine-to-mostly medium grained granite with xenomorphic granular texture. The rock is composed primarily of moderately to heavily altered Microperthite with areas of Quartz.

FS 174

Rock #1 is a fine-to-medium grained xenomorphic granular granite composed primarily of heavily altered Microperthite with lesser amounts of Quartz, a little heavily altered Plagioclase and minor Allanite and opaques.

FS 234

Sphene and opaques present.
Rock #1 is a medium-grained xenomorphic granular granite composed primarily of Quartz, lesser amounts of lightly to moderately altered Microperthite, a little Plagioclase and minor accessory Muscovite.

(continued)

Table 5.5. (continued)

Specimen Number
FS 235
Opaques present. Rock #1 is a fine-grained xenomorphic granular granite composed of Microperthite which is heavily altered, lesser amounts of Quartz, a little heavily altered Plagioclase and minor accessory Epidote, Allanite and opaques.
FS 244
Muscovite and opaques present. Rock #1 is a medium-grained xenomorphic granular granite composed of lightly altered Microperthite, lesser amounts of Quartz, a little Plagioclase and minor accessory Muscovite.
FS 265-2
Epidote, Allanite, Sphene, and a little Antiperthite present. Rock #1 is a fine-to-medium grained xenomorphic granular granite composed of moderately altered Microperthite, lesser amounts of Quartz, a little heavily altered Plagioclase and minor accessory Epidote.
FS 269
Biotite present. Rock #1 is a fine-to-medium grained xenomorphic granular granite composed of approximately equal amounts of lightly to moderately altered Microperthite and Quartz.
FS 287
Biotite, opaques. Rock #1 is a fine-to-mostly medium grained granite with xenomorphic granular texture. The rock is composed of Quartz primarily with large areas of lightly to moderately altered microperthite. A little Plagioclase is present.
FS 293-5
Opaques present. Rock #1 is a medium grained xenomorphic granular granite composed of Quartz, lesser amounts of lightly altered Microperthite and a little Plagioclase.

(continued)

Table 5.5. (continued)

Specimen Number
FS 293-6 Some Antiperthite present. Rock #1 is a fine-to-medium grained xenomorphic granular granite composed of moderately to heavily altered Microperthite, lesser amounts of Quartz, a little heavily altered Plagioclase and minor accessory Epidote and opaques. Rock #2 is a single rounded fragment of an andesitic rock.
FS 293-7 Epidote and some Antiperthite present. Rock #1 is a fine-to-medium grained xenomorphic granular granite composed of Microperthite which is heavily altered, lesser amounts of Quartz, a little heavily altered Plagioclase and minor accessory Epidote.
FS 312 Sphene present. Rock #1 is a fine-to-medium grained xenomorphic granular granite composed of about equal amounts of lightly to moderately altered Microperthite and Quartz. Minor accessory opaques are present.
FS 319 Epidote, Biotite and opaques present. Rock #1 is a medium-grained xenomorphic granular granite composed of lightly to mostly moderately altered Microperthite and Quartz in about equal amounts.
FS 293-4 Opaques present. Rock #1 is a fine-to-medium grained xenomorphic granular granite, composed primarily of heavily altered Microperthite with lesser amounts of Quartz, a little altered Plagioclase and minor accessory Sphene and Epidote. Rock #2 is an andesitic rock.
FS 258 Sphene and Epidote present. Rock #1 is a fine-to-mostly medium grained xenomorphic granular granite composed primarily of heavily altered Microperthite with lesser amounts of Quartz and minor accessory Epidote, Allanite, Biotite and opaques.

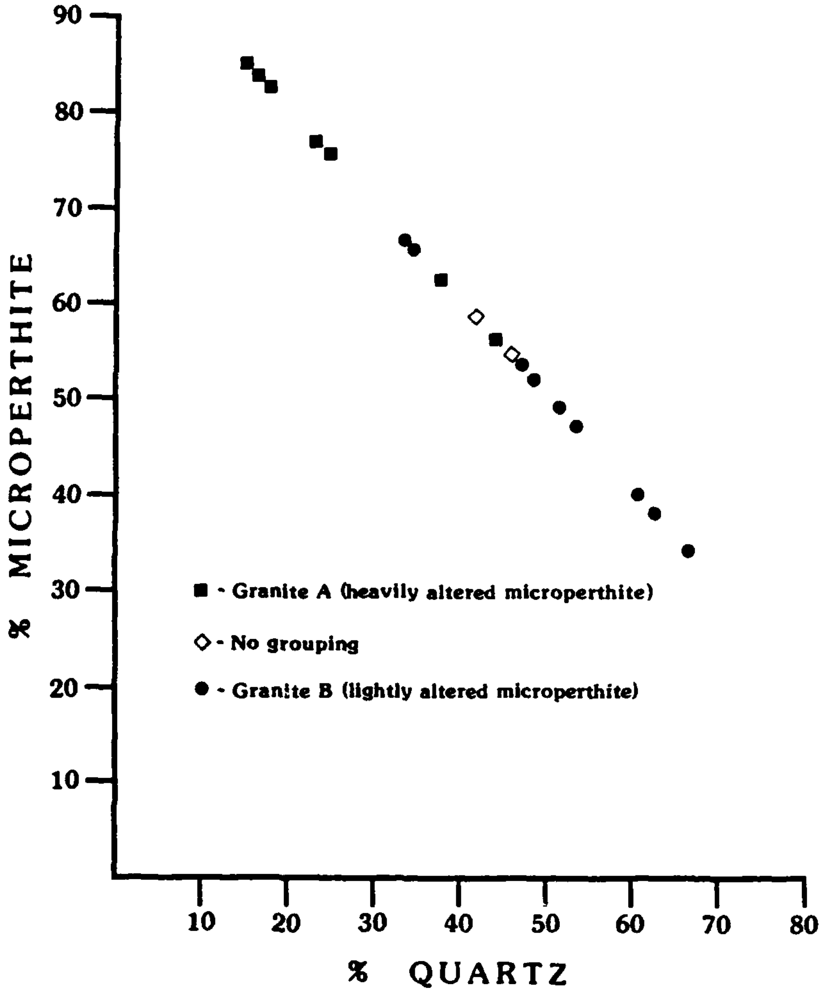


Figure 5.2. Relative abundance of Microperthite to Quartz for unspecific brownwares and El Paso painted wares

Table 5.6. Unspecific brownware, El Paso Bichrome, and El Paso Polychrome, listed by Granite temper association.

Granite A	Granite B
FS 171	FS 234
FS 174	FS 265-2
FS 21	FS 269
FS 235	FS 287
FS 293-6	FS 293-5
FS 293-7	FS 312
FS 3	FS 319
FS 293-4 (EPB)	
FS 258 (EPP)	

The nearest outcrop of Granite to the Fairchild site is in excess of 48 km (30 miles) to the west, along the eastern escarpment of the San Andres Mountains. This Granite is Precambrian in age and occurs along the entire base of the eastern escarpment of the San Andres Mountains (Kottlowski et al. 1956). Local outcrops of Precambrian Granite also occur along the eastern and southeastern edges of the Organ Mountains (Dunham 1935). The mineralogy of the Granite in the Organ Mountains is similar to Granite A but texturally is more coarse-grained than Granite A. Also Biotite was found in all the Granite from the Organ Mountains but was found in only one of the unspecific brownwares (FS 293-7). Therefore the Granite of the Organ Mountains does not appear to be the source of the temper found in the unspecific brownwares. Although the large body of Tertiary intrusive rocks comprising the majority of the Organ Mountains are in a generic sense granitic, technically they are Monzonites, and contain more Plagioclase Feldspar than Quartz. Therefore these rocks are mineralogically different from the tempering materials in the Fairchild brownwares. Kottlowski et al. (1956) describe some samples of Granite and Granite Gneiss from the San Andres Mountains in the vicinity of Rhodes Canyon, which are mineralogically dissimilar from the tempering materials found in the Fairchild unspecific brownwares. Kottlowski also describes the Precambrian rocks from Sulphur Canyon to Hembrillo Canyon, as rocks that are somewhat metamorphosed and mineralogically contain significant amounts of Mica. The source of the tempering material for the Fairchild brownwares therefore appears to lie somewhere in the southern portion of the eastern escarpment of the San Andres Mountains. To narrow this area further would likely require the analysis of rock samples from suspected source areas, an analysis beyond the scope of this report.

Although no direct quantitative comparison can be made between the Fairchild unspecific brownwares and the Jornada Brown sherds analyzed from the Three Rivers site (Rugge 1977), the mineralogic similarities between Granite A at the Fairchild site and the temper in some of the Jornada Brown sherds is sufficient to indicate that ceramics at both sites used the same general rock unit as a temper source. It is possible that some of the Three Rivers site Jornada Brown sherds are tempered with material that is identical to Granite A, noted on the Fairchild site. However, particle size in the Jornada Brown samples averages 0.7 mm larger than that of the Fairchild brownwares. This difference in particle sizes is contrary to the traditional definition of Jornada Brown as being more fine-grained than its southern counterpart.

El Paso Bichrome and El Paso Polychrome

Only two sherds were analyzed from these ceramic types, one Bichrome and one Polychrome (Tables 5.4, 5.5). Both were tempered with crushed granite which mineralogically and texturally falls into the Granite A category (Table 5.6). These sherds exhibit a high degree of consistency with the temper technology used in the production of the brownwares and conclusions pertaining to unspecific brownware also holds true for these ceramics.

Mimbres Black-on-white

The high degree of consistency in the temper technology used in the production of unspecific brownwares, El Paso Bichrome, and El Paso Polychrome recovered from the Fairchild site is not the case for Mimbres Black-on-white ceramics. Mimbres ceramics sampled in this study show an enormous range of variability in the tempering materials used in their production (Tables 5.7, 5.8). This variability is not only mineralogic but occurs with respect to temper particle size, shape and amount of temper present. Maximum particle size ranges from 0.7 mm to 1.5 mm. In some specimens tempering materials are rounded indicating the use of stream or dune sands; however, in other specimens the temper is decidedly angular. The amount of temper present ranges from 18.5 percent to 41.5 percent of the area of the thin section. Some specimens are composed of tempering materials derived from one rock, while others contain fragments of five or more distinct rock types. Before trying to interpret these findings, let us first turn to the problem of source areas for some of the tempering materials.

Five of the Mimbres Black-on-white sherds (FS 256, FS 581, FS 284, FS 264 and FS 272) contain tempering materials derived from heterogeneous mature sands, all of which are mineralogically quite different. In general it is very difficult to determine possible source areas when tempering materials are so varied. These sands may have traveled quite some distance from their original source areas, and mineralogic variability is so great in the south central part of New Mexico that rock mineralogies and textures can be duplicated at many localities. No attempt will therefore be made in this report to assign source areas for temper composed of heterogeneous mature sands.

Table 5.7. Data for truly Indeterminate Mimbres B/W (MTI), Mimbres B/W Indeterminate Styles II/III (MII/III), and Mimbres B/W Style III (MIII).

Specimen Number	Ceramic Type	Estimated volume % from point count: Matrix*	Tamper*	Maximum Grain Size (mm)	Temper Shape Angularity	Temper Particle Size Distribution Sorting	Mineral* and Rock** Presence as Percentage of Total Point Count Sample: Qrtz	San	Mcpth	Orth	Mcln	Plag	Sphe	Opaq	Horn	Oxyh	Biot	Chal	Musc	Calc	RK1	RK2	RK3	RK4
FS 157	MTI	60.5	39.5	1.1	Subangular	Seriate	10.0	4.0	-	-	-	2.5	1.0	-	-	-	-	-	-	-	22.0	-	-	-
FS 167	MTI	71.0	29.0	0.9	Subangular	Seriate	7.5	-	3.5	-	-	-	-	-	-	-	-	-	-	0.5	17.5	1.5	1.0	-
FS 233	MTI	73.5	26.5	1.1	Subangular	Seriate	2.5	1.0	-	0.5	-	2.0	-	0.5	-	-	-	-	-	-	17.0	1.0	1.0	1.0
FS 256	MTI	78.0	22.0	0.9	Subangular	Seriate	5.0	-	-	-	-	7.0	-	-	-	-	-	1.0	-	-	4.0	4.5	0.5	-
FS 265-1	MTI	60.5	39.5	1.3	Angular	Seriate	-	-	-	6.5	-	1.0	-	0.5	-	-	-	1.0	7.5	-	18.5	-	-	-
FS 272	MTI	77.5	22.5	1.0	Subangular	Seriate	12.0	-	-	0.5	1.0	1.0	-	-	1.0	-	-	-	-	1.5	3.5	1.0	1.0	0.5
FS 293-3	MTI	58.5	41.5	1.5	Subangular	Seriate	10.5	3.0	-	-	-	6.5	-	-	-	-	-	-	-	-	21.0	0.5	-	-
FS 264	MII/III	81.5	18.5	1.5	Subangular	Seriate	10.0	-	-	-	-	1.5	-	-	-	1.0	-	1.5	-	-	4.0	0.5	-	-
FS 293-1	MII/III	68.0	32.0	.9	Angular	Seriate	8.0	-	-	6.0	0.5	6.5	-	3.0	0.5	-	0.5	-	-	-	7.0	-	-	-
FS 293-2	MII/III	76.0	24.0	1.5	Subangular	Seriate	7.0	1.5	-	-	-	5.5	-	-	-	-	-	-	-	-	9.5	0.5	-	-
FS 284	MIII	75.5	24.5	1.4	Subangular	Seriate	6.0	1.0	-	-	-	3.5	-	1.5	-	-	-	-	-	-	6.0	4.0	3.0	-
FS 581	MIII	81.0	19.0	0.7	Subangular	Seriate	8.0	-	0.5	2.0	-	3.0	-	2.0	-	-	-	1.0	-	-	1.5	1.0	-	-

* Key: Qrtz = Quartz
San = Sanidine
Mcpth = Microperthite
Orth = Orthoclase
Mcln = Microcline
Plag = Plagioclase
Sphe = Sphene
Opaq = opaque minerals
Horn = Hornblende
Oxyh = Oxyhornblende
Biot = Biotite
Chal = Chalcedony (mineral)
Musc = Muscovite
Calc = Calcite
RK = rock

** for a description of each particular rock see Table 5.8

Table 5.8. Comments fields for Mimbres series samples

Specimen Number

FS 157

Rock #1 is a Rhyolite composed of anhedral Quartz in a glassy matrix containing areas of spherulites (radial growths).

FS 167

Muscovite and Plagioclase present.
Rock #1 is probably rhyolitic. It contains anhedral fine-grained Quartz and Potash Feldspar that is moderately altered in a nearly cryptocrystalline groundmass that is probably also Quartz and Potash Feldspar. Rock #2 consists entirely of a heavily clouded cryptocrystalline groundmass. Rock #3 consists of Quartz and Potash Feldspar (probably Orthoclase). The Microperthite in the slide is moderately altered and the intergrowth is poorly developed and masked, the host appears to be Orthoclase.

FS 233

Rock #1 is a Rhyolite. It contains Sanidine and Quartz microphenocrysts, Plagioclase phenocrysts microglomeroporphyritic anhedral Quartz in a slightly clouded microcrystalline groundmass of Quartz, Potash Feldspar and minor opaques. A few fragments show a radial fibrous habit (spherulites). Rock #2 is a fine-grained xenomorphic granite. Rock #3 is probably a latite with a felsitic matrix containing opaques. Rock #4 is andesitic and consists of Plagioclase laths with interstitial opaques.

FS 256

Augite present.
Rock #1 consists of Plagioclase phenocrysts in a clouded groundmass of feldspar microlites and opaques. This rock is probably an andesite. Rock #2 is a cryptocrystalline very clouded rock and can only be classified as probably volcanic. Rock #3 is cryptocrystalline and contains much Quartz and opaques.

FS 265-1

Rock #1 is a xenomorphic granular gneissic granite. It is composed of heavily altered Orthoclase which is microperthitic, Quartz and abundant Muscovite. There are areas of fine-grained granular Quartz. The rock appears to have a heavily altered matrix which probably is selective weathering of the Potash Feldspar.

(continued)

Table 5.8 (continued)

Specimen Number
FS 272
Andesitic rock fragments, Biotite and opaques present. Rock #1 is a xenomorphic granular granite containing Quartz and microperthitic Orthoclase. Rock #2 is a fine-grained Quartz siltstone. Rock #3 consists of a felsitic mass of Quartz, Potash Feldspar and minor opaques. Rock #4 is an unidentifiable clouded cryptocrystalline rock. Some of the Quartz in this slide has Quartz overgrowths indicating derivation from a Quartzite.
FS 293-3
Rock #1 is a rhyolitic tuff and consists of angular fine-grained Quartz, Sanidine(?), Plagioclase and a little Muscovite in a clouded cryptocrystalline matrix. Rock #2 is a single fragment of Plagioclase and Orthoclase or Sanidine. A little of the Sanidine in this slide may be microperthitic Orthoclase and appears to be moderately altered but the low 2V measured on several grains is indicative of Sanidine.
FS 264
Some rock fragments with radial fibrous habit (spherulites) present. Rock #1 consists of Plagioclase phenocrysts in a matrix of stumpy feldspar laths with interstitial opaques, Oxyhornblende and a Pyroxene. The rock is probably an andesite or latite. Rock #2 is a Quartzite.
FS 293-1
Rock #1 is a medium-grained hypidimorphic granular granite or quartz monzonite consisting of microperthitic moderately altered Orthoclase, Quartz and Plagioclase.
FS 293-2
A little poorly developed Microperthite may be present. Rock #1 is rhyolitic and consists of anhedral Quartz and some Plagioclase in an altered cryptocrystalline matrix that is clouded with opaques. The alternation appears in part to be of the Potash Feldspar and Quartz. The Sanidine in the slide is moderately altered and a little dusky, but the small 2V is indicative of Sanidine.
FS 284
Rock #1 is probably a tuff and consists of angular fragments of Quartz and Plagioclase in a cryptocrystalline partially glassy matrix. Rock

(continued)

Table 5.8 (continued)

Specimen Number
#2 is also volcanic and consists of Plagioclase, Sanidine, Oxyhornblende and opaques in a microcrystalline matrix that is probably Quartz and Potash Feldspar. This rock may be a latite. Rock #3b consists of radial fibrous cryptocrystalline material (spherulites).
FS 581
Rock #1 is a quartzite. Rock #2 is andesitic and consists of Plagioclase microlites with interstitial opaques. The Microperthite in this slide is heavily altered.

Some of the tempering materials used in the production of Mimbres ceramics recovered from the Fairchild site are mineralogically and texturally very similar to rock occurring in and around the Tularosa Basin. The tempering material in specimen FS 265-1 appears to be a heavily altered Gneissic Granite very similar to material that outcrops in the San Andres Mountains between Sulphur and Hembrillo Canyons (Kottlowski et al. 1956). There are also outcrops of a Gneissic Granite in the Organ Mountains which Dunham (1935) describes as having most of the Orthoclase altered to Sericite. Either of these rock units may be the one used to temper specimen FS 265-1. Specimen FS 157 is tempered with a rhyolitic rock having a glassy matrix and containing some spherulites. Dunham describes just such a rock unit on the southwest side of the Organ Mountains called the Cueva Rhyolite. Thus this sample may indicate production just outside the Tularosa Basin. A different Rhyolite which appears to be the main constituent of a stream sand is used to temper specimen FS 233. In a general way this Rhyolite resembles the Franklin Rhyolite Porphyry (McAnulty 1968), which occurs on the eastern side of the Franklin Mountains in the southern Tularosa Basin. Specimens FS 293-2 and FS 293-3 are tempered with a subangular sand composed primarily of fragments of a rhyolitic Tuff which is similar to the Basal Tuff of the Organ Mountains volcanic sequence described by Dunham (1935). Sample FS 293-1 is tempered with what appears to be an altered Quartz Monzonite, the mineralogy and texture of which is similar to the rock unit that makes up the main body of the Organ Mountains. One specimen, FS 167, is tempered with subangular sands composed primarily of rhyolitic rock fragments that may be tuffaceous. These rock fragments generally resemble those that occur in FS 293-2 and FS 293-3 but the sand in FS 167 has less Plagioclase and includes more Potash Feldspar that is probably plutonic in origin. Given the similarities in the main constituents, however, it is likely that FS 167 was produced with materials occurring in an area close to where the materials used in FS 293-2 and FS 293-3 were procured (perhaps the southwest side of the Organ Mountains).

It is striking that in 12 Mimbres Black-on-white sherds a minimum of 10 different temper mineralogies have been found. This demonstrates two things. First, that a large number and variety of procurement localities existed for the materials used in the production of Mimbres ceramics, and second, that these ceramics were produced over a large area including the possibility of several locations in or around the western edge of the Tularosa Basin. In addition the angularity and unilithologic composition of some Mimbres tempering materials suggests that the practice of crushing rocks may have been used in the production of some Mimbres series ceramics, in contrast to the use of stream sands in several other of the Mimbres sherds.

Attributing tempering materials to particular source localities should be considered tentative at this point. To specifically identify a particular source it is important to obtain samples from potential source areas so that the mineralogic and textural similarities can be verified. This is especially important in the case of volcanic rocks since they constitute a tremendous proportion of the potential rock types useful in the production of ceramics throughout south central and southwestern New Mexico. However, there is compelling evidence which suggests that some of the volcanic materials used in the production of Mimbres ceramics recovered at the Fairchild site may derive from the Organ Mountains.

The identification of source areas for Mimbres Black-on-white temper being within and on the margins of the Tularosa Basin is extremely significant in terms of our understanding of prehistoric ceramic exchange. The present study is the first concerning Mimbres sherds in an area east of what has traditionally been considered the core area of the Mimbres. Rugge (1976) conducted a pilot study of Mimbres Black-on-white ceramic technology on sherds recovered in the Mimbres Valley. The preliminary findings in that report show the use of stream sands composed almost entirely of intermediate to acidic volcanic rock fragments and associated minerals. These stream sands were interpreted as originating in the Mimbres Valley itself. Although no direct quantitative comparison is possible with Rugge's (1976) findings, since no point counts were performed on the Mimbres Valley sherds, it is clear that the temper used in Mimbres Black-on-white sherds found in the Mimbres Valley is different from the temper found in the Mimbres sherds from the Fairchild site. It would therefore appear that the Mimbres Black-on-white ceramics found at the Fairchild site were <u>not</u> manufactured in the Mimbres Valley. This finding has important implications for interpretations of prehistoric ceramic exchange and also for the use of Mimbres ceramic styles to relatively date sites in the Tularosa Basin.

Conclusions

Petrographic analysis clearly demonstrates that the analyzed unspecific brownwares and El Paso painted ceramics from the Fairchild site were manufactured within the Tularosa Basin. The tempering material used in their manufacture is a crushed granitic rock with a high degree of consistency in its preparation. Two distinct mineralogies occur in the granitic tempering material and it is suggested that both granitic types occur in the same general geographic area. The procurement locality for this rock is likely to be in the southern reaches of the San Andres Mountains along the foot of the eastern escarpment. This includes an area north of San Agustin Pass.

In contrast to the unspecific brownwares a tremendous range of variability is found in the tempering technology used to produce Mimbres Black-on-white ceramics. This variability is mineralogic, lithologic, and exists in the grain size and shape, and proportion of the sample composed of temper. There is evidence to suggest that at least some Mimbres ceramics from the Fairchild site are being produced in several different localities in or adjacent to the western edge of the Tularosa Basin in addition to other unknown localities.

Several questions arise from this petrographic analysis. First, why are the unspecific brownwares and El Paso painted wares produced with material exposed over 48 km (30 miles) to the west? Certainly there are clay and temper resources in the nearby Sacramento Mountains whose procurement costs must have been much less for Fairchild site occupants than for materials from the San Andres Mountains. However, if the occupants were highly mobile, seasonally exploiting par icular resources in the vicinity of the Fairchild site, as has been argued elsewhere in this volume, then they may not have produced ceramics at the Fairchild site. The production of ceramics may have fit into other scheduled activities focusing on areas near the procurement localities of the ceramic tempering materials.

Second, did the people who produced unspecific brownwares and El Paso painted wares also produce Mimbres Black-on-white ceramics? This is a complicated question and the answer is not at all clear cut. If they did produce Mimbres ceramics then why did they not use the same tempering materials for both their painted and unpainted ceramics as did the inhabitants of the Three Rivers site? (Rugge 1977). Most of the materials used in the production of the Mimbres wares occur minimally at distances in excess of 64-80 km (40 to 50 mi) from the Fairchild site. Also, why does such tremendous variability exist in the tempering materials used to produce the Mimbres ceramics recovered from the Fairchild site? If, as is suggested elsewhere in this volume, the inhabitants of the Fairchild site were highly mobile groups who visited the area seasonally, specifically during the spring to process succulents, then it may be expected that they would be in contact with other groups during their seasonal rounds. If exchange occurred with many of these other groups and Mimbres ceramics were obtained as an item of trade, then we would expect to see technological variability in the Mimbres wares reflecting diverse manufacturing locations and exchange relationships. It should be borne in mind that these interpretations are speculative in nature but that available petrographic evidence can be used to support the view of a highly mobile population using the Fairchild site, who were in contact with a number of other groups.

Monitoring Pipeline Construction

by Andrew P. Fowler

On December 10, 1984, Dr. Joseph Winter and Mr. Roger Anyon (OCA), and Dr. John Schelberg (COE) visited the Fairchild site to inspect the effects of unmonitored blading of the pipeline route through the right-of-way. No cultural features had been exposed by the blading and it was concluded that no damage to cultural resources occurred as a result of the blading.

On January 4, 1985, Mr. Andrew Fowler and Ms. Jacqueline Rossignol (OCA), visited the right-of-way to monitor pipeline trenching. On that day the trench was excavated between right-of-way stations 269 to 281. The trench was approximately 1 m wide and 2 m deep, except around the main arroyo between stations 274 and 276, where the trench was deepened in order to cross the drainage. The maximum depth excavated across this arroyo was 5 m. Along this deeper section the sides of the trench were stepped in order to prevent their collapse.

No cultural features or artifacts were seen along the whole length of the trench. Approximately 10 m to the north of the arroyo, a few pieces of charcoal were exposed in the east bank of the trench about 90 cm below the surface. The construction was halted while the charcoal was investigated. The charcoal proved to be a single piece of burned wood, probably the stump of a mesquite or creosote bush, which appeared to be lying at the bottom of a small filled-in drainage channel. There were several thin lenses of small gravels and sands above the charcoal and the faint outline of a drainage cut around it. No cultural material was found in association and the charcoal was covered with small rootlets. It was concluded that the charcoal was probably not cultural but more likely from a recent fire, possibly of natural origins.

Several filled-in drainage channels were noted in the trench walls. Each one occurred in the same location as the present surface drainages, some as deep as 2 m below the surface. At the main arroyo the deposits exposed in the trench to a depth of 5 m were silts and gravels of a different color than the surrounding deposits. This indicates that the drainages in this area have been following the same pattern for a long time, probably in a cycle of cutting and filling.

In conclusion, the surface blading and excavation of the pipeline trench did not expose or damage cultural resources at the Fairchild site.

Chapter 6

CONCLUSIONS

The Fairchild site (LA 45732) is one of the largest archeological sites in the Tularosa Basin and has been evaluated as eligible for inclusion in the National Register of Historic Places. As recorded by Eidenbach (1983a), it covers an area of approximately 0.5 by 0.25 mi (0.3 sq km) on the alluvial fan on the west slope of the Sacramento Mountains. In the north eastern portion of the site Eidenbach (1983a) and his colleagues (Human Systems Research 1973b) have recorded and mapped 25 mounds. Although they have interpreted these features as El Paso phase house mounds, this interpretation is open to question. We believe that the high density of fire-cracked rock that carpets these mounds is an indication that the features are probably not house mounds. However, the Escondido site, just south of the Fairchild site, also has surface remains consisting of fire-cracked rock and other artifacts with no surface indication of structures (Regge Wiseman personal communication 1985). Excavation at the Escondido site (Hedrick 1967) has uncovered an El Paso phase pueblo, and thus there is a possibility of similar remains at the Fairchild site.

The right-of-way tested during the present project was limited to a 1500 by 50 ft strip through the central portion of the site. Well-defined concentrations of fire-cracked rock were the major surface indication of human activity within the right-of-way. No structures were visible on the surface. All archeological fieldwork was conducted in accordance with the Scope of Services as set forth in Delivery Order #3 for contract DACW-47-83-D-0068.

A 10 percent surface collection of the right-of-way within the boundaries of the Fairchild site was conducted. The right-of-way was divided at right angles to its long axis into 1 m wide transects, and every tenth transect was collected. Collections and recording were based on 1 by 1 m grid squares. These collections were made in order to determine the nature of the surface artifact distributions and their relationship to the fire-cracked rock concentrations. Test excavations were conducted during two field sessions. The first, by the Army Corps of Engineers, tested three fire-cracked rock concentrations and one additional area away from those concentrations. The results of this fieldwork are presented in this report. The second set of test excavations was performed by the Office of Contract Archeology. Three fire-cracked rock concentrations were tested, including one which was completely excavated, and a series of test pits was placed outside the fire-cracked rock concentrations.

In Chapter 1 of this report the importance of placing the archeological remains at the Fairchild site within a regional context was stressed. A regional land-use model proposed by Hard (n.d.) was used as the basis for developing expectations for the function of the site as a whole. Local resources were also documented to determine the potential use of these resources by the people who used the Fairchild location.

Hard's model suggests that prior to the El Paso phase (specifically, during the Late Mesilla phase) residential use of the Fairchild site would have been by groups of people who were primarily hunter-gatherers and moved in a seasonal round. Hard's division of the year into seasons based on climatological, not calendrical, attributes and his delineation of the environment into zones of potentially differential utilization were used to predict when and how the Fairchild site was used. Briefly, the expectations for the Fairchild site were that it would have been used primarily during the spring and that succulents were the primary vegetal resource collected and processed. According to the model, spring would be the season with the fewest potential food resources in the region. Stores would have been consumed throughout the winter and would be either extremely low or exhausted, and many potential foods would not yet have had time to grow to an economically useful stage. Succulents along alluvial fans would have been the primary resources available during the spring. In general it is assumed that the overall characteristics of the present environment are similar to those that have existed since at least AD 300.

If the Fairchild site location were used during the spring for succulent processing, then at the local level we should expect locally available succulents and the raw materials necessary to process them. At the Fairchild site all the necessary resources are either on site or nearby. Succulents occur on the alluvial fan directly to the east of the site. Given the numerous ethnographic accounts of succulent roasting by native North American groups, all describing largely similar processes, we may expect that rocks, water, fuel, and grasses were necessary for processing succulents. Water is necessary for personal consumption (and possibly food processing) and therefore must be either on site or nearby. Permanent surface water occurs in Dog Canyon even during the spring, the driest part of the year in the Tularosa Basin. Mesquite and creosote, which occur on and around the site, could be used for firewood, and prior to use for cattle grazing the area would have contained large stands of grasses. Rock, the primary resource for heat retention, was available in the arroyos that run through the alluvial fans. Given the large amounts of rock used in succulent roasting and the weight of this material, we suspect that the availability of rock in proximity to the other needed resources would have been critical for selection of a processing location.

Ethnographic accounts of succulent roasting indicate that the primary material remains at these localities is fire-cracked rock in association with roasting pits. We should not expect the users of the location to have placed much effort into house construction because any structures would be temporary. Even when the site was used as a residential camp we expect that the occupants built huts, as Hard (n.d.) has defined them, and not pithouses. Logistical use of the site may produce even more ephemeral structural remains. Domestic trash is expected to be light and diffuse.

While the model and the availability of local resources allow the prediction that the primary use of the Fairchild site should be as a springtime residential base for succulent roasting, this is only one of many potential uses for the site. As noted in Chapter 1, the availability of mesquite may have prompted its use during the fall when mesquite beans can be gathered and processed or stored. Other uses, such as a camp during seasonal movement to the Sacramento Mountains to exploit piñon, may have occurred if Dog Canyon were being used as an access trail up the west escarpment of the mountains. Clearly, use during every season is possible, but the majority of the archeological remains at the site are expected to be related to succulent processing.

Excavations were performed primarily to determine the extent and nature of subsurface remains and to determine the date of their use as well as their function. The model outlined above is based on the expected use of the area during the Late Mesilla phase. Similar sites in the El Paso region (Aten 1972; Fields and Girard 1983; Hard 1983a; O'Laughlin 1979, 1980) are known to have been used at least from the Archaic through the El Paso phase, and we should expect a similar time frame for the use of the Fairchild site. Within the right-of-way the ceramics, the primary means of dating site use in the region, indicate use of the investigated portion of the site during the Mesilla phase. The vast majority of the sherds are unspecific brown, a type that is present from the beginning of the Early Mesilla phase (AD 200) to the end of the El Paso phase (AD 1400). The temporally diagnostic sherds from the right-of-way are Mimbres Black-on-white, primarily Styles II and III. These styles date between ca. AD 850 and 1150 in the Mimbres Valley (Anyon and LeBlanc 1984) and are assumed to have similar dates in the Tularosa Basin. It is important to note that this is just an assumption and not established fact. Fugge's analysis of Mimbres Black-on-white sherds from the Fairchild site (Chapter 5) clearly establishes that they were not manufactured in the Mimbres Valley. Therefore it is incumbent upon future research projects in the Jornada branch to obtain chronometric dates in good associational context with Mimbres Black-on-white ceramics to test this assumption. The lack of other painted ceramic types in the right-of-way indicates that this portion of the site could have been used at any time between AD 200 and 1150. The one radiocarbon date of 1090 BP ± 90 falls within the Late Mesilla phase. We therefore feel that the model of regional land use developed by Hard will help us understand the function of the right-of-way portion of the Fairchild site.

Although we believe that the remains within the right-of-way are from the Mesilla phase,it should not be assumed that the entire Fairchild site dates to this time. The presence of El Paso Bichrome and Polychrome from the pit in the arroyo indicates its use during the El Paso phase, as do other El Paso phase painted ceramics noted during previous surveys of the site (Eidenbach 1983a; Human Systems Research 1973b). As noted above, many similar sites in the El Paso area also have evidence of Archaic use. We expect that both Archaic and Apache groups used portions of the Fairchild site outside the right-of-way.

Determination of site function from the test excavations within the right-of-way is tenuous at best. We have approached this question in terms of seasonality, single or multiple use of features, and economic use of the features. Both ethnographic analogy and inference from archeological artifact distributions are used to interpret the prehistoric use of the right-of-way.

By far the most common prehistoric remains in the right-of-way are fire-cracked rocks. They occur as concentrations and as a general scatter across the project area. As Ingbar notes in Chapter 3, this class of artifact is a form of "site furniture" (Binford 1977), which tends to stay put at a site and thus is (or can be) directly related to the activities that were performed at the place where these artifacts are found. The size, amounts, and distribution of fire-cracked rock also potentially indicate different heating, cooling, and handling processes. By analyzing the size, amount, and both horizontal and vertical distribution of fire-cracked rock, Ingbar has concluded that the horizontal distribution can be interpreted as a result of redundant use, while the general background scatter may well be a result of natural processes. The mounding of fire-cracked rock on the present surface may have been caused by deflation. The lack of a hearth, roasting pit, or even a charcoal lens beneath Unit 1 (the only completely excavated fire-cracked rock concentration) also supports the suggestion that extensive deflation has occurred within the right-of-way. Even if the thermal feature were located near the fire-cracked rock concentration rather than under it, there should at least be a trail of charcoal from the pit to the concentration as a result of the rock having been dragged from the pit. Neither excavation nor auger holes revealed any indication of a charcoal lens. A similar lack of thermal features or charcoal lenses was evident in each of the other tested fire-cracked rock concentrations. Also, each of these test pits demonstrated that the majority of the fire-cracked rock occurred on the present ground surface or within the uppermost 10 cm of fill. Thus, the pattern inferred from the excavation of Unit 1 is strengthened by information from other test pits.

The chipped stone assemblage from the right-of-way is dominated by artifacts manufactured using expedient production techniques and, for the most part locally available limestone. Ingbar believes that this assemblage composition indicates redundant use of this portion of the site, which is consistent with the models of scheduled mobility. In a very general way the inferences made from the chipped stone assemblage from the right-of-way support the regional land-use model proposed by Hard (n.d.).

Chipped stone traits indicate that the main activities at the Fairchild site, at least within the right-of-way, were redundant and required a chipped stone technology that could be expedient. There was no need for curating and transporting chipped stone; items could be manufactured from the locally available raw materials that had washed down from the Sacramento Mountains.

Ceramic and ground stone artifacts are so fragmented that they provide little useful information from which to infer activities at the Fairchild right-of-way. The sherds were so fragmentary and weathered that it was impossible to determine a meaningful bowl-to-jar ratio. Based on findings (Hard 1983a) at the Castner Range sites, which are part of a large complex near Fusselman Canyon that is similar to the Fairchild site, it was expected that there should be a significant percentage of abraded sherds in close spatial association with the fire-cracked rock concentrations. Testing at the Fairchild right-of-way recovered extremely few abraded sherds, a finding quite different to that from the Castner Range sites. The weathering of the sherds in the right-of-way precluded any interpretation of sooting patterns on the ceramic vessels. Ground stone was rare in the right-of-way, but its presence indicates that activities other than succulent processing were performed. Given the local resources, we may expect grasses and mesquite, or even corn, to have been processed on the ground stone.

The flotation and pollen analyses are generally more accurate indicators of plant use than other artifact analyses, but even these results are mixed. This is because of the lack of in situ charcoal deposits in the case of flotation, and the lack of a defined subsurface feature in the case of pollen. Flotation of one sample from fill below FCR 7 in Unit 1 revealed no economic information about processing, but the fragments of charcoal were primarily from locally available shrubs that had probably been burned in a hot fire when green. Pollen analysis of subsurface samples had a range of pollen similar to, but more weathered than, the modern surface samples. No indication of prehistoric activities was forthcoming from subsurface pollen, and the environment, as monitored by pollen, has not changed to any noticeable degree.

Faunal data are few and, as with other subsistence data, provide inferences of site function that are very tentative. Only a few fragments were recovered from the right-of-way; all were from locally available fauna and were broken and charred. This could be inferred as evidence of roasting, stewing, or trash burning. Whatever the case, it appears that hunting was carried out at the site (note also the presence of two projectile points). Hunting may have been a food-procurement strategy embedded within the primary goal of succulent roasting or it may have been the result of logistical use of the Fairchild site from another residential base. In actuality, both forms of hunting undoubtedly occurred at the Fairchild site. Its location and the locally available resources would have been important for both hunter-gatherer and sedentary-agriculturalists from at least the early Mesilla through the end of the El Paso phases.

Clearly it is difficult to understand the prehistoric use of the Fairchild site from limited surface collection and subsurface excavation within a narrow right-of-way strip through the site. Our findings do, however, date the use of the right-of-way within the Mesilla phase (AD 200-1150) and specifically within the Late Mesilla phase (AD 750-1150), and they do not refute the expected use of the Fairchild site according to the regional land-use model proposed by Hard (n.d.).

Redundant use of the landscape, and in particular of localities, is what we expect to find if we are studying the adaptation of hunter-gatherers operating under scheduled seasonal mobility. Thus we should expect the Fairchild site to be similar to other sites in similar environmental settings within the desert and mountain region of southern New Mexico. Surface remains at the Fairchild site are reminiscent of the Transmountain Campus, Castner Range, and Northgate complex near the mouth of Fusselman Canyon on the east side of the Franklin Mountains (Aten 1972; Hard 1983a; O'Laughlin 1979). They are also similar to some sites in the Rio Grande Valley on the west wide of the Franklin Mountains (Fields and Girard 1983; O'Laughlin 1980). In each of these sites around the Franklin Mountains there have been substantial subsurface remains, including a wide range of thermal features and huts or pithouses. We should therefore expect this range of features at the Fairchild site, even though our limited testing and pipeline construction did not uncover subsurface deposits.

The sheer size and nature of the Fairchild site as a whole indicates that it has played a major role in prehistoric, and most probably historic, adaptations for hundreds if not thousands of years. This in itself accords the site tremendous archeological and historical significance. In fact, there is only one other known site within the Tularosa Basin and Hueco Bolson that bears close resemblance to the Fairchild site -- the Northgate/ Castner Range/Transmountain Campus complex at the mouth of Fusselman Canyon on the east slope of the Franklin Mountains. In terms of preservation there is a major difference between these two sites: the Fusselman Canyon complex is now within the suburbs of El Paso and has been impacted by urban development whereas the Fairchild site is largely intact even though the Dog Canyon development is nearby. Vandalism at the Fairchild site is almost nonexistent, and the integrity of the site is at present preserved. The Fairchild site has been evaluated as eligible for inclusion in the National Register of Historic Places. The Fairchild site holds tremendous potential for our understanding of human adaptations to the desert and mountain environment of southern New Mexico and extreme western Texas throughout a major portion of human occupation in the region.

REFERENCES CITED

Anyon, Roger, and Steven A. LeBlanc
1984 The Galaz Ruin: A Prehistoric Mimbres Village in Southwestern New Mexico. Maxwell Museum of Anthropology Publication Series, University of New Mexico Press, Albuquerque.

Anyon, Roger, Patricia A. Gilman, and Steven A. LeBlanc
1981 A Reevaluation of the Mogollon-Mimbres archaeological sequence. The Kiva 46:209-225.

Aten, Lawrence E.
1972 Evaluation of the Cultural Resources of the Northgate Site, El Paso County, Texas. Research Report 5. Texas Archeological Salvage Project, University of Texas at Austin.

Balls, Edward K.
1970 Early Uses of California Plants. California Natural History Guides 10. University of California Press, Berkeley and Los Angeles.

Barkley, Fred A.
1934 The Statistical Theory of Pollen Analysis. Ecology 15(3):283-289.

Barrows, David Prescott
1977 The Ethnobotany of the Coahuilla Indians of Southern California. Malki Museum Press, Morongo Indian Reservation, Banning, California.

Basehart, Harry W.
1974 Mescalero Apache Subsistence Patterns and Socio-Political Organization, Commission Findings on the Apache. Apache Indians XII. Garland, New York.

Beckes, Michael R.
1977 Prehistoric Cultural Stability and Change in the Southern Tularosa Basin. Ph.D. dissertation, Department of Anthropology, University of Pittsburgh.

Beckett, Patrick H.
1983a The Paleo-Indian Prehistory of the Tularosa Basin. In The Prehistory of Rhodes Canyon, Survey and Mitigation, edited by Peter L. Eidenbach, pp. 95-104. Human Systems Research, Tularosa, New Mexico.

1983b The Archaic Prehistory of the Tularosa Basin (5500 B.C. - A.D. 400). In The Prehistory of Rhodes Canyon, Survey and Mitigation, edited by Peter L. Eidenbach, pp. 105-110. Human Systems Research, Tularosa, New Mexico.

Bell, Willis H., and Edward F. Castetter
1937 The Utilization of Mesquite and Screwbean by the Aborigines in the American Southwest. The University of New Mexico Bulletin, Biological Series 5(2). Albuquerque.

Bell, Willis H., and Edward F. Castetter
1941 The Utilization of Yucca, Sotol, and Beargrass by the Aborigines in the American Southwest. The University of New Mexico Bulletin, Biological Series 5(5). Albuquerque.

Bertram, Jack B., and Neale Draper
1982 The Bones from the Bis sa'ani Community: A Sociotechnic Archaeofaunal Analysis. In Bis sa'ani: A Late Bonito Phase Community on Escavada Wash, Northwest New Mexico, edited by C. Breternitz, D. Doyel, and M. Marshall, pp. 1015-1065. Navajo Nation Papers in Anthropology No. 14. Navajo Nation Cultural Resource Management Program, Window Rock, Arizona.

Binford, Lewis R.
1977 Forty Seven Trips. In Stone Tools and Cultural Markers: Change, Evolution, and Complexity, edited by R.V.S. Wright, pp. 24-36. Prehistory and Material Culture Series No. 12. Australian Institute of Aboriginal Studies, Canberra.

1980 Willow Smoke and Dogs' Tails: Hunter-Gatherer Settlement Systems and Archaeological Site Formation. American Antiquity 45:4-20.

1981 Behavioral Archaeology and the "Pompeii Premise." Journal of Anthropological Research 37:195-208.

1982 The Archaeology of Place. Journal of Anthropological Archaeology 1(1):5-31.

1983 In Pursuit of the Past. Thames and Hudson, London.

Blackwelder, Eliot
1927 Fire as an Agent in Rock Weathering. Journal of Geology 35:134-140.

Camilli, Eileen L.
1983 Site Occupational History and Lithic Assemblage Structure: An Example from Southeastern Utah. Ph.D. dissertation, Department of Anthropology, University of New Mexico, Albuquerque.

Carmichael, David
1981 Non-Residential Occupation of the Pre-Historic Southern Tularosa Basin, New Mexico. The Artifact 19(3-4):51-68.

1983 Archaeological Survey in the Southern Tularosa Basin, New Mexico. Publications in Anthropology 10. El Paso Centennial Museum, El Paso.

Castetter, Edward F.
1935 Uncultivated Native Plants Used as Sources of Food. Ethnobiological Studies in the American Southwest I. University of New Mexico Bulletin 266. Biological Series 4. Albuquerque.

Castetter, Edward F., and Willis H. Bell
1937 The Aboriginal Utilization of the Tall Cacti in the American Southwest. University of New Mexico Bulletin, Biological Series 5(1). Albuquerque.

Castetter, Edward F., and M.E. Opler
1936 The Ethnobiology of the Chiricahua and Mescalero Apache: The Use of Plants for Foods, Beverages, and Narcotics. The University of New Mexico Bulletin, Biological Series 4(5). Albuquerque.

Castetter, Edward F., and Ruth M. Underhill
1935 The Ethnobiology of the Papago Indians. The University of New Mexico Bulletin, Biological Series 4(3). Albuquerque.

Castetter, Edward F., Willis H. Bell, and Alrin R. Grove
1938 The Early Utilization and the Distribution of Agave in the American Southwest. The University of New Mexico Bulletin, Biological Series 5(4). Albuquerque.

Chayes, Felix
1956 Petrographic Model Analysis. Geophysical Lab, Carnegie Institution of Washington. John Wiley and Sons, Inc., New York.

Cosgrove, C.B.
1947 Caves of the Upper Gila and Hueco Areas in New Mexico and Texas. Papers of the Peabody Museum, Harvard University XXIV(2). Cambridge.

Cosgrove, H.S., and C.B. Cosgrove
1932 The Swarts Ruin: A Typical Mimbres Site in Southwestern New Mexico. Papers of the Peabody Museum of American Archaeology and Ethnology 15(1). Harvard University, Cambridge.

Cully, Jack
1973 Tentative List of Animals Identified on the Western Sacramento Mountain Slope. In Technical Manual: 1973 Survey of the Tularosa Basin by Human Systems Research, pp. 202-203. Human Systems Research, Tularosa.

Curtin, L.S.M.
1949 By the Prophet of the Earth. San Vicente Foundation, Santa Fe.

Dart, Al
1977 Cultural Resource Impact Statement, New Mexico State Park and Recreation Commission, Oliver Lee Memorial State Park, Alamogordo, New Mexico. Museum of New Mexico, Santa Fe.

Denison, R. E., and E. A. Hetherington Jr.
1969 Basement Rocks in Far West Texas and South Central New Mexico. In Border Stratigraphy Symposium New Mexico Bureau of Mines and Mineral Resources Circular #104. Socorro.

Derr, Phillip S.
1981 Soil Survey of Otero Area, New Mexico; Parts of Otero, Eddy, and Chaves Counties. U.S. Department of Agriculture, Soil Conservation Service and Forest Service, in cooperation with the New Mexico State University Agricultural Experiment Station.

Dick-Peddie, William A.
1975 Vegetation of Southern New Mexico. In New Mexico Geological Society Guidebook, 26th Field Conference, Las Cruces Country, pp. 81-85. New Mexico Bureau of Mines and Mineral Resources and New Mexico Institute of Mining and Technology, Socorro.

DiPeso, Charles
1974 Casas Grandes: A Fallen Trading Center of the Gran Chichimeca. Amerind Foundation Publications No. 9. Northland Press, Flagstaff.

Dunham, K. C.
1935 The geology of the Organ Mountains. New Mexico Bureau of Mines and Mineral Resources Bulletin #11. Socorro.

Eck, David C.
1979 An Overview of the Culture History of the Hueco Bolson and Vicinity. In Excavations at the Transmountain Campus El Paso Community College, El Paso, Texas, by Thomas C. O'Laughlin, pp. 9-15. Publications in Anthropology No. 7. El Paso Centennial Museum.

Eidenbach, Peter L.
1983a Cultural Resources Survey. Holloman Air Force Base Water Pipeline Right-of-way near Dog Canyon, Otero County, New Mexico. Ms. on file, Human Systems Research, Tularosa, New Mexico.

1983b The Prehistory of Rhodes Canyon. Human Systems Research, Tularosa, New Mexico.

Eidenbach, Peter L., and Mark Wimberly
1980 Archeological Reconnaissance in White Sands National Monument, New Mexico, 1978. Human Systems Research, Tularosa, New Mexico.

Elmore, Francis H.
1944 Ethnobotany of the Navajo. University of New Mexico Bulletin, Monograph Series 1(7). University of New Mexico, Albuquerque, and School of American Research, Santa Fe.

Fewkes, J. Walter
1896 A Contribution to Ethnobotany. American Anthropologist 9:14-21.

Fields, Ross C., and Jeffrey S. Girard
1983 Investigations at Site 32 (41EP325), Keystone Dam Project; A Multicomponent Archeological Site in Western El Paso County, Texas. Reports of Investigations 21. Prewitt and Associates, Austin. Contract DACW47-82-C-0018. Submitted to the U.S. Army Corps of Engineers, Albuquerque District Office.

Foley, Robert
1981 Off-Site Archaeology: An Alternative Approach for the Short-Sited. In Patterns of the Past: Essays in Honor of David L. Clarke, edited by I. Hodder, G. Isaac, and N. Hammond, pp. 157-183. Cambridge University Press, Cambridge.

Freeman, C.E.
1972 Pollen Study of Some Holocene Alluvial Deposits in Doña Ana County, Southern New Mexico. The Texas Journal of Science 24(2):203-220.

Frison, George C.
1968 A Functional Analysis of Certain Chipped Stone Tools. American Antiquity 33:149-155.

Gardner, J.L.
1951 Vegetation of the Creosote Area of the Rio Grande Valley in New Mexico. Ecological Monographs 21:379-403.

Gasser, Robert E.
1983 Negative Evidence for Roasting Pits: The Flotation Data. In Excavations in the Castner Range Archaeological District in El Paso, Texas, by Robert J. Hard, pp. 189-196. Publications in Anthropology 11. El Paso Centennial Museum, El Paso.

Gilman, Patricia A.
1983 Changing Architectural Forms in the Prehistoric Southwest. Unpublished Ph.D. dissertation, Department of Anthropology, University of New Mexico, Albuquerque.

Goodyear, Albert C., III
1975 Hecla II and III, An Interpretive Study of Archaeological Remains from the Lakeshore Project, Papago Reservation, South-Central Arizona. Anthropological Research Paper 9. Arizona State University, Tempe.

Greer, John W.
1965 A Typology of Midden Circles and Mescal Pits. Southwestern Lore 31(3):41-55.

1968a Excavations at a Midden Circle Site in El Paso County, Texas. Texas Archeological Society Bulletin 39:111-131.

1968b Notes on Excavated Ring Midden Sites, 1963-1968. Texas Archeological Society Bulletin 38:39-44.

Hard, Robert Jarratt
1983a Excavations in the Castner Range Archeological District in El Paso, Texas. Publications in Anthropology 11. El Paso Centennial Museum, The University of Texas at El Paso.

1983b The Mesilla Phase near El Paso, Texas, and Southwestern Agricultural Dependence. Ph.D. dissertation proposal. Ms. on file, Department of Anthropology, University of New Mexico, Albuquerque.

n.d. Settlement and Subsistence in the Chihuahuan Desert: Cultural-Ecological Models for Ft. Bliss, Texas. To be published in the Proceedings of the American Society for Conservation Archeology, in press.

Harrill, Bruce G.
1980 A Cultural Resource Management Plan for Timber Sale and Forest Development Areas on the Mescalero Apache Indian Reservation, vol. I. U.S. Department of the Interior, Forestry Archeological Program, Bureau of Indian Affairs, Albuquerque Area Office.

Haury, Emil W.
1936 Some Southwestern Pottery Types, Series IV. Medallion Papers 19. Gila Pueblo, Globe, Arizona.

Havard, V.
1895 Food Plants of the North American Indians. Bulletin of the Torrey Botanical Club 22(3):98-123.

Hedrick, J.A.
1967 Escondida Survey. The Artifact 5(2):19-34.

Heiser, Charles B.
1951 The Sunflower Among the North American Indians. Proceedings of the American Philosophical Society 95(4):432-438.

Heizer, Robert F., and Albert B. Elsasser
1980 The Natural World of the California Indians. University of California Press, Berkeley and Los Angeles.

Hough, Walter
1897 The Hopi in Relation to Their Plant Environment. American Anthropologist 10:33-44.

Human Systems Research
1973a Technical Manual, 1973 Survey of the Tularosa Basin. Human Systems Research, Tularosa, New Mexico.

1973b Evaluation of the Archeological and Related Resources of the Dog Canyon Detached Portion of White Sands National Monument, New Mexico. Ms. on file, Human Systems Research, Tularosa, New Mexico. Contract CS700030220. Submitted to the U.S. Department of the Interior, National Park Service.

Jennings, J. D.
1940 A Variant of Southwestern Culture. Laboratory of Anthropology Technical Series 10, Santa Fe.

Jones, Volney
1930 The Ethnobotany of the Isleta Indians. Unpublished M.A. thesis, University of New Mexico, Albuquerque.

Kapp, Ronald O.
1969 Pollen and Spores. Wm. C. Brown Co. Publishers, Dubuque.

Katz, Susanna R., and Paul R. Katz
1981 Ring Middens of the Southern Guadalupe Mountains. The Artifact 19(3-4):203-208.

Kelley, Jane Holden
1966 The Archaeology of the Sierra Blanca Region of Southeastern New Mexico. Ph.D. dissertation, Harvard University, Cambridge.

Kelly, Robert L.
1980 Hunter-Gatherer Settlement Systems. M.A. Thesis, Department of Anthropology, University of New Mexico, Albuquerque.

King, P. B., R. E. King, and J. B. Knight
1945 Geology of the Hueco Mountains, El Paso and Hudspeth Counties, Texas. U. S. Geological Survey, Oil and Gas Investigatons Preliminary Map #36.

Kottlowski, Frank E., R. H. Flower, M. L. Thompson, R. W. Foster
1956 Stratigraphic Studies of the San Andres Mountains, New Mexico. New Mexico Bureau of Mines and Mineral Resources Memoir #1. Socorro.

Lancaster, James W.
1983 An Analysis of Manos and Metates from the Mimbres Valley, New Mexico. Unpublished M.A. Thesis, Department of Anthropology, University of New Mexico, Albuquerque.

LeBlanc, Steven A.
1976 Archaeological Recording Systems. Journal of Field Archaeology 3:159-168.

LeBlanc, Steven A., and Michael E. Whalen
1980 An Archeological Synthesis of South-Central and Southwestern New Mexico. Office of Contract Archeology, University of New Mexico, Albuquerque.

Lehmer, Donald J.
1948 The Jornada Branch of the Mogollon. University of Arizona Bulletin, Social Science Bulletin 17. Tucson.

Magne, Martin P.R.
1983 Lithics and Livelihood: Stone Tool Technologies of Central and Southern Interior British Columbia. Ph.D. dissertation, Department of Anthropology and Sociology, University of British Columbia, Vancouver.

Magne, Martin P.R., and David L. Pokotylo
1981 A Pilot Study in Bifacial Lithic Reduction Sequences. Lithic Technology 10:34-47.

Marshall, Michael P.
1973 Background Information on the Jornada Culture Area. In Technical Manual: 1973 Survey of the Tularosa Basin, pp. 49-119. Human Systems Research, Tularosa, New Mexico.

MacDowell-Loudan, Ellis E.
1983 Fire-Cracked Rock: Preliminary Experiments to Determine Its Nature and Significance in Archeological Contexts. The Chesopiean 21:20-29.

McAnulty, W. N., Jr.
1968 Precambrian Rocks of the Fusselman Canyon Area, Franklin Mountains. In West Texas Geologic Society Guidebook, 1968 Field Conferernce, Midland.

Mehringer, P.J.
1967 Pollen Analysis of the Tule Springs Site, Nevada. In Pleistocene Studies in Southern Nevada, edited by H.H. Wormington and Dorothy Ellis. Nevada State Museum Anthropological Papers 13.

Meinzer, O.E., and R.F. Hare
1915 Geology and Water Resources of Tularosa Basin, New Mexico. Department of the Interior, United States Geological Survey, Water Supply Paper 343. U.S. Government Printing Office, Washington, D.C.

Murphey, Edith Van Allen
1959 Indian Uses of Native Plants. Mendocino County Historical Society, Fort Bragg, California.

Nelson, L. A. and W. S. Strain
1946 Straigraphy of the Hueco and Franklin Mountains. West Texas Geological Society Guidebook. 1946 Field Conference, Midland

Nelson, L. A. and B. R. Haigh
1956 West Texas Geological Society Guidebook. 1958 Field Conference, Midland.

Nelson, Margaret C.
1981 Chipped Stone Analysis in the Reconstruction of Prehistoric Subsistence Practices: An Example from Southwestern New Mexico. Unpublished Ph.D. dissertation, Department of Anthropology, University of California, Santa Barbara.

Newberry, J.S.
1887 Food and Fiber Plants of the North American Indians. Popular Science Monthly 32:31-46.

Oakes, Yvonne Roye
1981 Prehistoric Subsistence Adaptations on White Sands Missile Range. Laboratory of Anthropology Note 277. Museum of New Mexico, Santa Fe.

O'Laughlin, Thomas C.
1977 Excavations at the Sandy Bone site. AWANYU 5(2):11-42.

1979 Excavations at the Transmountain Campus, El Paso Community College, El Paso, Texas. Publications in Anthropology 7. El Paso Centennial Museum, The University of Texas at El Paso.

1980 The Keystone Dam Site and Other Archaic and Formative Sites in Northwest El Paso, Texas. Publications in Anthropology 8. El Paso Centennial Museum, The University of Texas at El Paso.

1981 The Roth Site: A Pithouse Site in the Mesilla Valley of Southern New Mexico. The Artifact 19(3-4):133-150.

O'Laughlin, Thomas C. and T. Weber Greiser
1973 Preliminary Field Report on the Findings and Results of the Cultural and Historical Resources of the Spillway Area of the Range Dam Lying within the Northgate National Registry Site (EPCM 31:106:3:10) in El Paso, Texas. Publications in Anthropology No. 2. El Paso Centennial Museum, University of Texas at El Paso.

Pray, Lloyd C.
1961 Geology of the Sacramento Mountains Escarpment, Otero County, New Mexico. New Mexico Bureau of Mines and Mineral Resources Bulletin 35. State Bureau of Mines and Mineral Resources, New Mexico Institute of Mining and Technology, Socorro.

Rayl, Sandra L.
1983 Archeological testing of the Fairchild Site, Otero County, New Mexico. Unpublished manuscript on file, U.S. Army Corps of Engineers, Albuquerque District, New Mexico.

Reagan, Albert B.
1928 Plants Used by the White Mountain Apache of Arizona. The Wisconsin Archaeologist 8(4):143-161.

Riddell, Francis A., and William E. Pritchard
1971 Archeology of the Rainbow Point Site (4-Plu-594), Bucks Lake, Plumas County, California. In Great Basin Anthropological Conference 1970, Selected Papers, edited by C. Melvin Aikens, pp. University of Oregon Anthropological Papers No. 1. Eugene.

Robbins, Wilfred W., John P. Harrington, and Barbara Freire-Marreco
1916 Ethnobotany of the Tewa Indians. Bureau of American Ethnology Bulletin 55. U.S. Government Printing Office, Washington, D.C.

Rugge, Dale
1976 A Petrographic Study of Ceramics from the Mimbres River Valley, New Mexico. Senior Thesis, College of Letters and Science, University of California, Los Angeles.

1977 A Petrographic Study of Ceramics from the Mimbres Valley, New Mexico. Paper presented at the 42nd Annual Meeting of the Society for American Archaeology, New Orleans.

1984 Mimbres Ceramic Technology and Exchange. Paper presented at the Third Mogollon Conference, Las Cruces, New Mexico. Manuscript in possession of author.

1985a Petrographic Analysis of Mimbres Series Ceramics from the Ft. Bliss Military Reservation, Texas and New Mexico. Manuscript in possession of author, prepared for Ft. Bliss Environmental Protection Office.

1985b Petrographic analysis of Ceramics from the Borderstar '85 Survey Area. Manuscript in preparation, Office of Contract Archeology, UNM. UNM Proposal #185-227.

n.d. A Pilot Study of Ceramic Technology from LA4921 Three Rivers, New Mexico. Manuscript prepared for New Mexico State University, Las Cruces.

Runyan, John W., and John A. Hedrick
1973 Pottery Types of the SWFAS Area. Transactions of the Eighth Regional Archaeological Symposium for Southeastern New Mexico and Western Texas, pp. 19-45. Lea County Archeological Society.

Russell, Frank
1908 The Pima Indians. In Twenty-sixth Annual Report of the Bureau of American Ethnology, pp. 3-391. U.S. Government Printing Office, Washington, D.C.

Schiffer, Michael C.
1976 Behavioral Archaeology. Academic Press, New York.

Schutt, Jeanne C.
1983 Chipped Stone Assemblages from Rhodes Canyon. In The Prehistory of Rhodes Canyon, Survey and Mitigation, edited by Peter L. Eidenbach, pp. 69-94. Human Systems Research, Tularosa, New Mexico.

Scott, Catherine J.
1983 The Evolution of Mimbres Pottery. In _Mimbres Pottery: Ancient Art of the American Southwest_ by J.J. Brody, Catherine J. Scott, and Steven A. LeBlanc, pp. 39-68. Hudson Hills Press, New York.

Shreve, Forrest
1942 The Desert Vegetation of North America. _The Botanical Review_ 8(4):195-246.

Southward, Judith A.
1979 A Summary of Ceramic Technology, Plant Remains, and Shell Identification Analyses from LA 4921, Three Rivers, New Mexico. In _Jornada Mogollon Archaeology: Proceedings of the First Jornada Conference_, edited by Patrick H. Beckett and Regge N. Wiseman, pp. 91-102. New Mexico State University, Las Cruces.

Stevenson, Matilda Coxe
1915 Ethnobotany of the Zuni Indians. _Thirtieth Annual Report of the Bureau of American Ethnology, 1908-1909_, pp. 31-102. U.S. Government Printing Office, Washington, D.C.

Stockmarr, Jens
1971 Tablets with Spores Used in Absolute Pollen Analysis. _Pollen et Spores_ 13(4):615-621.

Stuart, David E., and Rory P. Gauthier
1981 _Prehistoric New Mexico: Background for Survey_. New Mexico Historic Preservation Bureau, Santa Fe.

Suhm, Dee Ann, and Edward B. Jelks
1962 _Handbook of Texas Archeology: Type Descriptions_. Texas Memorial Museum Bulletin No. 4. Austin.

Swank, G.R.
1932 _The Ethnobotany of the Acoma and Laguna Indians_. Unpublished M.A. thesis, University of New Mexico, Albuquerque.

Thomas, David H. and Robert L. Bettinger
1976 _Prehistoric Piñon Ecotone Settlements of the Upper Reese River Valley, Central Nevada_. Anthropological Papers of the American Museum of Natural History 53(3). New York.

Torrence, Robin
1983 Time Budgeting and Hunter-Gatherer Technology. In _Hunter-Gatherer Economy in Prehistory: A European Perspective_, edited by G. Bailey, pp. 11-22. Cambridge University Press, Cambridge.

Tuan, Yi-Fu, Cyril E. Everhard, Jerold G. Widdison, and Iven Bennett
1973 _The Climate of New Mexico_. (revised edition) State Planning Office, Santa Fe.

VanDevender, Thomas R., and W. Geoffrey Spaulding
1979 Development of Vegetation and Climate in the Southwestern United States. Science 204:701-710.

VanDevender, Thomas R., and Laurence J. Toolin
1983 Late Quaternary Vegetation of the San Andres Mountains, Sierra County, New Mexico. In The Prehistory of Rhodes Canyon, Survey and Mitigation, edited by Peter L. Eidenbach, pp. 33-54. Human Systems Research, Tularosa, New Mexico.

Way, Karen L.
1979 Early Pueblo Occupation in the Southern Tularosa Basin, New Mexico. In Jornada Mogollon Archaeology: Proceedings of the First Jornada Conference, edited by Patrick H. Beckett and Regge N. Wiseman, pp. 41-51. New Mexico State University, Las Cruces.

Wells, Phillip V.
1977 Post-Glacial Origin of the Present Chihuahuan Desert Less Than 11,500 Years Ago. In Transactions of the Symposium on the Biological Resources of the Chihuahuan Desert Region, United States and Mexico, edited by Roland H. Wauer and David H. Riskind, pp. 67-83. National Park Service Transactions and Proceedings Series 3. Washington, D.C.

Whalen, Michael E.
1977 Settlement Patterns of the Eastern Hueco Bolson. Publications in Anthropology 4. El Paso Centennial Museum, The University of Texas at El Paso.

1978 Settlement Patterns of the Western Hueco Bolson. Publications in Anthropology 6. El Paso Centennial Museum, The University of Texas at El Paso.

Whalen, Michael E.
1980 Special Studies in the Archeology of the Western Hueco Bolson. Publications in Anthropology 9. El Paso Centennial Museum, The University of Texas at El Paso.

1981a Cultural-Ecological Aspects of the Pithouse-to-Pueblo Transition in a Portion of the Southwest. American Antiquity 46:75-92.

1981b Origin and Evolution of Ceramics in Western Texas. Bulletin of the Texas Archaeological Society 52:215-229.

White, Leslie A.
1944 Notes on the Ethnobotany of the Keres. Papers of the Michigan Academy of Science, Arts and Letters 30:557-568.

Whiting, Alfred F.
1966 Ethnobotany of the Hopi. Museum of Northern Arizona Bulletin 15. (originally printed 1939) Northern Arizona Society of Science and Art, Flagstaff.

Wilmsen, Edwin N.
1970 Lithic Analysis and Cultural Inference: A Paleoindian Case. Anthropological Papers of the University of Arizona 16. Tucson.

Wimberly, Mark, and Alan Rogers
1977 Cultural Succession, A Case Study. Archeological Survey, Three River Drainage, New Mexico. The Artifact, vol. 15. Human Systems Research, Three Rivers, New Mexico.

Wimberly, Mark, Peter Eidenbach, and Julio Betancourt
1979 Cañon del Perro, A History of Dog Canyon. Human Systems Research, Tularosa.

Wilson, Ernest W.
1930 Burned Rock Mounds of South-West Texas. Bulletin of the Texas Archaeological and Paleontological Society 2:59-63.

Wiseman, Regge
1983 Rhodes Canyon Ceramics. In The Prehistory of Rhodes Canyon, Survey and Mitigation, edited by Peter L. Eidenbach, pp. 125-134. Human Systems Research, Tularosa, New Mexico.

APPENDIX A

Artifacts from the Surface-transect Collection

Appendix A. Artifacts from the surface-transect collection

	Grid Square Number															
Artifact Type	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Transect A																
Fire-cracked rock	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sherd	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chipped Stone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Transect B																
Fire-cracked rock	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sherd	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chipped Stone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Transect C																
Fire-cracked rock	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sherd	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chipped Stone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Transect D																
Fire-cracked rock	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sherd	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chipped Stone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Transect E																
Fire-cracked rock	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sherd	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chipped Stone	-	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-
Transect F																
Fire-cracked rock	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sherd	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chipped Stone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Transect G																
Fire-cracked rock	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sherd	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chipped Stone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Transect H																
Fire-cracked rock	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sherd	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chipped Stone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Transect I																
Fire-cracked rock	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Sherd	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-
Chipped Stone	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-

(continued)

Appendix A. (continued)

Artifact Type	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
							Grid Square Number									
Transect J																
Fire-cracked rock	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
Sherd	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chipped Stone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Transect K																
Fire-cracked rock	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-
Sherd	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chipped Stone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Transect L																
Fire-cracked rock	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-
Sherd	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chipped Stone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Transect M																
Fire-cracked rock	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sherd	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chipped Stone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Transect N																
Fire-cracked rock	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-
Sherd	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chipped Stone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Transect O																
Fire-cracked rock	-	1	3	-	1	2	-	-	-	-	-	-	-	-	-	-
Sherd	-	-	1	-	-	-	-	-	1	-	-	-	-	-	-	-
Chipped Stone	-	-	-	-	-	-	G	-	-	-	-	-	-	-	-	-
Transect P																
Fire-cracked rock	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-
Sherd	-	1	-	-	-	-	-	-	-	-	-	1	-	-	-	-
Chipped Stone	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Transect Q																
Fire-cracked rock	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sherd	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chipped Stone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Transect R																
Fire-cracked rock	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sherd	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chipped Stone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

(continued)

Appendix A. (continued)

Artifact Type	Grid Square Number 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Transect S																
Fire-cracked rock	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sherd	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chipped Stone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Transect T																
Fire-cracked rock	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sherd	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chipped Stone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Transect U																
Fire-cracked rock	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sherd	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chipped Stone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Transect V																
Fire-cracked rock	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sherd	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chipped Stone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Transect W																
Fire-cracked rock	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sherd	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chipped Stone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Transect X																
Fire-cracked rock	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sherd	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chipped Stone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Transect Y																
Fire-cracked rock	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sherd	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chipped Stone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Transect Z																
Fire-cracked rock	-	1	-	-	-	-	-	-	-	-	-	-	1	-	-	1
Sherd	-	1	-	-	1	-	-	-	-	-	-	-	1	-	-	-
Chipped Stone	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
Transect AA																
Fire-cracked rock	-	4	3	-	-	-	-	-	-	-	-	-	-	-	-	-
Sherd	-	-	4	1	-	-	-	-	-	-	-	-	-	1	-	-
Chipped Stone	-	G	-	-	-	-	-	-	-	-	-	-	-	-	-	-

(continued)

	Grid Square Number															
Artifact Type	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<u>Transect BB</u>																
Fire-cracked rock	1	-	1	1	1	-	-	-	-	-	-	1	-	-	-	-
Sherd	-	-	-	-	-	-	-	1	-	-	-	-	2	-	1	-
Chipped Stone	-	-	-	-	-	-	-	1	-	-	-	-	-	-	1	-
<u>Transect CC</u>																
Fire-cracked rock	-	1	3	9	10	4	3	5	-	3	1	2	2	3	4	2
Sherd	-	-	2	4	1	-	-	-	-	-	-	1	1	-	-	-
Chipped Stone	-	-	1	1	-	-	1	-	-	1	-	-	-	-	-	-
<u>Transect DD</u>																
Fire-cracked rock	-	1	-	-	-	-	-	1	-	-	-	-	1	-	-	-
Sherd	-	-	-	1	-	-	-	-	-	-	-	-	-	1	-	-
Chipped Stone	-	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-
<u>Transect EE</u>																
Fire-cracked rock	-	1	1	-	-	5	1	-	1	-	-	-	-	-	-	-
Sherd	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chipped Stone	1	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
<u>Transect FF</u>																
Fire-cracked rock	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
Sherd	-	-	-	-	-	-	1	-	-	-	1	-	-	-	-	-
Chipped Stone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<u>Transect GG</u>																
Fire-cracked rock	-	12	10	7	4	4	6	4	6	2	7	3	5	6	-	1
Sherd	2	1	2	2	-	-	-	7	2	-	3	2	2	1	-	-
Chipped Stone	1	1	-	-	-	-	-	-	1	-	-	-	-	-	-	-
<u>Transect HH</u>																
Fire-cracked rock	-	1	7	7	12	10	4	7	5	8	8	10	4	4	8	9
Sherd	-	-	-	1	4	4	4	5	3	1	4	2	3	-	-	-
Chipped Stone	-	-	-	1	-	1	2	-	H	1	-	-	-	-	-	-
<u>Transect II</u>				OCA Unit 1, Loci 1-4												
Fire-cracked rock	-	-	2	31	60	17	6	9	4	6	7	5	2	2	3	5
Sherd	-	-	-	1	2	-	-	-	1	2	1	2	-	1	1	-
Chipped Stone	-	-	-	1	3	1	-	-	-	-	-	-	-	-	-	-
<u>Transect JJ</u>																
Fire-cracked rock	-	-	1	-	-	-	-	-	-	1	1	-	-	-	-	-
Sherd	-	-	-	-	-	-	-	-	-	-	-	1	4	-	-	-
Chipped Stone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

(continued)

Appendix A. (continued)

Artifact Type	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
								Grid Square Number								
Transect KK																
Fire-cracked rock	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sherd	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chipped Stone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Transect LL																
Fire-cracked rock	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sherd	1	2	1	-	-	-	-	-	-	-	-	-	-	1	-	-
Chipped Stone	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Transect MM																
Fire-cracked rock	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sherd	-	-	-	-	-	-	-	1	-	-	-	-	1	-	-	-
Chipped Stone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Transect NN																
Fire-cracked rock	6	2	-	-	-	-	1	1	2	4	2	-	-	-	-	-
Sherd	-	-	-	-	-	-	-	-	2	1	-	-	-	-	-	1
Chipped Stone	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
Transect OO																
Fire-cracked rock	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1
Sherd	-	-	-	-	-	-	-	-	-	-	-	4	2	-	1	1
Chipped Stone	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-
Transect PP																
Fire-cracked rock	-	1	4	1	-	-	-	-	-	-	-	-	-	-	-	-
Sherd	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chipped Stone	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Transect QQ						Unit 3										
Fire-cracked rock	-	-	-	1	2	5	9	7	-	-	-	-	-	-	-	-
Sherd	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
Chipped Stone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Transect RR																
Fire-cracked rock	4	-	-	-	2	-	-	-	1	-	-	-	-	-	-	-
Sherd	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chipped Stone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Transect SS																
Fire-cracked rock	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-
Sherd	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chipped Stone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

(continued)

Appendix A. (continued)

Artifact Type	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	Grid Square Number															
Transect TT																
Fire-cracked rock	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sherd	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chipped Stone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

H = hammerstone
G = ground stone

APPENDIX B

OCA Excavation Provenience Data

APPENDIX B

OCA Excavation Provenience Data

Provenience**	Depth of Level (cm)	Screen* (mesh size inches)	Munsell Color	Wet/ Dry
1-0-1	—	—	10 YR 3/4	D
1-1-1	10	1/8	10 YR 4/4	D
1-0-2	—	—	10 YR 4/4	D
1-1-2	10	1/8	10 YR 5/4	D
1-0-3	—	—	10 YR 5/4	D
1-1-3	10	1/8	10 YR 4/6	W
1-0-4	—	—	10 YR 5/4	D
1-1-4	10	1/8	—	-
1-0-5	—	—	10 YR 5/4	D
1-1-5	10	1/8	10 YR 6/3	D
1-0-6	—	—	10 YR 5/3	D
1-1-6	10	1/8	10 YR 6/3	D
1-2-6	10	1/8	—	-
1-0-7	—	—	10 YR 5/4	D
1-1-7	5	1/8	10 YR 6/3	D
1-2-7	5	1/8	10 YR 4/4	D
1-0-8	—	—	10 YR 5/4	D
1-1-8	10	1/8	10 YR 4/4	D
1-0-9	—	—	10 YR 5/4	D
1-1-9	10	1/8	10 YR 4/3	D
1-2-9	5	1/8	10 YR 5/4	D
1-0-10	—	—	10 YR 5/4	D
1-1-10	10	1/8	10 YR 5/4	D
1-2-10	10	1/8	7.5 YR 4/4	D
1-0-11	—	—	10 YR 5/4	D
1-1-11	10	1/8	—	-
1-0-12	—	—	10 YR 4/4	D
1-1-12	10	1/8	10 YR 5/4	Moist
1-0-13	—	—	10 YR 3/4	D
1-1-13	10	1/8	10 YR 5/4	D
1-0-14	—	—	10 YR 5/4	D
1-1-14	10	1/8	10 YR 5/4	D
1-0-15	—	—	10 YR 5/4	D
1-1-15	10	1/8	10 YR 4/4	Moist
1-0-16	—	—	10 YR 5/4	D
1-1-16	10	1/8	7.5 YR 4/4	D
1-0-17	—	—	—	-
1-1-17	10	1/4	7.5 YR 5/4	Moist
1-0-18	—	—	—	-
1-1-18	10	1/4	10 YR 5/4	D
1-0-19	—	—	—	-
1-1-19	10	1/4	10 YR 4/4	D
1-0-20	—	—	—	-
1-1-20	10	1/4	10 YR 4/4	D
1-0-21	—	—	—	-
1-1-21	10	1/4	10 YR 5/4	D
1-0-22	—	—	—	-
1-1-22	10	1/4	10 YR 5/4	D
1-0-23	—	—	—	-
1-1-23	10	1/4	10 YR 5/4	D

(continued)

Appendix B. (continued)

Provenience	Depth of Level (cm)	Screen*	Munsell Color	Wet/ Dry
1-0-24	—	—	—	-
1-1-24	10	1/4	10 YR 4/4	D
1-0-25	—	—	—	-
1-1-25	10	1/4	10 YR 4/4	D
1-0-26	—	—	—	-
1-1-26	10	1/4	10 YR 4/4	D
1-0-27	—	—	—	-
1-1-27	10	1/4	10 YR 5/3	D
1-0-28	—	—	—	-
1-1-28	10	1/4	10 YR 4/4	D
2-0-1	—	—	—	-
2-1-1	10	1/4	—	-
2-2-1	10	1/4	10 YR 6/4	D
2-3-1	10	1/4	—	-
2-4-1	10	1/4	—	-
2-5-1	10	1/4	—	-
2-0-2	—	—	—	-
2-1-2	10	1/4	10 YR 5/4	D
2-0-3	—	—	—	-
2-1-3	10	1/4	10 YR 4/4	D
2-0-4	—	—	—	-
2-1-4	10	1/4	10 YR 5/4	D
2-0-5	—	—	—	-
2-1-5	10	1/4	10 YR 4/4	D
3-0-1	—	—	—	-
3-1-1	10	1/4	10 YR 5/4	D
3-2-1	10	1/4	10 YR 6/4	D
3-3-1	5	1/4	10 YR 5/4	W
4-0-1	—	—	—	-
4-1-1	10	1/4	—	-
4-2-1	10	1/4	—	-
4-3-1	10	1/4	—	-
4-4-1	10	1/4	—	-
4-5-1	10	1/4	10 YR 5/4	D
5-0-1	—	—	—	-
5-1-1	10	1/4	10 YR 6/4	D
5-2-1	10	1/4	—	-
5-3-1	10	1/4	10 YR 6/4	D
5-4-1	5	1/4	10 YR 5/4	D

* All screened level loci were screened 100 percent
** All surface levels are labelled 0

APPENDIX C

Auger Hole Descriptions

Apendix C. Auger Hole Descriptions

Auger Hole	Depth (cm)	Munsell Color	Condition	Comments	
1	0-30	10 YR 4/4	Wet	Silty	
2	0-17	10 YR 4/4	Wet	Silty	
	17-23	10 YR 3/1	Wet	Darker, clayey	
	23-30	10 YR 4/4	Damp	Silty	
3	0-10	10 YR 4/4	Wet	Silty	
	10-15	10 YR 4/4	Wet	Same	
	15-19	10 YR 7/3	Dry	Silty	
	19-30	10 YR 5/4	Dry	Silty	
4	0-15	10 YR 4/4	Wet	Silty	
	15-20	10 YR 7/3	Dry	Silty	
	20-30	10 YR 6/4	Dry	Silty	
5	0-10	10 YR 4/4	Wet	Silty	
	10-15	10 YR 7/3	Dry	Silty	
	15-21	10 YR 6/3	Dry	Silty, with gravel	
	21-30	10 YR 6/4	Dry	Silty, with gravel	old stream
6	0-10	10 YR 4/4	Wet	Silty	channel?
	10-20	10 YR 6/4	Dry	Silty, with gravel	
	20-30	10 YR 5/4	Dry	Silty, with gravel	
7	0-12	10 YR 5/4	Damp	Silty	
	12-20	10 YR 6/4	Dry	Silty	
	20-30	10 YR 5/4	Dry	Silty, with gravel	
8	0-20	10 YR 4/3	Wet	Silty, clayey	
	20-30	10 YR 6/3	Dry	Silty, with gravel	
9	0-10	10 YR 4/4	Damp	Silty	
	10-20	10 YR 4/3	Wet	Silty, clayey, with light gravel	
	20-25	10 YR 5/4	Wet	Silty, light gravel	
	25-30	10 YR 6/4	Dry	Silty	
10	0-10	10 YR 4/4	Wet	Silty	
	10-20	10 YR 6/4	Dry	Silty, light gravel	
	20-30	10 YR 6/4	Dry	Silty, light gravel	
11	0-8	10 YR 5/4	Wet	Silty	in FCR 13;
	8-30	10 YR 6/4	Dry	Silty, with gravel	no charcoal
12	0-10	10 YR 5/4	Wet	Silty	in
	10-30	10 YR 6/3	Dry	Silty, with gravel	FCR 13
13	0-5	10 YR 5/4	Wet	Silty, surface	
	5-20	10 YR 3/3	Wet	Clayey, darker, compact, with gravel	low area
	20-30	10 YR 5/4	Dry	Silty, with gravel	

(continued)

Appendix C. (continued)

Auger Hole	Depth (cm)	Munsell Color	Condition	Comments
14	0-10	10 YR 5/4	Wet	Silty
	10-20	10 YR 6/4	Dry	Loose, powdery sand, gravel low
	20-30	10 YR 6/4	Dry	Light gravel, sandy and silty
15	0-10	10 YR 4/4	Wet	Silty
	10-20	10 YR 4/4	Wet	Silty, compact
	20-30	10 YR 6/4	Dry	Silty
16	0-16	10 YR 5/4	Wet	Silty
	16-30	10 YR 6/4	Dry	Silty, gravel at 20-30 cm
17	0-20	10 YR 4/4	Wet	Silty
	20-25	10 YR 5/4	Wet	Silty, with gravel
	25-30	10 YR 6/4	Dry	Silty, with gravel
18	0-10	10 YR 5/4	Damp	Silty
	10-20	10 YR 6/4	Dry	Silty
	20-30	10 YR 6/4	Dry	Silty, roots
19	0-15	10 YR 5/4	Damp	Silt, gravel
	15-20	10 YR 6/4	Dry	Silt
	20-	10 YR 6/4	Dry	Silt, light gravel
20	0-10	10 YR 5/4	Damp	Silty
	10-20	10 YR 6/4	Dry	Silty
	20-30	10 YR 6/4	Dry	Silty
21	0-10	10 YR {RY?} 5/4	Wet	Silty
	10-20	10 YR 6/4	Dry	Silty, caliche
	20-30	10 YR 6/4	Dry	Silty
22	0-10	10 YR 4/3	Damp	Silty. with pea-sized gravel
	10-20	10 YR 6/4	Dry	Soft, dry silt
	20-30	10 YR 6/4	Dry	Gravel, silt
23	0-10	10 YR 5/4	Damp	Silty
	10-20	10 YR 6/4	Dry	Silt with gravel
	20-30	10 YR 6/4	Dry	Silt
24	0-10	10 YR 5/4	Damp	Silt
	10-30	10 YR 6/4	Dry	Silt
25	0-10	10 YR 4/4	Damp	Silt, small gravel
	10-20	10 YR 6/4	Dry	Silt, gravel
	20-30	10 YR 6/4	Dry	Silt, gravel
26	0-10	10 YR 4/4	Damp	Silty
	10-20	10 YR 5/4	Dry	Silty edge of FCR 13
	20-30	10 YR 5/3	Dry	Silty

(continued)

Appendix C. (continued)

Auger Hole	Depth (cm)	Munsell Color	Condition	Comments	
27	0-5	10 YR 5/4	Damp	Silty	edge of
	5-30	10 YR 6/4	Dry	Silty	FCR 13
28	0-8	10 YR 5/4	Damp	Silty	
	8-30	10 YR 6/4	Dry	Silty	
29	0-12	10 YR 4/4	Damp	Silty	
	12-30	10 YR 6/4	Dry	Silty	
30	0-6	10 YR 4/3	Damp	Silty	
	6-18	10 YR 5/4	Dry	Silty	
	18-30	10 YR 6/4	Dry	Silty	
31	0-10	10 YR 5/4	Damp	Silty	
	10-20	10 YR 6/4	Dry	Silty, small gravel	
	20-30	10 YR 6/4	Dry	Silty	
32	0-14	10 YR 4/3	Wet	Silty gravel	
	(gravel prevented auger from going deeper)				
33	0-16	10 YR 4/4	Wet	Silty, small gravel	
	16-30	10 YR 6/4	Dry	Silty	
34	0-15	10 YR 4/3	Damp	Silty	
	15-30	10 YR 6/4	Dry	Silty	
35	0-15	10 YR 4/3	Damp	Silty, light gravel	
	15-30	10 YR 6/4	Dry	Silty	
36	0-10	10 YR 5/4	Damp	Silty	
	10-30	10 YR 6/4	Dry	Silty	
37	0-10	10 YR 4/3	Damp	Silty	
	10-18	10 YR 5/4	Dry	Silty	
	18-30	10 YR 6/4	Dry	Silty	
38	0-10	10 YR 5/4	Damp	Silt, small gravel	
	10-20	10 YR 6/4	Dry	Silt, small gravel, root	
	20-30	10 YR 6/4	Dry	Silt, small gravel	
39	0-10	10 YR 5/4	Slightly damp	Silt	
	10-30	10 YR 6/4	Dry	Silt	
40	0-15	10 YR 4/4	Damp	Silt	
	15-20	10 YR 5/4	Damp	Silt, small charcoal flecks	
	20-30	10 YR 6/4	Dry	Silt	
41	0-8	10 YR 4/3	Damp	Silt	
	8-15	10 YR 5/4	Slightly damp	Silt	
	15-30	10 YR 6/4	Dry	Silt, roots	

(continued)

Appendix C. (continued)

Auger Hole	Depth (cm)	Munsell Color	Condition	Comments	
42	0-18	10 YR 4/3	Damp	Silt, small gravel	
	18-30	10 YR 6/4	Dry	Gravel, silt, roots	
43	0-10	10 YR 4/3	Wet	Silty	
	10-18	10 YR 5/4	Damp	Silty	
	18-30	10 YR 6/4	Dry	Silty	
44	0-16	10 YR 4/3	Damp	Silty, very small gravels	
	16-20	10 YR 6/4	Dry	Silty, caliche	
	20-30	10 YR 6/4	Dry	Silty, gravel	
45	0-10	10 YR 4/3	Damp	Silty	
	10-20	10 YR 5/4	Dry	Silty, small gravel	
	20-30	10 YR 6/4	Dry	Silty	
46	0-5	10 YR 5/4	Damp	Silty	
	5-30	10 YR 6/4	Dry	Silty	
	*30-40	10 YR 6/4	Dry	Silty	
	*40-45	10 YR 6/4	Dry	Silty, compact	
47	0-10	10 YR 5/4	Slightly damp	Silt	
	10-22	10 YR 6/4	Dry	Slightl·· compact silt, gravel	
	22-30	10 YR 6/4	Dry	Loose silt, light gravel	
48	0-22	10 YR 4/4	Damp	Silt, gravel	
	22-26	10 YR 6/4	Dry	Silt, gravel	
	26-30	10 YR 6/4	Dry	Silt, no gravel	
49	0-5	10 YR 5/4	Damp	Silt	
	5-30	10 YR 6/4	Dry	Silt, very small gravel	
50	0-10	10 YR 4/4	Damp	Silt, gravel	
	10-16	10 YR 5/4 - 6/4	Dry	Too much gravel; auger prevented from going deeper	
51	0-12	10 YR 4/4	Damp	Soft, silt	
	12-20	10 YR 6/4	Dry	Silt, medium-sized gravel at 12 cm	
	20-30	10 YR 6/4	Dry	Sandy silt, gravel	
52	0-6	10 YR 5/4	Slightly damp	Silty	in FCR 13
	6-40	10 YR 6/4	Dry	Silty, no gravel	
53	0-17	10 YR 5/4	Very slightly damp	Silty	
	17-30	10 YR 6/4	Dry	Silty	
54	0-15	10 YR 4/4	Damp	Silty	
	15-23	10 YR 6/4	Slightly damp	Silty, pea-sized gravel	
	23-30	10 YR 6/4	Dry	Silty, pea-sized gravel	

(continued)

Appendix C. (continued)

Auger Hole	Depth (cm)	Munsell Color	Condition	Comments	
55	0-20	10 YR 4/4	Damp	Silty; in channel	
	20-25	10 YR 6/4	Dry	Loose sandy silt	
	25-30	10 YR 6/4	Dry	Silt, gravel	
56	0-5	10 YR 5/4	Damp	Silty	
	5-30	10 YR 6/4	Dry	Silty	
57	0-19	10 YR 4/4	Damp	Roots; silty; in channel	
	19-30	10 YR 6/4	Dry	Loose sandy silt	
58	0-15	10 YR 4/3	Damp	Pea-sized gravel, silt	Edge of FCR 13; in channel
	15-30	10 YR 6/4	Dry	Silt, some pea-sized gravel	
59	0-8	10 YR 4/4	Damp	Silty, medium-sized gravel at 8-10 cm	in FCR 13
	8-20	10 YR 6/4	Dry	Silty, pea-sized gravel at top	
	20-30	10 YR 6/4	Dry	Silty, rootlet	
60	0-10	10 YR 4/4	Damp	Silty, rootlet	
	10-30	10 YR 6/4	Dry	Silty, gravel at 12-30 cm	
61	0-15	10 YR 4/4	Damp	Silty, no gravel	
	15-30	10 YR 6/4	Dry	Silty, no gravel	
62	0-10	10 YR 4/4	Damp	Silty, moderate gravel	
	10-20	10 YR 6/4	Dry	Silty, small gravel	
	20-30	10 YR 6/4	Dry	Silty, no gravel	
63	0-10	10 YR 4/3	Damp	Silty, rootlets	
	10-20	10 YR 6/4	Dry	Silty	
	20-30	10 YR 6/4	Dry	Silty, small gravel	
64	0-10	10 YR 4/4	Slightly damp	Silt, pea-sized gravel	
	10-30	10 YR 6/4	Dry	Silt	
65	0-12	10 YR 5/4	Slightly damp	Silty	
	12-30	10 YR 6/4	Dry	Silty	
66	0-14	10 YR 5/4	Slightly damp	Silty, channel	
	14-30	10 YR 6/4	Dry	Silty, light gravel	
67	0-10	10 YR 5/4	Very slightly damp	Silty	
	10-30	10 YR 6/4	Dry	Loose sandy silt, gravel	
68	11-51	10 YR 6/3	Dry	Silt/hardpan	in Unit 1
69	20-67	10 YR 6/3	Dry	Silt/hardpan	
74	0-40	10 YR 5/4	Dry	Silt/hardpan	

(continued)

Appendix C. (continued)

Auger Hole	Depth (cm)	Munsell Color	Condition	Comments	
70	11-101	10 YR 4/4	Dry	Silt/hardpan	excavated
71	16-81	10 YR 5/4	Dry	Silt/hardpan	loci
72	11-71	10 YR 5/4	Dry	Silt/hardpan	
73	0-40	10 YR 5/4	Dry	Silt/hardpan	
75	0-39	10 YR 5/4	Dry	Silt/hardpan	
76	0-38	10 YR 5/4	Dry	Silt/hardpan	
77	0-42	10 YR 5/4	Dry	Silt/hardpan	
78	0-39	10 YR 5/3	Dry	Silt/hardpan	
79	0-38	10 YR 5/3	Dry	Silt/hardpan	
80	0-38	10 YR 5/4	Dry	Silt/hardpan, roots	
81	0-40	10 YR 5/4	Dry	Silt/hardpan	
82	0-40	10 YR 5/4	Dry	Silt/hardpan	
83	0-37	10 YR 4/4	Dry	Silt/hardpan	
84	0-45	10 YR 5/4	Dry	Silt/hardpan	
85	0-43	10 YR 5/4	Dry	Silt/hardpan	
86	0-43	10 YR 5/4	Dry	Silt/hardpan; alluvial pebbles at 40 cm	
87	0-42	10 YR 5/4	Dry	Silt/hardpan	
88	0-43	10 YR 5/4	Dry	Silt/hardpan	
89	0-40	10 YR 5/4	Dry	Silt/hardpan; small pebbles at 35 cm, alluvium in small drainage (as is Auger Hole 86)	
90	0-43	10 YR 5/4	Dry	Silt/hardpan	
91	0-41	10 YR 5/4	Dry	Silt/hardpan	
92	0-39	10 YR 5/4	Dry	Silt/hardpan	
93	0-40	10 YR 5/4	Dry	Silt/hardpan	
94	0-44	10 YR 5/4	Dry	Silt/hardpan	
95	0-45	10 YR 5/4	Dry	Silt/hardpan	
96	0-46	10 YR 5/4	Dry	Silt/hardpan	
97	0-45	10 YR 5/4	Dry	Silt/hardpan	
98	0-39	10 YR 5/4	Dry	Silt/hardpan	

APPENDIX D

Fire-Cracked Rock and Chipped Stone Data

Appendix D, Table 1. Fire-cracked rock assemblage collected by OCA from the Fairchild site

Unit	Level	Locus	< 8 cm Chert	< 8 cm Dolo-mite	< 8 cm Lime-stone	< 8 cm Total	< 8 cm Weight*	> 8 cm Chert	> 8 cm Dolo-mite	> 8 cm Lime-stone	> 8 cm Total	> 8 cm Weight*
1	0	1	0	0	30	30	795	0	0	1	1	114
1	1	1	1	4	22	27	528	0	0	0	0	0
1	0	2	2	1	50	53	1477	0	1	6	7	1477
1	1	2	11	3	48	62	1021	0	0	0	0	0
1	0	3	0	2	14	16	681	0	0	1	1	225
1	1	3	0	5	37	42	340	0	0	2	2	114
1	0	4	1	2	3	6	114	0	0	0	0	0
1	1	4	0	0	43	43	340	0	0	2	2	114
1	0	5	0	4	20	24	568	0	0	6	6	1702
1	1	5	0	0	35	35	910	0	0	1	1	225
1	0	6	0	4	33	37	1702	0	1	5	6	795
1	1	6	0	7	20	27	454	0	0	0	0	0
1	2	6	0	0	3	3	100	0	0	0	0	0
1	0	7	0	2	65	67	2155	0	1	10	11	2040
1	1	7	0	1	48	51	776	0	0	2	2	397
1	0	8	0	3	27	30	681	0	0	2	2	795
1	1	8	9	14	15	41	910	0	0	0	0	0
1	0	9	0	0	13	13	681	0	1	3	4	681
1	1	9	0	1	32	33	567	0	0	2	2	341
1	2	9	0	0	3	5	109	0	0	1	1	1185
1	0	10	0	0	67	67	1816	0	0	10	10	2155
1	1	10	0	13	45	58	1600	0	0	3	3	910
1	2	10	0	0	5	5	111	0	0	1	1	351
1	0	11	0	4	68	72	1816	0	0	14	14	2270
1	1	11	4	2	71	77	1750	0	0	0	0	0
1	0	12	1	2	20	23	568	0	0	2	2	340
1	1	12	2	0	34	36	268	0	0	0	0	0
1	0	13	0	1	2	3	114	0	0	1	1	225
1	1	13	0	1	5	6	275	0	0	1	1	63
1	0	14	0	4	5	9	340	0	1	3	4	795
1	1	14	0	2	24	26	226	0	0	0	0	0
1	0	15	0	1	11	12	225	0	0	3	3	795
1	1	15	0	1	34	35	454	0	0	0	0	0
1	0	16	0	0	0	0	0	0	0	1	1	228
1	1	16	0	0	11	11	114	0	0	0	0	0
1	0	17	1	0	5	6	395	0	0	0	0	0
1	1	17	1	1	13	15	450	0	0	0	0	0
1	0	18	1	1	4	6	373	0	0	1	1	165
1	1	18	0	7	9	16	346	0	1	0	1	365
1	0	19	0	1	2	3	225	0	0	0	0	0

(continued)

* Because some of the initial analysis was done in the field using a small, hand-held scale, some of the weights appear identical following conversion to grams. The rounding error introduced is very slight.

Appendix D, Table 1. (continued)

Unit	Level	Locus	< 8 cm Chert	< 8 cm Dolo-mite	< 8 cm Lime-stone	< 8 cm Total	< 8 cm Weight	> 8 cm Chert	> 8 cm Dolo-mite	> 8 cm Lime-stone	> 8 cm Total	> 8 cm Weight
1	1	19	5	5	42	52	221	0	0	0	0	0
1	0	20	1	0	4	5	157	0	0	0	0	0
1	1	20	0	1	0	1	102	0	0	0	0	0
1	0	21	2	2	4	8	461	0	0	0	0	0
1	1	21	1	5	15	21	256	0	0	0	0	0
1	0	22	0	1	6	7	184	0	1	0	1	148
1	1	22	3	4	11	18	455	0	0	0	0	0
1	1	23	3	0	8	11	67	0	0	0	0	0
1	0	24	1	0	2	3	34	0	0	0	0	0
1	1	24	1	2	18	21	521	0	0	0	0	0
1	0	25	1	0	5	6	253	0	0	0	0	0
1	1	25	1	4	8	13	180	0	0	0	0	0
1	0	26	1	0	0	1	3	0	0	0	0	0
1	1	26	1	2	13	16	131	0	0	0	0	0
1	0	27	0	0	4	4	14	0	0	0	0	0
1	1	27	4	0	12	16	144	0	0	0	0	0
1	0	28	0	0	1	1	11	0	0	1	1	210
1	1	28	2	0	6	8	56	0	0	0	0	0
2	0	1	2	2	8	12	76	0	0	1	1	191
2	1	1	6	2	33	41	254	0	0	0	0	0
2	4	1	0	0	3	3	17	0	0	0	0	0
2	5	1	0	0	2	2	7	0	0	0	0	0
2	0	2	1	0	0	1	3	0	0	0	0	0
2	1	2	0	0	17	17	220	0	0	0	0	0
2	0	3	0	2	8	10	409	0	0	0	0	0
2	1	3	2	0	22	24	277	0	0	0	0	0
2	0	4	1	1	2	4	47	0	0	2	2	488
2	1	4	5	4	20	29	247	0	0	0	0	0
2	0	5	0	0	2	2	8	0	0	0	0	0
2	1	5	2	0	9	11	137	0	0	0	0	0
3	0	1	0	0	6	6	184	0	1	2	3	697
3	1	1	0	5	20	25	290	0	0	0	0	0
4	0	1	0	0	3	3	98	0	0	1	1	166
4	1	1	0	0	3	3	18	0	0	0	0	0
4	3	1	0	0	1	1	6	0	0	2	2	585
4	4	1	4	0	42	46	172	0	0	2	2	292
4	5	1	5	0	5	10	168	0	0	0	0	0
5	0	1	2	2	11	15	212	0	0	0	0	0
5	1	1	1	0	37	38	228	0	0	0	0	0
5	2	1	2	1	5	8	117	0	0	0	0	0
5	3	1	2	0	6	8	49	0	0	0	0	0
			97	140	1422	1666	33040	0	8	95	103	21644

Appendix D, Table 2. Fire-cracked rock assemblage collected by COE from the Fairchild site

		< 8 cm					> 8 cm				
Test Unit	Level	Chert	Dolo- mite	Lime- stone	Total	Weight*	Chert	Dolo- mite	Lime- stone	Total	Weight*
1E	0	7	3	69	79	3709	0	0	10	10	2152
1E	1	13	9	61	83	2235	0	0	4	4	707
1E	2	0	0	4	4	111	0	0	0	0	0
1E	3	0	0	3	3	87	0	0	0	0	0
1W	0	2	0	21	22	1221	0	0	3	3	1018
1W	1	5	3	17	25	555	0	0	1	1	215
1W	2	1	1	1	3	168	0	0	0	0	0
1W	3	2	2	3	7	49	0	0	0	0	0
1W	4	0	0	1	1	25	0	0	0	0	0
2	0	2	0	4	6	110	0	0	0	0	0
2	2	1	0	3	6	36	0	0	0	0	0
2	4	12	4	26	39	800	0	0	0	0	0
2	5	4	0	12	16	307	0	0	1	1	190
3	0	0	0	1	1	52	0	0	7	7	5727
3	1	0	1	27	28	611	0	0	4	4	1013
3	2	1	0	12	13	271	0	0	0	0	0
4	0	2	2	96	100	3408	1	0	12	13	6222
4	1	5	2	45	52	270	0	0	0	0	0
4	2	0	0	8	8	38	0	0	0	0	0
5	0	4	0	6	10	122	0	0	0	0	0
5	1	0	0	1	1	14	0	0	0	0	0
5	2	9	1	9	24	195	0	0	0	0	0
		70	28	430	531	14394	1	0	42	43	17244

Appendix D, Table 3. Chipped stone attribute codes and definitions

Column Name	Code	Definition
FS Number	n/a	n/a
Provenience	n/a	n/a
Material type	01	Gray limestone
	02	Gray fine-grained dolomite
	03	Gray chert
	04	Black chert - vitreous appearance
	05	Tan/white chalcedony
	11	Dark gray fine-grained limestone
	12	Brown coarse-grained limestone with (dendritic?) inclusions
	13	White chert
	14	Brown chert - metaquartzite
Item type	Points	Described
	Bifaces	
	10	Large (>10 cm) chunky biface
	11	Large (>10 cm) thin biface
	12	Small (<10 cm) chunky biface
	13	Small (<10 cm) thin biface
	14	Indeterminate thick biface
	15	Indeterminate thin biface
	16	Indeterminate biface fragment
	17	Drill
	18	Other formally shaped biface (described)
	Scrapers	
	20	Endscraper
	21	Sidescraper
	22	Other plano-convex and disk scraper
	23	Concave-edged scraper
	24	Composite scraper
	25	Other tool modified to scraper
	26	Other scraper (described)
	27	Scraper fragment, indeterminate
	Flakes	
	30	Retouched flake (retouch scars are >2 mm in length), abrupt retouch
	31	Retouched flake, acute retouch
	32	Retouched flake, converging acute or abrupt retouch
	33	Composite of several kinds of retouch
	34	Other flake tool, no consistent retouch

(continued)

Appendix D, Table 3. (continued)

Column Name	Code	Definition
	35	Formally shaped unifacial tool (described)
	36	Edge-damaged, utilized (scars are <2 mm in length)
	39	Plain flake
	Cores	
	40	Single platform core
	41	Opposed platform core
	42	Globular core (multiple platforms)
	43	Disk core
	44	Bipolar core
	45	Tested core
	46	Core/hammerstone/chopper
	47	Other kind of core
	Miscellaneous	
		Described
	99	Indeterminate (e.g., broken)
Flake type (based on platform morphology)	01	Shatter, angular debris
	02	Biface thinning/resharpening flake (lipping)
	03	Probable biface thinning flake; platform missing
	04	Regular flake
	05	Bipolar flake
	06	Lamellar blade
	07	Crushed platform (unidentifiable)
	08	Not applicable
	09	Indeterminate
	10	Retouch/resharpening (<5 mm overall; complete)
Completeness	1	Whole
	2	Proximal
	3	Distal
	4	Medial
	5	Lateral
	8	Not applicable
	9	Indeterminate (broken, portion unclear)
Dorsal cortex cover	1	0%
	2	1-25%
	3	26-50%
	4	51-75%
	5	76-99%
	6	100%

(continued)

Appendix D, Table 3. (continued)

Column Name	Code	Definition
	8	Not applicable
Edge 1 modification	0	None
	1	Utilization (<2 mm scars)
	2	Unifacial marginal retouch (<1/3 of surface)
	3	Bifacial marginal retouch
	4	Unifacially flaked (>1/3 of surface)
	5	Bifacially flaked
	9	Indeterminate
Edge 1 location of modification	1	Side
	2	End
	3	End and side
	4	Entire edge
	8	Not applicable
	9	Indeterminate
Edge 2 modification		as for Edge 1
Edge 2 location of modification		as for Edge 1
Morphology	1	Convex, both edges
	2	Concave, both edges
	3	Straight, both edges
	4	Composite
	7	Irregular
	8	Not applicable (not used or modified)
Dorsal scar count		All flake scars >2 mm are counted (plain flakes only)
Platform scar count		All flake scars on the platform are counted, excluding dorsal scars that originate on the platform.
	99	No platform present
Platform width		measured in millimeters
Length		Measured in millimeters from the platform to the distal end, or along the longitudinal axis of the flake if the platform is missing, or from the working edge to the haft (as in scrapers); when indeterminate, the maximum length is given
Width		Measured in millimeters, perpendicular to the length

(continued)

Appendix D, Table 3. (continued)

Column Name	Code	Definition
Thickness		Measured in millimeters
Weight		Measured in tenths of grams
Dorsal platform angle		Measured to the nearest 5 degrees
Edge 1 angle		Measured to the nearest 5 degrees
Edge 2 angle		as Edge 1
Burning	0	Not present
	1	Present

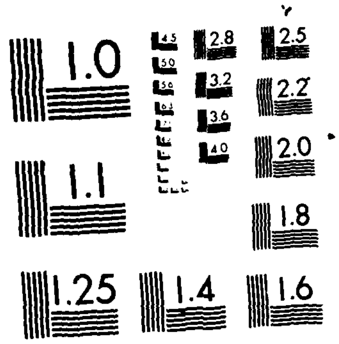
Appendix D, Table 4. Chipped Stone Assemblage from Excavations at the Fairchild site

FS	Unit-	Level-	Locus	Mate-rial	Item Type	Flake Type	Por-tion	Dor-sal Cor-tex	Edge 1 Mod.	Edge 1 Loc.	Edge 2 Mod.	Edge 2 Loc.	Mor-pho-logy	Dorsal Scars	Plat-form Scars	Plat-form Width	Length	Width	Thick-ness	Weight	Plat-form Angle	Edge 1 Angle	Edge 2 Angle	Burned
														OCA Excavations										
151	1	0	1	1	39	7	1	6	0	8	0	8	8	0	0	9	39	55	11	23.8	0	0	0	0
123	1	1	1	2	39	4	1	1	0	8	0	8	8	3	1	4	20	11	4	0.7	100	0	0	0
288	1	1	1	3	1	9	3	1	5	5	0	8	3	0	0	0	16	14	4	0.8	35	0	0	0
127	1	0	2	1	39	4	2	1	0	8	0	8	8	4	1	10	27	32	13	15.4	70	0	0	0
127	1	0	2	3	39	4	2	1	0	8	0	8	8	2	1	6	19	25	8	3.3	60	0	0	0
127	1	0	2	1	31	4	2	1	2	2	1	1	4	3	1	8	44	53	17	44.8	75	55	70	0
87	1	1	2	1	39	4	1	1	1	2	0	8	3	1	1	10	30	38	11	11.4	75	40	0	0
87	1	1	2	1	39	4	1	6	0	8	0	8	8	0	1	7	28	18	5	3.4	65	0	0	0
145	1	0	3	3	39	4	1	2	0	8	0	8	8	1	1	4	19	15	3	1.7	80	0	0	0
114	1	1	3	3	39	1	1	1	0	8	0	8	8	1	0	0	17	34	9	4.9	0	0	0	1
114	1	1	3	4	39	7	1	2	0	8	0	8	8	1	0	0	25	30	7	4.5	0	0	0	0
114	1	1	3	3	39	4	1	1	0	8	0	8	8	3	1	8	28	20	5	3.0	50	0	0	0
114	1	1	3	3	39	7	1	3	0	8	0	8	8	1	0	0	23	15	4	1.3	0	0	0	0
114	1	1	3	11	39	4	1	1	0	8	0	8	8	1	1	3	12	19	5	1.0	75	0	0	0
106	1	1	4	11	39	4	1	2	0	8	0	8	8	4	2	3	29	26	5	4.2	85	0	0	0
106	1	1	4	11	39	7	2	2	0	8	0	8	8	2	0	0	27	26	4	3.5	0	0	0	0
106	1	1	4	11	39	4	2	1	0	8	0	8	8	2	1	3	24	12	5	2.1	80	0	0	0
106	1	1	4	11	39	4	1	1	0	8	0	8	8	2	2	4	15	22	4	1.4	65	0	0	0
106	1	1	4	4	39	4	1	2	0	8	0	8	8	5	1	5	26	16	8	4.1	75	0	0	0
106	1	1	4	4	39	4	1	1	0	8	0	8	8	6	1	6	20	15	5	1.6	65	0	0	0
106	1	1	4	4	39	4	1	2	0	8	0	8	8	5	1	5	28	18	8	4.1	75	0	0	0
106	1	1	4	4	39	4	1	1	0	8	0	8	8	1	2	2	18	10	2	0.2	85	0	0	0
106	1	1	4	3	39	4	1	1	0	8	0	8	8	1	1	4	15	15	3	1.1	45	0	0	0
106	1	1	4	12	39	4	1	2	0	8	0	8	8	3	1	9	22	23	5	3.4	70	0	0	0
106	1	1	4	12	39	4	1	9	0	8	0	8	8	2	1	4	23	34	4	3.8	75	0	0	1
106	1	1	4	11	39	9	3	1	0	8	0	8	8	2	0	0	13	16	2	0.4	0	0	0	0
90	1	1	5	1	39	4	1	1	1	1	0	8	1	5	1	16	54	41	12	35.9	60	70	0	1
90	1	1	5	3	39	4	1	1	0	8	0	8	8	3	1	2	26	29	5	3.3	85	0	0	0
96	1	0	6	1	39	4	2	1	0	8	0	8	8	3	1	7	23	38	5	7.2	55	0	0	0
96	1	0	6	1	39	7	1	1	0	8	0	8	8	2	0	0	36	32	9	8.8	0	0	0	1
153	1	0	6	1	39	4	2	1	0	8	0	8	8	2	1	9	23	22	7	5.4	65	0	0	0
163	1	1	6	11	39	4	1	3	0	9	0	9	9	1	1	3	29	25	8	5.6	70	0	0	1
147	1	2	6	4	39	4	1	1	0	8	0	8	8	3	1	4	30	9	5	1.0	70	0	0	0
147	1	2	6	3	39	4	1	2	2	1	0	8	1	2	1	17	57	38	19	48.3	65	50	0	0
131	1	0	7	1	39	4	1	6	2	2	0	8	1	0	1	15	55	50	14	47.5	65	40	0	0
124	1	0	7	12	39	4	1	5	2	1	1	2	3	0	1	24	111	120	36	598.2	90	60	45	0
154	1	0	8	3	39	7	1	1	0	8	0	8	8	1	0	0	16	15	4	1.1	0	0	0	0
100	1	1	8	3	39	9	9	1	0	8	0	8	8	99	0	0	13	13	3	0.6	0	0	0	0
100	1	1	8	1	39	4	2	1	0	8	0	8	8	3	1	7	26	18	4	2.6	60	0	0	0
136	1	0	9	1	39	4	2	1	4	2	4	2	7	6	1	18	50	49	16	50.9	70	55	50	0
152	1	1	10	1	39	9	3	1	0	8	0	8	8	2	0	0	23	16	3	1.0	0	0	0	0
152	1	1	10	1	39	4	1	1	0	8	0	8	8	3	1	10	33	37	7	7.0	50	0	0	0
104	1	1	11	1	39	4	1	1	0	8	0	8	8	2	1	2	33	16	3	1.7	70	0	0	0
104	1	1	11	1	39	4	1	6	0	8	0	8	8	0	1	8	42	17	6	4.0	40	0	0	0

AD-A174 024 ARCHEOLOGICAL TESTING AT AT THE FAIRCHILD SITE (LA 45732) OTERO COUNTY NEW MEXICO(U) NEW MEXICO UNIV ALBUQUERQUE OFFICE OF CONTRACT ARCHEOLOGY R ANYON 3/3

UNCLASSIFIED 11 MAY 85 185214A F/G 5/6 NL

END
DATE
FILMED
1-87
DTIC



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

Appendix D, Table 4. Chipped Stone Assemblage from Excavations at the Fairchild site (continued)

FS	Unit	Level	Mate-rial	Item Type	Flake Type	Por-tion	Dor-sal Cor-tex	Edge 1 Mod.	Edge 1 Loc.	Edge 2 Mod.	Edge 2 Loc.	Mor-pho-logy	Dorsal Scars	Plat-form Scars	Plat-form Width	Length	Width	Thick-ness	Weight	Plat-form Angle	Edge 1 Angle	Edge 2 Angle	Burned
													COE Excavations										
5	1E	0	2	39	4	1	2	1	1	0	8	3	4	1	6	49	49	25	51.4	115	0	0	0
8	1E	1	2	39	4	1	1	0	8	0	8	8	3	1	5	24	19	6	3.1	60	0	0	0
8	1E	1	1	39	4	1	2	0	8	0	8	8	4	1	4	50	35	14	23.8	90	0	0	0
13	1E	2	1	39	4	1	1	0	8	0	8	8	2	1	1	23	9	3	0.8	80	0	0	0
15	1E	3	4	39	4	2	1	0	8	0	8	8	1	1	4	7	12	2	0.2	45	0	0	1
17	1E	4	3	39	2	1	1	0	8	0	8	8	2	1	2	15	9	3	0.5	65	0	0	0
20	1W	0	1	39	4	2	1	0	8	0	8	8	2	1	4	17	16	4	1.2	60	0	0	0
20	1W	0	3	42	8	1	1	0	8	0	8	8	99	0	0	22	26	18	13.3	0	0	0	0
20	1W	0	3	42	8	1	2	0	8	0	8	8	0	0	0	21	26	15	10.1	0	0	0	0
25	1W	1	1	39	4	1	6	0	8	0	8	8	0	1	13	35	21	9	8.0	90	0	0	1
25	1W	1	1	39	4	1	1	0	8	0	8	8	1	1	1	17	21	4	2.3	65	0	0	0
25	1W	1	3	39	9	3	1	0	8	0	8	8	2	0	0	14	16	3	0.7	0	0	0	0
11	1W	1	1	39	4	1	2	0	8	0	8	8	3	1	11	27	30	18	14.7	90	0	0	1
28	1W	2	1	39	4	1	1	0	8	0	8	8	2	1	4	35	22	7	5.4	70	0	0	0
28	1W	2	1	39	4	1	1	0	8	0	8	8	3	1	2	18	17	4	1.5	80	0	0	0
28	1W	2	1	39	4	1	2	0	8	0	8	8	1	1	2	17	26	4	1.2	70	0	0	1
28	1W	2	3	39	1	1	1	0	8	0	8	8	2	0	0	11	18	7	1.2	0	0	0	0
28	1W	2	1	39	9	3	1	0	8	0	8	8	1	0	0	11	14	2	0.4	0	0	0	1
30	1W	3	2	39	9	3	1	0	8	0	8	8	1	0	0	15	11	2	0.5	0	0	0	0
40	1W	5	1	39	4	1	2	0	8	0	8	8	2	1	4	33	15	9	3.5	70	0	0	1
40	1W	5	3	39	1	1	5	0	8	0	8	8	1	0	0	23	16	9	2.8	0	0	0	1
47	2	4	1	39	7	1	5	0	8	0	8	8	1	0	0	55	43	15	45.5	0	0	0	0
47	2	4	1	39	4	1	1	0	8	0	8	8	1	1	2	20	26	3	2.0	70	0	0	0
47	2	4	2	39	2	2	1	0	8	0	8	8	2	1	4	12	16	3	0.6	50	0	0	0
47	2	4	4	39	4	1	2	2	1	0	8	1	0	1	4	26	28	8	6.7	80	70	0	1
47	2	4	3	39	4	1	1	0	8	0	8	8	3	1	3	21	12	4	1.1	70	0	0	1
47	2	4	3	39	4	2	1	0	8	0	8	8	2	1	2	15	10	3	0.4	85	0	0	0
50	2	5	3	39	9	3	1	0	8	0	8	8	2	0	0	27	14	4	1.6	0	0	0	0
50	2	5	3	39	9	3	1	0	8	0	8	8	2	0	0	14	18	2	1.5	0	0	0	0
50	2	5	1	39	4	2	1	0	8	0	8	8	3	1	4	17	18	3	1.7	65	0	0	1
50	2	5	3	39	9	3	1	0	8	0	8	8	4	0	0	24	18	6	2.7	0	0	0	1
50	2	5	3	39	9	3	1	0	8	0	8	8	1	0	0	8	10	2	0.4	0	0	0	0
59	3	2	14	39	9	3	1	2	1	0	8	3	2	0	0	39	36	10	18.0	0	0	0	0
59	3	2	3	39	4	1	1	0	8	0	8	8	2	1	2	14	8	2	0.2	80	0	0	0
66	4	1	1	39	4	1	6	0	8	0	8	8	0	1	5	36	47	10	19.2	95	0	0	1
68	4	2	1	39	4	1	6	0	8	0	8	8	0	1	0	19	15	5	1.9	45	0	0	0
68	4	2	1	39	4	1	6	0	8	0	8	8	0	1	8	50	22	5	8.6	50	0	0	0
74	5	0	3	39	4	1	1	0	8	0	8	8	1	1	4	11	12	2	5.0	50	0	0	0
74	5	0	1	39	4	1	1	0	8	0	8	8	2	2	12	21	33	9	7.4	80	0	0	0
74	5	0	1	39	4	2	2	0	8	0	8	8	1	1	15	35	31	8	11.0	105	0	0	0
74	5	0	3	39	4	2	1	0	8	0	8	8	2	1	3	7	8	3	0.4	80	0	0	0
77	5	1	1	39	4	2	1	0	8	0	8	8	1	2	10	31	22	6	4.8	55	0	0	0
78	5	2	3	39	4	1	2	0	8	0	8	8	1	1	2	37	20	7	6.0	75	0	0	0

Appendix D, Table 4. Chipped Stone Assemblage from Excavations at the Fairchild site (continued)

FS	Unit-	Level-	Locus	Mate-rial	Item Type	Flake Type	Por-tion	Dor-sal Cor-tex	Edge 1 Mod.	Edge 1 Loc.	Edge 2 Mod.	Edge 2 Loc.	Mor-pho-logy	Dorsal Scars	Plat-form Scars	Plat-form Width	Length	Width	Thick-ness	Weight	Plat-form Angle	Edge 1 Angle	Edge 2 Angle	Burned
												OCA Excavations (continued)												
160	1	0	12	2	39	4	1	3	1	1	0	8	1	2	1	10	27	21	7	4.9	60	30	0	0
109	1	1	12	4	39	4	1	1	0	8	0	8	8	1	1	4	12	10	2	0.2	60	0	0	0
109	1	1	12	4	39	4	1	3	0	8	0	8	8	1	1	3	14	32	4	1.5	65	0	0	0
109	1	1	12	1	39	9	3	6	0	8	0	8	8	0	0	0	26	50	13	17.5	0	0	0	0
155	1	0	15	3	39	1	1	1	0	8	0	8	8	1	0	0	10	6	4	0.2	0	0	0	0
162	1	1	19	1	39	4	2	1	0	8	0	8	8	2	1	6	42	23	6	7.8	70	0	0	0
162	1	1	19	1	39	4	1	1	1	1	1	1	4	3	1	13	52	49	14	36.6	60	35	45	0
162	1	1	19	2	39	4	1	1	1	1	0	8	1	5	1	8	47	51	22	58.8	105	45	0	0
162	1	1	19	3	39	7	1	1	0	8	0	8	8	2	0	0	17	12	4	0.8	0	0	0	0
162	1	1	19	1	55	8	1	6	0	8	0	8	8	99	0	0	83	39	55	262.5	0	0	0	0
121	1	1	20	5	39	1	1	1	0	8	0	8	8	2	0	0	19	16	8	3.4	0	0	0	0
98	1	1	22	1	39	7	1	1	1	2	0	8	1	4	0	0	36	68	12	29.7	0	60	0	0
98	1	1	22	1	39	4	1	2	0	8	0	8	8	3	1	15	34	41	13	17.3	90	0	0	0
138	1	1	24	3	31	1	1	3	2	1	1	1	2	1	0	0	28	21	10	7.6	0	50	75	0
116	1	1	25	1	39	4	1	1	0	8	0	8	8	3	1	3	37	15	4	2.4	85	0	0	0
82	1	1	26	3	39	9	3	1	0	8	0	8	8	1	0	0	11	21	3	0.7	0	0	0	0
158	1	1	27	3	39	1	1	1	0	8	0	8	8	1	0	0	13	12	9	1.6	0	0	0	0
150	2	2	1	3	39	4	1	1	0	8	0	8	8	3	1	6	12	19	4	1.3	60	0	0	0
150	2	2	1	4	39	1	1	2	0	8	0	8	8	1	1	6	11	22	6	1.1	90	0	0	0
112	2	3	1	13	39	1	1	2	0	8	0	8	8	0	0	0	18	19	7	2.7	0	0	0	0
112	2	3	1	1	39	7	1	1	0	8	0	8	8	2	0	0	9	19	2	0.6	0	0	0	0
139	2	4	1	13	39	7	2	1	0	8	0	8	0	3	0	0	18	10	3	0.6	0	0	0	0
139	2	4	1	1	39	4	1	1	0	8	0	8	8	2	1	12	24	35	6	5.0	60	0	0	0
139	2	4	1	4	39	7	1	3	0	8	0	8	8	1	0	0	14	8	4	0.5	0	0	0	0
166	2	1	2	2	39	4	2	1	0	8	0	8	8	3	1	2	22	14	6	1.5	80	0	0	1
111	2	1	3	1	39	4	2	1	0	8	0	8	8	3	1	4	19	13	4	1.1	70	0	0	0
111	2	1	3	1	39	4	2	1	0	8	0	8	8	2	1	5	26	10	5	1.4	75	0	0	1
111	2	1	3	1	39	1	1	1	0	8	0	8	8	1	0	0	12	9	5	0.6	0	0	0	0
133	2	1	4	3	39	4	1	3	1	2	0	8	1	1	1	6	28	23	9	6.8	80	30	0	0
133	2	1	4	3	39	1	1	2	0	8	0	8	8	3	0	0	30	29	18	20.6	0	0	0	0
142	2	0	5	4	42	8	1	1	0	8	0	8	8	99	0	0	22	33	21	22.5	0	0	0	0
92	3	0	1	4	39	1	1	1	0	8	0	8	8	1	0	0	16	21	7	2.3	0	0	0	0
102	3	1	1	1	39	4	2	1	0	8	0	8	8	2	1	4	12	7	3	0.3	65	0	0	0
85	4	1	1	3	39	4	1	6	0	8	0	8	8	0	1	4	19	25	5	3.3	75	0	0	0
148	4	4	1	1	39	4	1	6	0	8	0	8	8	0	1	6	52	17	5	1.3	75	0	0	1
148	4	4	1	1	39	4	1	1	0	8	0	8	8	3	1	8	19	28	6	2.9	70	0	0	1
148	4	4	1	1	39	7	1	6	0	8	0	8	8	0	0	0	19	14	9	1.0	0	0	0	1
148	4	4	1	4	39	1	1	1	0	8	0	8	8	1	0	0	16	14	4	1.0	0	0	0	0
89	5	1	1	3	39	1	1	1	0	8	0	8	8	3	0	0	15	11	6	1.8	0	0	0	0
89	5	1	1	3	39	1	1	2	0	8	0	8	8	3	0	0	32	11	11	6.1	0	0	0	0

Appendix D, Table 5. LA 45732 OCA Systematic Surface Collection, Chipped Stone Assemblage*

FS	Tran- sect	Grid	Mate- rial	Item Type	Flake Type	Por- tion	Dor- sal Cor- tex	Edge 1 Mod.	Edge 1 Loc.	Edge 2 Mod.	Edge 2 Loc.	Mor- pho- logy	Dorsal Scars	Plat- form Scars	Plat- form Width	Length	Width	Thick- ness	Weight	Plat- form Angle	Edge 1 Angle	Edge 2 Angle	Burned
175	E	3	3	39	1	1	3	0	8	0	8	8	1	0	0	49	39	13	18.5	0	0	0	0
223	E	5	3	39	4	2	2	0	8	0	8	8	2	1	2	15	34	9	3.7	90	0	0	0
222	I	4	3	39	9	3	1	1	1	0	8	1	2	0	0	12	13	3	0.6	0	30	0	0
225	P	1	1	39	4	1	1	0	8	0	8	8	3	1	3	24	16	5	2.0	80	0	0	0
226	Z	7	4	39	2	1	1	0	8	0	8	8	3	1	2	10	8	1	0.1	55	0	0	0
209	BB	8	3	39	4	1	1	0	8	0	8	8	1	1	6	19	29	7	3.1	50	0	0	0
193	BB	15	3	39	1	1	3	0	8	0	8	8	1	0	0	16	10	7	0.9	0	0	0	0
255	CC	3	3	39	2	2	1	0	8	0	8	8	3	1	1	9	15	2	0.2	60	0	0	0
173	CC	4	3	39	4	2	1	1	1	0	8	8	2	2	2	26	21	7	4.1	85	0	0	0
230	CC	7	3	39	9	3	1	0	8	0	8	8	1	0	0	23	20	6	3.5	0	0	0	1
315	CC	10	3	39	1	1	1	0	8	0	8	8	2	0	0	19	12	5	1.1	0	0	0	0
231	DD	3	3	39	9	3	1	0	8	0	8	8	1	0	0	14	7	2	0.2	0	0	0	0
221	DD	5	3	39	4	2	1	0	8	0	8	8	2	2	3	11	13	3	0.6	80	0	0	0
198	EE	1	1	39	4	1	4	1	1	1	1	3	2	1	5	47	32	13	6.4	80	60	60	0
314	EE	5	3	39	[illegible]	1	1	0	8	0	8	8	2	0	0	13	20	7	2.1	0	0	0	0
195	GG	1	3	45	8	8	5	0	8	0	8	8	0	0	0	33	29	20	23.0	0	0	0	0
250	GG	2	4	39	9	3	1	0	8	0	8	8	4	0	0	28	18	8	3.7	0	0	0	0
239	GG	9	1	39	4	1	2	0	8	0	8	8	2	1	8	38	22	10	9.5	75	0	0	0
100	HH	4	3	14	8	9	1	5	3	0	8	1	0	0	0	56	26	20	24.3	0	55	0	0
202	HH	6	3	39	4	1	1	0	8	0	8	8	3	1	5	38	15	11	5.5	80	0	0	0
242	HH	7	3	39	9	3	1	0	8	0	8	8	1	0	0	10	7	2	0.2	0	0	0	0
242	HH	7	4	39	9	3	1	3	3	0	8	1	2	0	0	13	12	5	0.8	0	40	0	0
211	HH	[illegible]	3	55	8	1	6	0	8	0	8	8	0	0	0	73	51	56	295.9	0	0	0	0
215	HH	10	3	39	5	1	1	1	1	0	8	8	2	1	5	39	20	10	8.5	80	55	0	0
245	LL	1	3	39	4	1	1	0	8	0	8	8	4	1	3	20	15	6	1.9	75	0	0	0
185	NN	10	3	39	9	3	1	0	8	0	8	8	1	0	0	26	43	9	1.2	0	0	0	0
260	OO	13	1	39	4	2	1	0	8	0	8	8	2	1	2	13	17	3	0.8	70	0	0	0
260	OO	13	3	39	9	1	3	3	3	0	8	1	0	0	0	27	29	10	9.5	0	45	70	0
313	PP	2	3	39	1	1	2	0	8	0	8	8	3	1	12	56	28	17	28.4	0	0	0	0

* For Transect II, Grid 4, see Unit 1, Level 0, Locus 1 in Appendix D, Table 4
For Transect II, Grid 5, see Unit 1, Level 0, Locus 2
For Transect II, Grid 6, see Unit 1, Level 0, Locus 3
For Transect II, Grid 7, see Unit 3, Level 0, Locus 1

Appendix D, Table 6. Chipped stone assemblage from the pit in the arroyo and surface finds

FS	SF	Mate-rial	Item Type	Flake Type	Por-tion	Dor-sal Cor-tex	Edge 1 Mod.	Edge 1 Loc.	Edge 2 Mod.	Edge 2 Loc.	Mor-pho-logy	Dorsal Scars	Plat-form Scars	Plat-form Width	Length	Width	Thick-ness	Weight	Plat-form Angle	Edge 1 Angle	Edge 2 Angle	Burned
292*		1	39	4	2	2	2	1	0	8	3	3	1	13	52	85	12	68.5	80	35	0	0
292		1	39	4	1	4	1	1	0	8	3	1	1	10	61	42	22	48.5	85	50	0	0
292		1	39	4	1	1	0	8	0	8	8	4	1	9	32	47	7	9.9	75	0	0	0
292		2	39	4	1	3	0	8	0	8	8	3	1	5	44	19	7	7.8	55	0	0	0
292		1	39	4	2	1	0	8	0	8	8	2	1	11	22	31	6	3.2	35	0	0	0
292		2	39	4	2	1	0	8	0	8	8	1	1	4	16	23	3	1.5	95	0	0	0
292		3	39	1	1	1	0	8	0	8	8	99	0	0	31	17	10	6.6	0	0	0	0
268	SF 01	99	39	4	1	6	2	1	2	1	1	0	1	6	64	34	6	17.9	70	65	45	0
280	SF 03	1	46	8	1	3	3	1	1	2	1	0	0	0	63	43	58	321.1	0	55	80	0
281	SF 05	1	55	8	1	6	0	8	0	8	8	99	0	0	56	69	59	348.0	0	0	0	0
277	SF 06	1	49	8	1	6	2	1	1	1	1	0	0	0	73	45	23	110.4	0	65	80	0
276	SF 07	3	42	8	1	3	0	8	0	8	8	0	0	0	43	29	37	51.9	0	0	0	0
279	SF 12	99	39	4	1	1	2	1	1	1	3	4	1	4	44	33	14	26.4	65	65	40	0
266	SF 16	1	42	8	1	3	0	8	0	8	8	0	0	0	55	68	47	208.0	0	0	0	0
317	SF 19	99	39	9	1	5	2	4	0	8	1	0	0	0	39	35	13	21.7	0	65	80	1
318	SF 20	14	39	4	1	2	1	1	1	1	4	3	1	8	61	46	18	49.1	65	45	40	0
271	SF 22	3	39	9	1	6	4	4	0	8	1	0	0	0	26	49	12	15.3	0	40	0	0
294	SF 23	13	1	8	1	1	5	4	0	8	8	0	0	0	44	11	4	1.9	0	30	0	0

* FS 292 is the pit in the arroyo (outside the right-of-way)

APPENDIX E

Ceramic Data

Appendix E, Table 1. Ceramic assemblage from surface collection and excavation, Fairchild site

Provenience	UB	R	II/III	III	TI	EPB	EPP	Total
				Surface Finds				
SF-4	-	-	-	-	1	-	-	1
SF-10	-	-	-	-	-	1?	-	1
SF-14	-	-	1	-	-	-	-	1
SF-16	1	-	-	-	1	-	-	2
SF-17	5	-	-	-	-	-	-	5
SF-18	2	-	-	-	-	-	-	2
SF-21	-	-	-	1	-	-	-	1
Subtotal	8	-	1	1	2	1?	-	13
				Surface Transects				
Transect I, Grid 4	1	-	-	-	-	-	-	1
Transect O, Grid 3	1	-	-	-	-	-	-	1
Transect O, Grid 9	1	-	-	-	-	-	-	1
Transect P, Grid 2	1	-	-	-	-	-	-	1
Transect P, Grid 12	1	-	-	-	-	-	-	1
Transect Z, Grid 2	1	-	-	-	-	-	-	1
Transect Z, Grid 5	1	-	-	-	-	-	-	1
Transect Z, Grid 13	1	-	-	-	-	-	-	1
Transect AA, Grid 3	4	-	-	-	-	-	-	4
Transect AA, Grid 4	1	-	-	-	-	-	-	1
Transect AA, Grid 14	1	-	-	-	-	-	-	1
Transect BB, Grid 2	1	-	-	-	-	-	-	1
Transect BB, Grid 8	1	-	-	-	-	-	-	1
Transect BB, Grid 13	1	-	-	-	-	-	1?	2
Transect BB, Grid 15	1	-	-	-	-	-	-	1
Transect CC, Grid 3	1	-	-	-	1	-	-	2
Transect CC, Grid 4	4	-	-	-	-	-	-	4
Transect CC, Grid 5	1	-	-	-	-	-	-	1
Transect CC, Grid 12	1	-	-	-	-	-	-	1
Transect CC, Grid 13	1	-	-	-	-	-	-	1
Transect DD, Grid 4	1	-	-	-	-	-	-	1

(continued)

UB = Unspecified brownware
R = Red slip
II/III = Mimbres Black-on-white; indeterminate style II/III
III = Mimbres Black-on-white; style III
TI = Truly indeterminate Mimbres whiteware
EPB = El Paso bichrome
EPP = El Paso polychrome

Appendix E, Table 1. (continued)

Provenience	UB	R	II/III	III	TI	EPB	EPP	Total
Transect DD, Grid 14	1	-	-	-	-	-	-	1
Transect FF, Grid 7	1	-	-	-	-	-	-	1
Transect FF, Grid 11	1	-	-	-	-	-	-	1
Transect GG, Grid 1	2	-	-	-	-	-	-	2
Transect GG, Grid 2	1	-	-	-	-	-	-	1
Transect GG, Grid 3	2	-	-	-	-	-	-	2
Transect GG, Grid 4	2	-	-	-	-	-	-	2
Transect GG, Grid 8	7	-	-	-	-	-	-	7
Transect GG, Grid 9	2	-	-	-	-	-	-	2
Transect GG, Grid 11	3	-	-	-	-	-	-	3
Transect GG, Grid 12	2	-	-	-	-	-	-	2
Transect GG, Grid 13	1	1	-	-	-	-	-	2
Transect GG, Grid 14	-	-	-	-	1?	-	-	1*
Transect HH, Grid 4	1	-	-	-	-	-	-	1
Transect HH, Grid 5	3	1	-	-	-	-	-	4
Transect HH, Grid 6	4	-	-	-	-	-	-	4
Transect HH, Grid 7	4	-	-	-	-	-	-	4
Transect HH, Grid 8	4	1	-	-	-	-	-	5
Transect HH, Grid 9	3	-	-	-	-	-	-	3
Transect HH, Grid 10	1	-	-	-	-	-	-	1
Transect HH, Grid 11	2	1	-	-	1?	-	-	4
Transect HH, Grid 12	2	-	-	-	-	-	-	2
Transect HH, Grid 13	2	1	-	-	-	-	-	3
Transect II, Grid 4	1	-	-	-	-	-	-	1
Transect II, Grid 5	2	-	-	-	-	-	-	2
Transect II, Grid 9	1	-	-	-	-	-	-	1
Transect II, Grid 10	2	-	-	-	-	-	-	2
Transect II, Grid 11	1	-	-	-	-	-	-	1
Transect II, Grid 12	2	-	-	-	-	-	-	2
Transect II, Grid 14	1	-	-	-	-	-	-	1
Transect II, Grid 15	1	-	-	-	-	-	-	1
Transect JJ, Grid 12	1	-	-	-	-	-	-	1
Transect JJ, Grid 13	4	-	-	-	-	-	-	4
Transect LL, Grid 1	1	-	-	-	-	-	-	1
Transect LL, Grid 2	2	-	-	-	-	-	-	2
Transect LL, Grid 3	1	-	-	-	-	-	-	1
Transect LL, Grid 14	1	-	-	-	-	-	-	1
Transect MM, Grid 8	1	-	-	-	-	-	-	1
Transect MM, Grid 13	1	-	-	-	-	-	-	1
Transect NN, Grid 9	2	-	-	-	-	-	-	2
Transect NN, Grid 10	1	-	-	-	-	-	-	1
Transect NN, Grid 16	1	-	-	-	-	-	-	1
Transect OO, Grid 12	4	-	-	-	-	-	-	4
Transect OO, Grid 13	2	-	-	-	-	-	-	2

(continued)

* Unknown; white slip (?), gray core

Appendix E, Table 1. (continued)

Provenience	UB	R	II/III	III	TI	EPB	EPP	Total
Transect OO, Grid 15	1	-	-	-	-	-	-	1
Transect OO, Grid 16	1	-	-	-	-	-	-	1
Transect QQ, Grid 13	1	-	-	-	-	-	-	1
Subtotal	114	5	-	-	3	-	1	123
	COE Excavation Units							
Test Unit 1E, surface	8	-	-	-	-	-	-	8
Test Unit 1E, Level 1	21	-	-	-	1	-	-	22
Test Unit 1E, Level 2	3	-	-	-	-	-	-	3
Test Unit 1E, Level 3	7	-	-	-	-	-	-	7
Test Unit 1W, surface	7	-	-	-	-	-	-	7
Test Unit 1W, Level 1	35	-	-	-	-	-	-	35
Test Unit 1W, Level 2	2	-	-	-	-	-	-	2
Test Unit 1W, Level 4	1	-	-	-	-	-	-	1
Test Unit 1W, SW 1/4, Level 5	1	-	-	-	-	-	-	1
Test Unit 2, surface	-	1	-	-	-	-	-	1
Test Unit 2, Level 3	2	-	-	-	-	-	-	2
Test Unit 2, Level 4	7	-	-	-	-	-	-	7
Test Unit 2, Level 5	12	-	-	-	-	-	-	12
Test Unit 3, Level 1	1	-	-	-	-	-	-	1
Test Unit 4, surface	1	-	-	-	-	-	-	1
Test Unit 5, surface	18	-	-	-	-	-	-	18
Test Unit 5, Level 1	2	-	-	-	-	-	-	2
Subtotal	128	1	-	-	1	-	-	130
	OCA Excavation Units							
1-0-1	see Transect II, Grid 4							
1-1-1	3	-	-	-	-	-	-	3
1-0-2	see Transect II, Grid 5							
1-1-2	1	-	-	-	-	-	-	1
1-1-3	3	-	-	-	-	-	-	3
1-1-4	5	-	-	-	-	-	-	5
1-0-5	2	-	-	-	-	-	-	2
1-0-6	2	-	-	-	-	-	-	2
1-0-7	1	-	-	-	-	-	-	1
1-1-7	2	-	-	-	-	-	-	2
1-1-8	2	-	-	-	-	-	-	2
1-0-9	1	-	-	-	-	-	-	1
1-1-9	1	-	-	-	-	-	-	1

(continued)

Appendix E, Table 1. (continued)

Provenience	UB	R	II/III	III	TI	EPB	EPP	Total
1-0-11	6	-	-	-	-	-	-	6
1-1-11	1	-	-	-	-	-	-	1
1-1-13	1	-	-	-	-	-	-	1
1-1-14	1	-	-	-	-	-	-	1
1-1-16	2	-	-	-	-	-	-	2
1-1-17	2	-	-	-	-	-	-	2
1-1-18	2	-	-	-	-	-	-	2
1-1-19	7	-	-	-	-	-	-	7
1-1-20	1	-	-	-	1	-	-	2
1-1-21	3	-	-	-	-	-	-	3
1-1-22	2	-	-	-	-	-	-	2
1-1-23	2	-	-	-	-	-	-	2
1-0-24	2	-	-	-	-	-	-	2
1-1-24	1	-	-	-	-	-	-	1
1-1-25	5	-	-	-	-	-	-	5
1-1-26	12	-	-	1	-	-	-	13
1-1-27	3	-	-	-	1	-	-	4
2-0-1	see Transect HH, Grid 9							
2-1-1	10	-	-	-	-	-	-	10
2-0-2	see Transect HH, Grid 10							
2-1-2	1	-	-	-	-	-	-	1
2-0-3	see Transect HH, Grid 12							
2-1-3	11	1?	-	-	-	-	-	12
2-1-4	18	-	-	-	-	-	-	18
2-0-5	1	-	-	-	-	-	-	1
2-1-5	3	-	-	-	-	-	-	3
3-1-1	1	-	-	-	-	-	-	1
4-1-1	2	-	-	-	-	-	-	2
4-5-1	1	-	-	-	-	-	-	1
5-0-1	1	-	-	-	-	-	-	1
5-1-1	12	-	-	-	-	-	-	12
Subtotal	137	1	-	1	2	-	-	141
GRAND TOTAL	387	7	1	2	8	1	1	407
Pit in Arroyo	44	-	2	-	2	2	-	50

Appendix E, Table 2. Attributes of ceramic assemblage

Provenience	Type	Portion	Form	Soot	Abrading	Mend Hole
SF-4	TI	Body	Bowl	-	-	-
SF-10	EPB?	Body	Jar	-	-	-
SF-14	II/III	Body	Bowl	-	-	-
SF-16	TI	Body	Bowl	-	-	-
SF-18	UB	Rim	Ind.	-	-	-
SF-21	III	Rim	Bowl	-	-	-
Transect BB, Grid 13	EPP?	Rim	Jar	-	-	-
Transect CC, Grid 3	TI	Body	Bowl	-	-	-
Transect CC, Grid 4	UB	Body	Ind.	Exterior	-	-
Transect GG, Grid 13	R	Body	Jar	-	-	-
Transect GG, Grid 14	TI?	Body	Jar	-	-	-
Transect HH, Grid 5	R	Body	Bowl	-	-	-
Transect HH, Grid 8	UB	Body	Ind.	-	-	Present
Transect HH, Grid 8	R	Body	Jar	-	-	-
Transect HH, Grid 11	R	Neck	Jar	-	-	-
Transect HH, Grid 11	TI?	Body	Bowl	-	-	-
Transect HH, Grid 13	R	Body	Bowl	-	-	-
Test Unit 1E, surface	UB	Neck	Jar	-	-	-
Test Unit 1E, surface	UB	Rim	Bowl	-	-	-
Test Unit 1E, Level 1	UB	Body	Ind.	Exterior	-	-
Test Unit 1E, Level 1	UB	Rim	Bowl	-	-	-
Test Unit 1E, Level 1	TI	Body	Jar	-	-	-
Test Unit 1E, Level 2	UB	Body	Ind.	Exterior	-	-
Test Unit 1W, surface	UB	Body	Ind.	Exterior	Present	-
Test Unit 1W, Level 1	UB	Body	Ind.	Exterior	-	-
Test Unit 1W, Level 1	UB	Body	Ind.	Exterior	-	-
Test Unit 1W, Level 1	UB	Body	Ind.	Exterior	-	-
Test Unit 1W, Level 1	UB	Body	Ind.	Exterior	-	-
Test Unit 2, surface	R	Body	Jar	-	-	-
Test Unit 2, Level 3	UB	Body	Ind.	-	Present	-
Test Unit 2, Level 4	UB	Rim	Bowl	-	-	-
Test Unit 2, Level 5	UB	Neck	Jar	-	-	-
Test Unit 5, surface	UB	Body	Ind.	-	-	Present
1-1-20	TI	Body	Bowl	-	-	-
1-1-26	III	Rim	Bowl	-	-	-
1-1-27	TI	Body	Bowl	-	-	-
2-1-3	R?	Body	Bowl	-	-	-
2-1-4	UB	Rim	Ind.	-	-	-
2-1-4	UB	Rim	Ind.	-	-	-
2-1-4	UB	Rim	Ind.	-	-	-

(continued)

Appendix E, Table 2. (continued)

Provenience	Type	Portion	Form	Soot	Abrading	Mend Hole
Pit in arroyo	UB	Body	Ind.	Interior	-	-
Pit in arroyo	UB	Body	Ind.	Interior	-	-
Pit in arroyo	UB	Body	Ind.	Exterior	-	-
Pit in arroyo	UB	Body	Ind.	Exterior	-	-
Pit in arroyo	UB	Body	Ind.	Exterior	-	-
Pit in arroyo	UB	Body	Ind.	Exterior	-	-
Pit in arroyo	UB	Body	Ind.	Exterior	-	-
Pit in arroyo	UB	Body	Ind.	Exterior	-	-
Pit in arroyo	UB	Body	Ind.	Exterior	-	-
Pit in arroyo	UB	Body	Ind.	Exterior	-	-
Pit in arroyo	UB	Body	Ind.	Exterior	-	-
Pit in arroyo	UB	Body	Ind.	Exterior	-	-
Pit in arroyo	UB	Rim*	Jar	-	-	-
Pit in arroyo	UB	Rim	Jar	-	-	-
Pit in arroyo	UB	Rim**	Jar	Exterior	-	-
Pit in arroyo	UB	Rim	Seed Jar	Exterior	-	-
Pit in arroyo	II/III	Body	Bowl	-	-	-
Pit in arroyo	II/III	Body	Bowl	-	-	-
Pit in arroyo	TI	Body	Bowl	-	-	-
Pit in arroyo	TI	Body	Jar	-	-	-
Pit in arroyo	EPB	Body	Jar	-	-	-
Pit in arroyo	EPB	Body	Bowl	-	-	-

* Estimated rim diameter 18 cm
** Estimated rim diameter 22 cm

UB = Unspecified brownware
R = Red slip
II/III = Mimbres Black-on-white; indeterminate style II/III
III = Mimbres Black-on-white; style III
TI = Truly indeterminate Mimbres whiteware
EPB = El Paso bichrome
EPP = El Paso polychrome

APPENDIX F

Catalog of Materials Recovered

Appendix F, Table 1. Catalog of Army Corps Materials Recovered

Date	Description	Provenience	Level	FS#
11/29/83	FCR	TU 1E	L.0 (surface)	1
11/29/83	FCR	TU 1E	L.0 (surface)	2
11/29/83	Sherds	TU 1E	L.0 (surface)	3
11/29/83	Burned bone	TU 1E	L.0 (surface)	4
11/29/83	Lithics	TU 1E	L.0 (surface)	5
11/30/83	FCR	TU 1E	L.1 (0-10 cm)	6
11/30/83	Sherds	TU 1E	L.1 (0-10 cm)	7
11/30/83	Lithics	TU 1E	L.1 (0-10 cm)	8
11/30/83	Bone	TU 1E	L.1 (0-10 cm)	9
11/30/83	Sherds	TU 1E	L.2 (10-20 cm)	10
11/30/83	Charcoal	TU 1E	L.2 (10-20 cm)	11
11/30/83	FCR	TU 1E	L.2 (10-20 cm)	12
11/30/83	Lithics	TU 1E	L.2 (10-20 cm)	13
11/30/83	FCR	TU 1E	L.3 (20-30 cm)	14
11/30/83	Lithics	TU 1E	L.3 (20-30 cm)	15
11/30/83	Sherds	TU 1E	L.3 (20-30 cm)	16
11/30/83	Lithics	TU 1E	L.4 (30-40 cm)	17
11/29/83	FCR	TU 1W	L.0 (surface)	18
11/29/83	Ground stone	TU 1W	L.0 (surface)	19
11/29/83	Lithics	TU 1W	L.0 (surface)	20
11/29/83	Sherds	TU 1W	L.0 (surface)	21
11/30/83	FCR	TU 1W	L.1 (0-10 cm)	22
11/30/83	Charcoal	TU 1W	L.1 (0-10 cm)	23
11/30/83	Sherds	TU 1W	L.1 (0-10 cm)	24
11/30/83	Lithics	TU 1W	L.1 (0-10 cm)	25
11/30/83	FCR	TU 1W	L.2 (10-20 cm)	26
11/30/83	Charcoal	TU 1W	L.2 (10-20 cm)	27
11/30/83	Lithics	TU 1W	L.2 (10-20 cm)	28
11/30/83	Sherds	TU 1W	L.2 (10-20 cm)	29
12/1/83	Lithics	TU 1W	L.3 (20-30 cm)	30
12/1/83	FCR	TU 1W	L.3 (20-30 cm)	31
12/1/83	Sherds	TU 1W	L.4 (30-40 cm)	32
12/1/83	FCR	TU 1W	L.4 (30-40 cm)	33
12/1/83	Burned bone	TU 1W	L.4 (30-40 cm)	34
12/1/83	Charcoal	TU 1W	L.4 (30-40 cm)	35
12/1/83	Discard	TU 1W	L.4 (30-40 cm)	36
12/1/83	Soil sample	TU 1W	L.4 (30-40 cm)	37
12/1/83	Sherds	TU 1W SW 1/4	L.5 (40-50 cm)	38
12/1/83	Soil sample	TU 1W SW 1/4	L.5 (40-50 cm)	39
12/1/83	Lithics	TU 1W SW 1/4	L.5 (40-50 cm)	40
12/1/83	Lithics	TU 1W auger 2	L.6 (50-78 cm)	41
11/30/83	Sherds	TU 2	L.0 (surface)	42
11/30/83	FCR	TU 2	L.0 (surface)	43
11/30/83	Lithics	TU 2	L.2 (20-30 cm)	44
11/30/83	FCR	TU 2	L.2 (10-20 cm)	45
11/30/83	Sherds	TU 2	L.3 (20-30 cm)	46
11/30/83	Lithics	TU 2	L.4 (30-40 cm)	47

(continued)

Appendix F, Table 1. (continued)

Date	Description	Provenience	Level	FS#
11/30/83	Sherds	TU 2	L.4 (30-40 cm)	48
11/30/83	FCR	TU 2	L.4 (30-40 cm)	49
11/30/83	Lithics	TU 2	L.5 (40-50 cm)	50
11/30/83	Sherds	TU 2	L.5 (40-50 cm)	51
11/30/83	FCR	TU 2	L.5 (40-50 cm)	52
11/30/83	FCR	TU 3	L.0 (surface)	53
11/30/83	FCR	TU 3	L.0 (surface)	54
11/30/83	FCR	TU 3	L.1 (0-10 cm)	55
11/30/83	FCR	TU 3	L.1 (0-10 cm)	56
11/30/83	Sherds	TU 3	L.1 (0-10 cm)	57
11/30/83	Charcoal	TU 3	L.2 (10-20 cm)	58
11/30/83	Lithics	TU 3	L.2 (10-20 cm)	59
11/30/83	FCR	TU 3	L.2 (10-20 cm)	60
12/1/83	FCR	TU 4	L.0 (surface)	61
12/1/83	FCR	TU 4	L.0 (surface)	62
12/1/83	FCR	TU 4	L.0 (surface)	63
12/1/83	FCR	TU 4	L.0 (surface)	64
12/1/83	Sherds	TU 4	L.0 (surface)	65
12/2/83	Lithics	TU 4	L.1 (0-10 cm)	66
12/2/83	FCR	TU 4	L.1 (0-10 cm)	67
12/2/83	Lithics	TU 4	L.2 (10-20 cm)	68
12/2/83	FCR	TU 4	L.2 (10-20 cm)	69
12/1/83	Sherds	TU 5	L.0 (surface)	70
12/1/83	FCR	TU 5	L.0 (surface)	71
12/2/83	Sherds	TU 5	Surface strip	72
12/2/83	FCR	TU 5	Surface strip	73
12/2/83	Lithics	TU 5	Surface strip	74
12/2/83	Sherds	TU 5	L.1 (2-10 cm)	75
12/2/83	FCR	TU 5	L.1 (2-10 cm)	76
12/2/83	Lithics	TU 5	L.1 (2-10 cm)	77
12/2/83	Lithics	TU 5	L.2-3 (10-30 cm)	78
12/2/83	FCR	TU 5	L.2-3 (10-30 cm)	79
12/2/83	Charcoal	TU 4	L.2 (10-20 cm)	80

Appendix F, Table 2. Catalog of OCA Materials Recovered

Date	Description	Provenience	FS#
5/21/84	Sherds	1-1-26	81
5/21/84	Lithics	1-1-26	82
5/19/84	Sherds	1-1-7	83
5/21/84	Sherds	4-1-1	84
5/21/84	Lithics	4-1-1	85
5/19/84	Sherds	1-1-2	86
5/19/84	Lithics	1-1-2	87
5/20/84	Sherds	5-1-1	88
5/20/84	Lithics	5-1-1	89
5/18/84	Lithics	1-1-5	90
5/20/84	Sherds	5-surface-1	91
5/20/84	Lithics	5-surface-1	92
5/21/84	Sherds	1-surface-24	93
5/21/84	Sherds	4-5-1	94
5/17/84	Sherds	1-surface-6	95
5/17/84	Lithics	1-surface-6	96
5/20/84	Sherds	1-1-22	97
5/20/84	Lithics	1-1-22	98
5/20/84	Sherds	1-1-8	99
5/20/84	Lithics	1-1-8	100
5/20/84	Sherds	3-1-1	101
5/20/84	Lithics	3-1-1	102
5/19/84	Sherds	1-1-11	103
5/19/84	Lithics	1-1-11	104
5/17/84	Sherds	1-1-4	105
5/17/84	Lithics	1-1-4	106
5/18/84	Sherds	1-surface-11	107
5/18/84	Discard	1-surface-11	108
5/19/84	Lithics	1-1-12	109
5/21/84	Sherds	2-1-3	110
5/21/84	Lithics	2-1-3	111
5/19/84	Lithics	2-3-1	112
5/17/84	Sherds	1-1-3	113
5/17/84	Lithics	1-1-3	114
5/21/84	Sherds	1-1-25	115
5/21/84	Discard	1-1-25	116
5/20/84	Sherds	1-1-18	117
5/20/84	Discard	1-1-18	118
5/18/84	Sherds	1-surface-1	119
5/20/84	Sherds	1-1-20	120
5/20/84	Lithics	1-1-20	121
5/20/84	Sherds	1-1-1	122
5/20/84	Lithics	1-1-1	123
5/18/84	Lithics	1-surface-1	124
5/21/84	Sherds	1-1-23	125
5/18/84	Sherds	1-surface-2	126

(continued)

Appendix F, Table 2. (continued)

Date	Description	Provenience	FS#
5/18/84	Lithics	1-surface-2	127
5/19/84	Sherds	1-1-14	128
5/21/84	Discard	1-surface-28	129
5/18/84	Sherds	1-surface-7	130
5/18/84	Lithics	1-surface-7	131
5/21/84	Sherds	2-1-4	132
5/21/84	Lithics	2-1-4	133
5/21/84	Sherds	2-1-2	134
5/18/84	Sherds	1-surface-9	135
5/18/84	Lithics	1-surface-9	136
5/2/84	Sherds	1-1-24	137
5/21/84	Lithics	1-1-24	138
5/19/84	Lithics	2-4-1	139
5/21/84	Sherds	2-1-5	140
5/21/84	Sherds	2-surface-5	141
5/21/84	Lithics	2-surface-5	142
5/20/84	Sherds	1-1-21	143
5/20/84	Sherds	1-1-17	144
5/17/84	Lithics	1-surface-3	145
5/19/84	Sherds	1-1-13	146
5/18/84	Lithics	1-2-6	147
5/21/84	Lithics	4-4-1	148
5/19/84	Sherds	2-2-1	149
5/19/84	Lithics	2-2-1	150
5/18/84	Lithics	1-surface-1	151
5/18/84	Lithics	1-0-10	152
5/18/84	Lithics	1-surface-6	153
5/18/84	Lithics	1-surface-8	154
5/18/84	Lithics	1-surface-15	155
5/17/84	Sherds	1-surface-5	156
5/21/84	Sherds	1-1-27	157
5/21/84	Lithics	1-1-27	158
5/18/84	Sherds	1-1-9	159
5/18/84	Lithics	1-surface-12	160
5/20/84	Sherds	1-1-19	161
5/20/84	Lithics	1-1-19	162
5/18/84	Lithics	1-1-6	163
5/18/84	Sherds	1-1-16	164
5/18/84	Discard	1-1-16	165
5/21/84	Lithics	2-1-2	166
5/16/84	Sherds	Transect GG Grid 14	167
5/17/84	Sherds	Transect DD Grid 8	168
5/16/84	Sherds	Transect GC Grid 8	169
5/16/84	Sherds	Transect GG Grid 4	170
5/16/84	Sherds	Transect BB Grid 2	171
5/16/84	Sherds	Transect CC Grid 4	172
5/16/84	Lithics	Transect CC Grid 4	173
5/16/84	Sherds	Transect HH Grid 8	174

(continued)

Appendix F, Table 2. (continued)

Date	Description	Provenience	FS#
5/15/84	Lithics	Transect E 3	175
5/16/84	Groundstone	Transect AA Grid 2	176
5/17/84	Sherds	Transect OO Grid 12	177
5/17/84	Sherds	Transect OO Grid 16	178
5/17/84	Sherds	Transect OO Grid 15	179
5/16/84	Sherds	Transect AA Grid 14	180
5/17/84	Sherds	Transect MM Grid 8	181
5/16/84	Sherds	Transect DD Grid 14	182
5/17/84	Sherds	Transect NN Grid 9	183
5/16/84	Sherds	Transect Z Grid 2	184
5/17/84	Lithics	Transect NN Grid 10	185
5/17/84	Sherds	Transect NN Grid 10	186
5/17/84	Sherds	Transect NN Grid 16	187
5/16/84	Sherds	Transect GG Grid 13	188
5/16/84	Sherds	Transect GG Grid 12	189
5/16/84	Sherds	Transect CC Grid 5	190
5/16/84	Sherds	Transect Z Grid 5	191
5/16/84	Sherds	Transect BB Grid 15	192
5/16/84	Lithics	Transect BB Grid 15	193
5/16/84	Sherds	Transect HH Grid 9	194
5/16/84	Lithics	Transect GG Grid 1	195
5/16/84	Sherds	Transect GG Grid 1	196
5/16/84	Sherds	Transect FF Grid 7	197
5/16/84	Lithics	Transect EE Grid 1	198
5/16/84	Sherds	Transect FF Grid 11	199
5/16/84	Lithics	Transect HH Grid 4	200
5/16/84	Sherds	Transect HH Grid 4	201
5/16/84	Lithics	Transect HH Grid 6	202
5/16/84	Sherds	Transect HH Grid 6	203
5/16/84	Sherds	Transect HH Grid 5	204
5/16/84	Sherds	Transect II Grid 14	205
5/16/84	Lithics	Transect EE Grid 5	206
5/16/84	Sherds	Transect II Grid 10	207
5/16/84	Sherds	Transect II Grid 11	208
5/16/84	Lithics	Transect BB Grid 8	209
5/16/84	Sherds	Transect BB Grid 8	210
5/16/84	Hammerstone	Transect HH Grid 9	211
5/16/84	Sherds	Transect AA Grid 4	212
5/16/84	Sherds	Transect II Grid 15	213
5/16/84	Sherds	Transect AA Grid 3	214
5/16/84	Lithics	Transect HH Grid 10	215
5/16/84	Sherds	Transect HH Grid 10	216
5/15/84	Sherds	Transect P Grid 2	217
5/17/84	Lithics	Transect PP Grid 2	218
5/15/84	Groundstone	Transect O Grid 7	219
5/16/84	Discard	Transect Q Grid 7	220
5/16/84	Lithics	Transect DD Grid 5	221
5/16/84	Sherds	Transect I Grid 4	222

(continued)

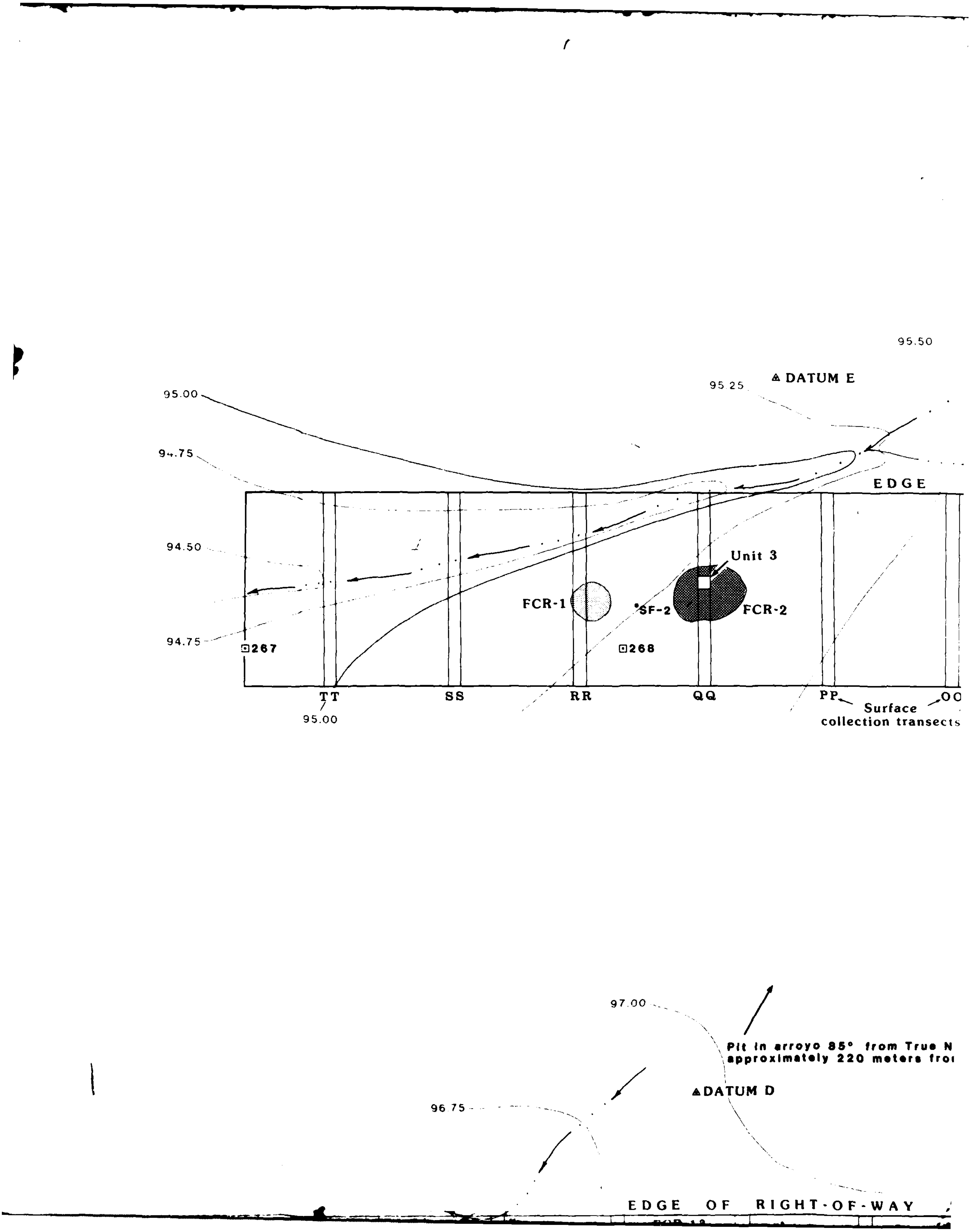
Appendix F, Table 2. (continued)

Date	Description	Provenience	FS#
5/15/84	Lithics	Transect E Grid 5	223
5/16/84	Lithics	Transect CC Grid 10	224
5/15/84	Lithics	Transect P Grid 1	225
5/16/84	Lithics	Transect Z Grid 7	226
5/16/84	Sherds	Transect Z Grid 13	227
5/15/84	Sherds	Transect O Grid 3	228
5/17/84	Discard	Transect LL Grid 11	229
5/16/84	Lithics	Transect CC Grid 7	230
5/16/84	Lithics	Transect DD Grid 3	231
5/17/84	Sherds	Transect JJ Grid 13	232
5/16/84	Sherds	Transect HH Grid 11	233
5/16/84	Sherds	Transect II Grid 12	234
5/15/84	Sherds	Transect P Grid 12	235
5/16/84	Sherds	Transect GG Grid 3	236
5/15/84	Sherds	Transect O Grid 9	237
5/16/84	Sherds	Transect GG Grid 11	238
5/16/84	Lithics	Transect GG Grid 9	239
5/16/84	Sherds	Transect GG Grid 9	240
5/17/84	Sherds	Transect JJ Grid 12	241
5/16/84	Lithics	Transect HH Grid 7	242
5/16/84	Sherds	Transect HH Grid 7	243
5/16/84	Sherds	Transect II Grid 9	244
5/17/84	Lithics	Transect LL Grid 1	245
5/17/84	Sherds	Transect LL Grid 1	246
5/17/84	Discard	Transect LL Grid 2	247
5/17/84	Sherds	Transect LL Grid 2	248
5/17/84	Sherds	Transect LL Grid 14	249
5/16/84	Lithics	Transect GG Grid 2	250
5/16/84	Sherds	Transect GG Grid 2	251
5/16/84	Sherds	Transect HH Grid 13	252
5/16/84	Sherds	Transect CC Grid 13	253
5/17/84	Sherds	Transect LL Grid 3	254
5/16/84	Lithics	Transect CC Grid 3	255
5/16/84	Sherds	Transect CC Grid 3	256
5/16/84	Sherds	Transect CC Grid 12	257
5/16/84	Sherds	Transect BB Grid 13	258
5/17/84	Sherds	Transect QQ Grid 13	259
5/17/84	Lithics	Transect OO Grid 13	260
5/17/84	Sherds	Transect OO Grid 13	261
5/17/84	Sherds	Transect MM Grid 13	262
5/17/84	Sherds	Transect HH Grid 12	263
5/17/84	Sherds	SF - 14	264
5/17/84	Sherds	SF - 16	265
5/17/84	Core	SF - 16	266
5/17/84	Sherds	SF - 18	267
5/16/84	Lithics	SF - 1	268
5/17/84	Sherds	SF - 10	269
5/17/84	Groundstone	SF - 2	270

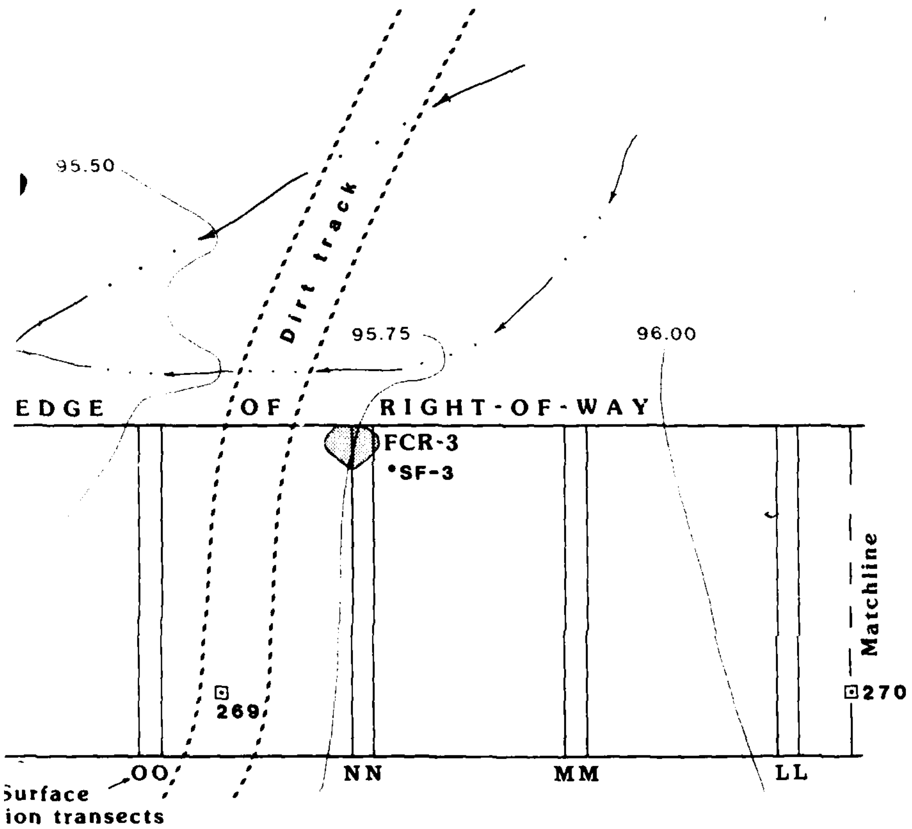
(continued)

Appendix F, Table 2. (continued)

Date	Description	Provenience	FS#
5/17/84	Lithics	SF - 22	271
5/17/84	Sherds	SF - 4	272
5/17/84	Lithics	SF - 19	273
5/17/84	Lithics	SF - 20	274
5/17/84	Groundstone	SF - 13	275
5/17/84	Core	SF - 7	276
5/17/84	Core	SF - 6	277
5/17/84	Groundstone	SF - 8	278
5/17/84	Lithics	SF - 12	279
5/17/84	Core	SF - 3	280
5/17/84	Hammerstone	SF - 5	281
5/17/84	Groundstone	SF -15	282
5/17/84	Mano	SF - 11	283
5/17/84	Sherds	SF - 21	284
5/17/84	Groundstone	SF - 9	286
5/17/84	Sherds	SF - 17	287
5/19/84	Projectile Point	1-1-11	288
5/17/84	Bone	1-1-3	289
5/18/84	Bone	1-1-16	290
5/22/84	Bone	Pit in Arroyo	291
5/22/84	Lithics	Pit in Arroyo	292
5/22/84	Sherds	Pit in Arroyo	293
5/20/84	Biface Point	SF - 23	294
5/19/84	C 14	1-1-11/3	295
5/21/84	Pollen	4-3-1/3	296
5/20/84	Pollen	1-2-7/1	297
5/20/84	Pollen	3-3-1/1	298
5/20/84	Pollen	271/30 W of R-O-W	299
5/20/84	Pollen	274/30 E of R-O-W	300
5/19/84	Pollen	3-surface-1	301
5/17/84	Pollen	1-surface-6/1	302
5/17/84	Pollen	1-surface-9/1	303
5/17/84	Pollen	1-surface-4/1	304
5/19/84	Pollen	1-2-9/1	305
5/19/84	Pollen	2-surface-1/1	306
5/20/84	Flotation	5-2-1/1	307
5/20/84	Flotation	5-1-1/1	308
5/19/84	Flotation	1-1-11/2	309
5/17/84	Sherds	Transect NN Grid 16	310
5/17/84	Sherds	Transect JJ Grid 12	311
5/15/84	Sherds	Transect I Grid 4	312
5/17/84	Lithics	Transect PP Grid 2	313
5/16/84	Lithics	Transect CC Grid 10	314
5/16/84	Lithics	Transect EE Grid 5	315
5/16/84	Sherds	Transect II Grid 10	316
5/17/84	Scraper	SF - 19	317
5/17/84	Flake	SF - 20	318
5/17/84	Sherds	SF - 18	319

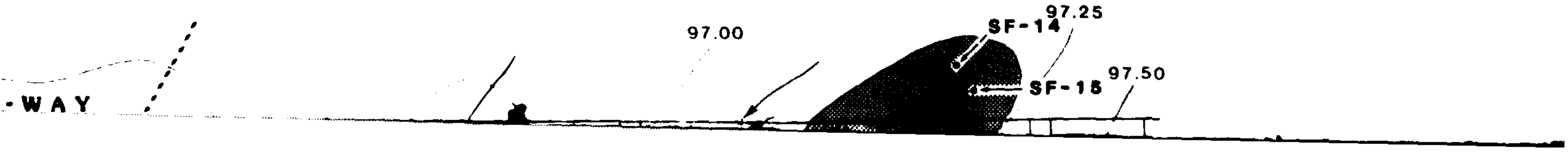


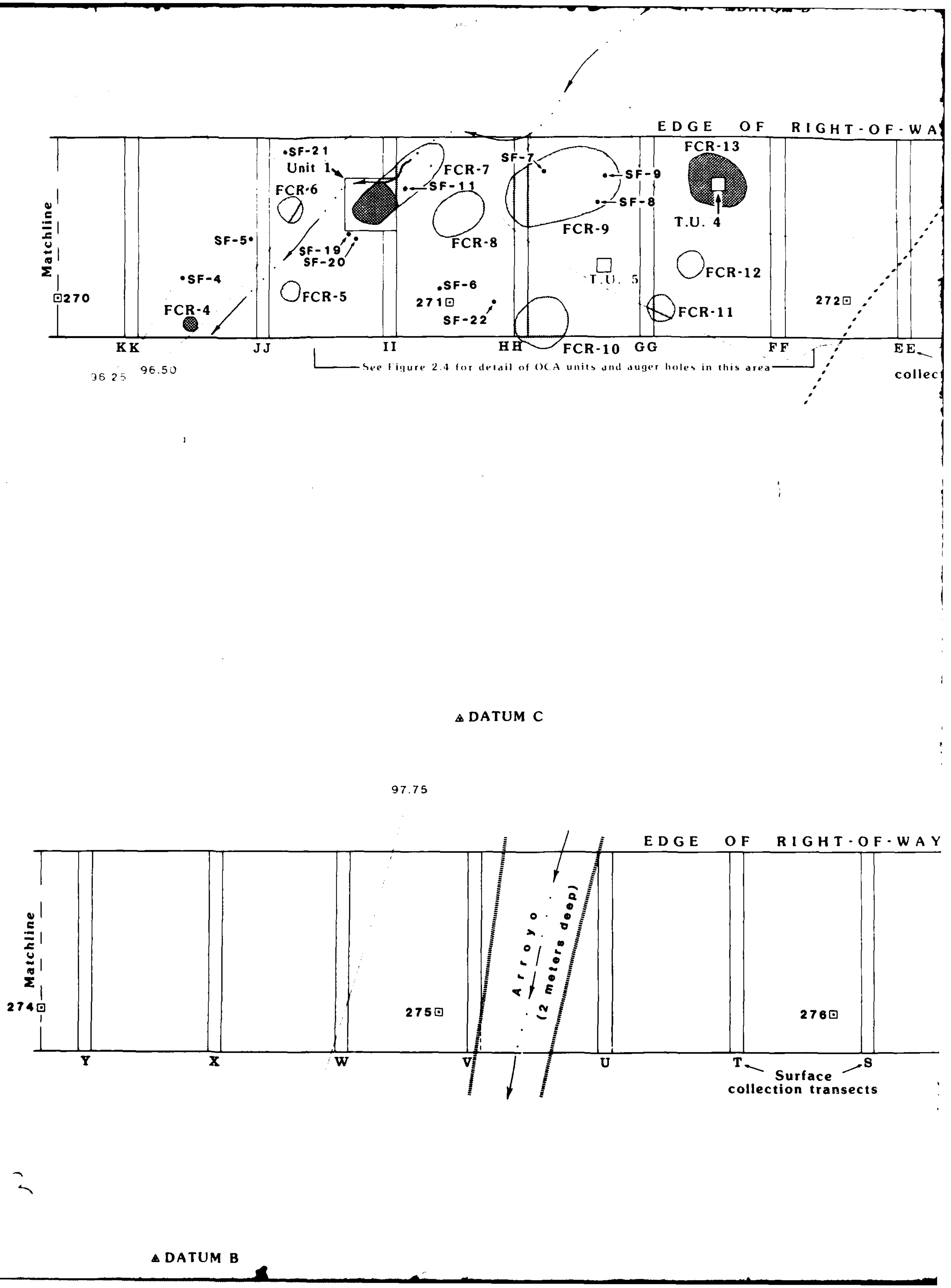
95.50
DATUM E
95.25
95.00
94.75
EDGE
94.50
Unit 3
FCR-1
SF-2
FCR-2
94.75
267
268
TT
SS
RR
QQ
PP
OO
95.00
Surface
collection transects
97.00
Pit in arroyo 85° from True N
approximately 220 meters fro
DATUM D
96.75
EDGE OF RIGHT-OF-WAY



from True North
) meters from Datum D.

2

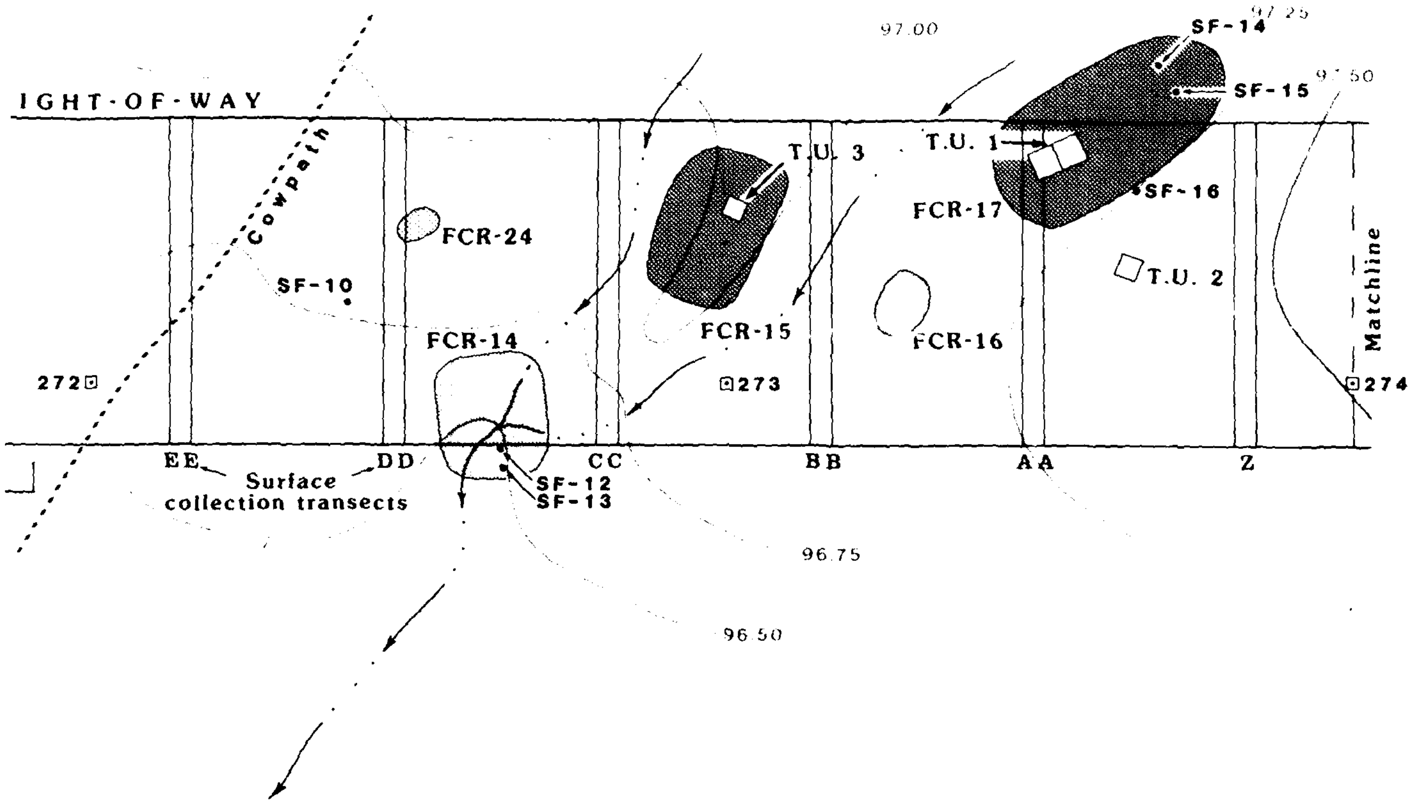


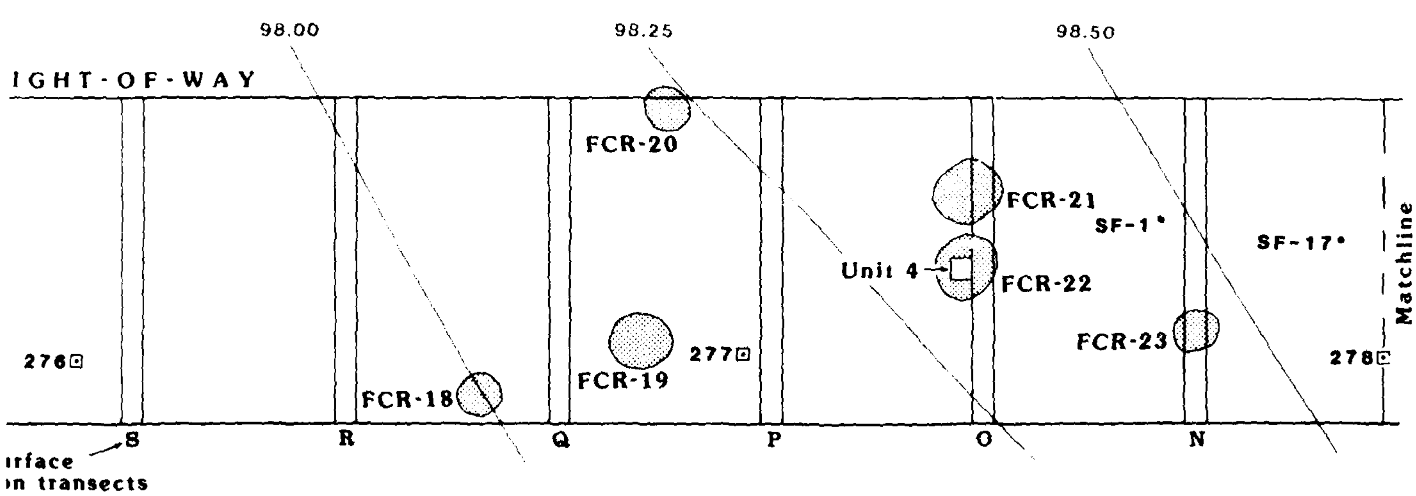

EDGE OF RIGHT-OF-WAY
Matchline
270
271
272
FCR-4
FCR-5
FCR-6
FCR-7
FCR-8
FCR-9
FCR-10
FCR-11
FCR-12
FCR-13
SF-4
SF-5
SF-6
SF-7
SF-8
SF-9
SF-11
SF-19
SF-20
SF-21
SF-22
Unit 1
T.U. 4
T.U. 5
KK
JJ
II
HH
GG
FF
EE
96.25
96.50
See Figure 2.4 for detail of OCA units and auger holes in this area
collec
DATUM C
97.75
EDGE OF RIGHT-OF-WAY
Matchline
274
275
276
Arroyo
(2 meters deep)
Y
X
W
V
U
T
S
Surface collection transects
DATUM B

ximately 220 meters from Datum D.

D

2





4

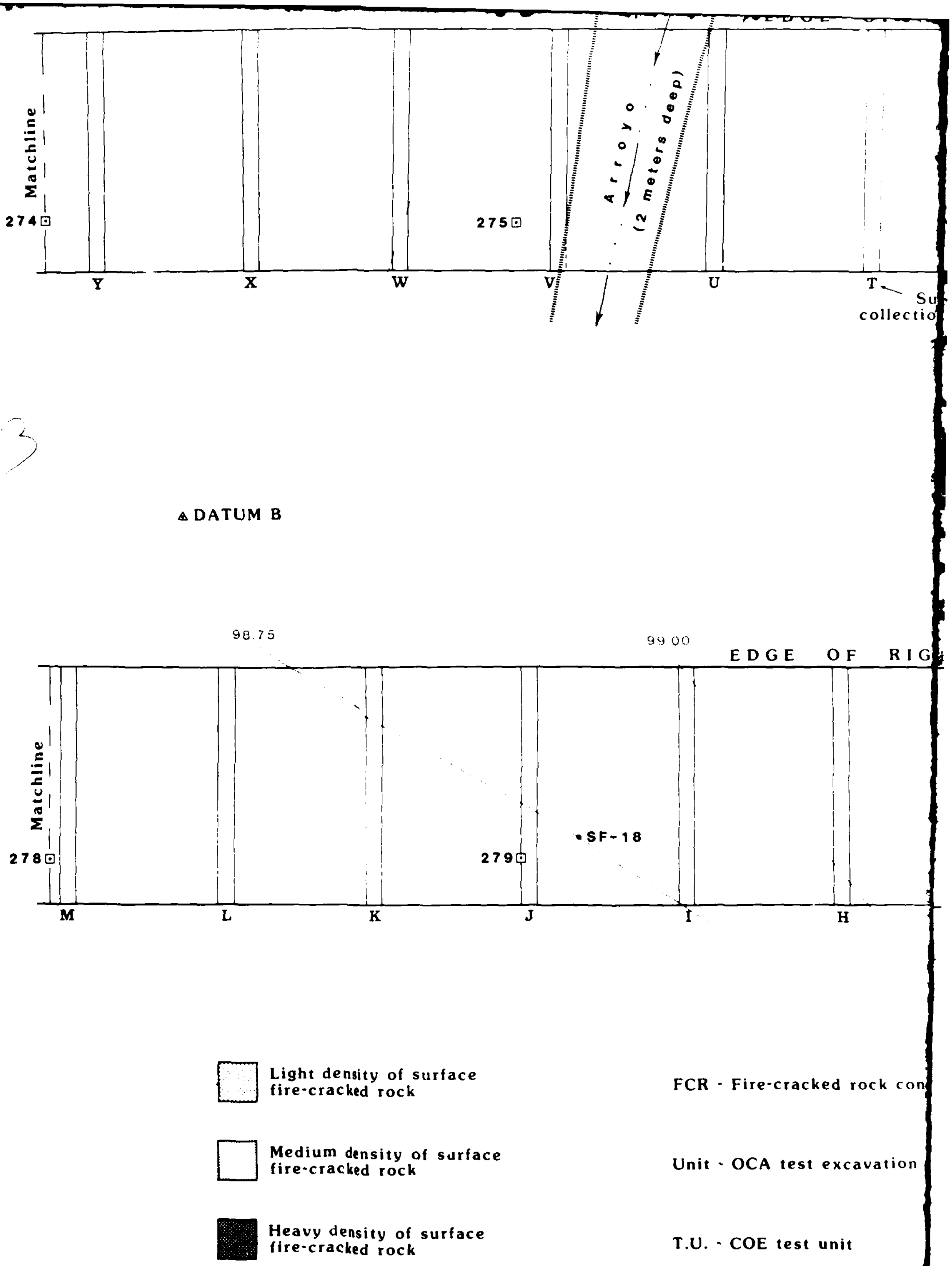
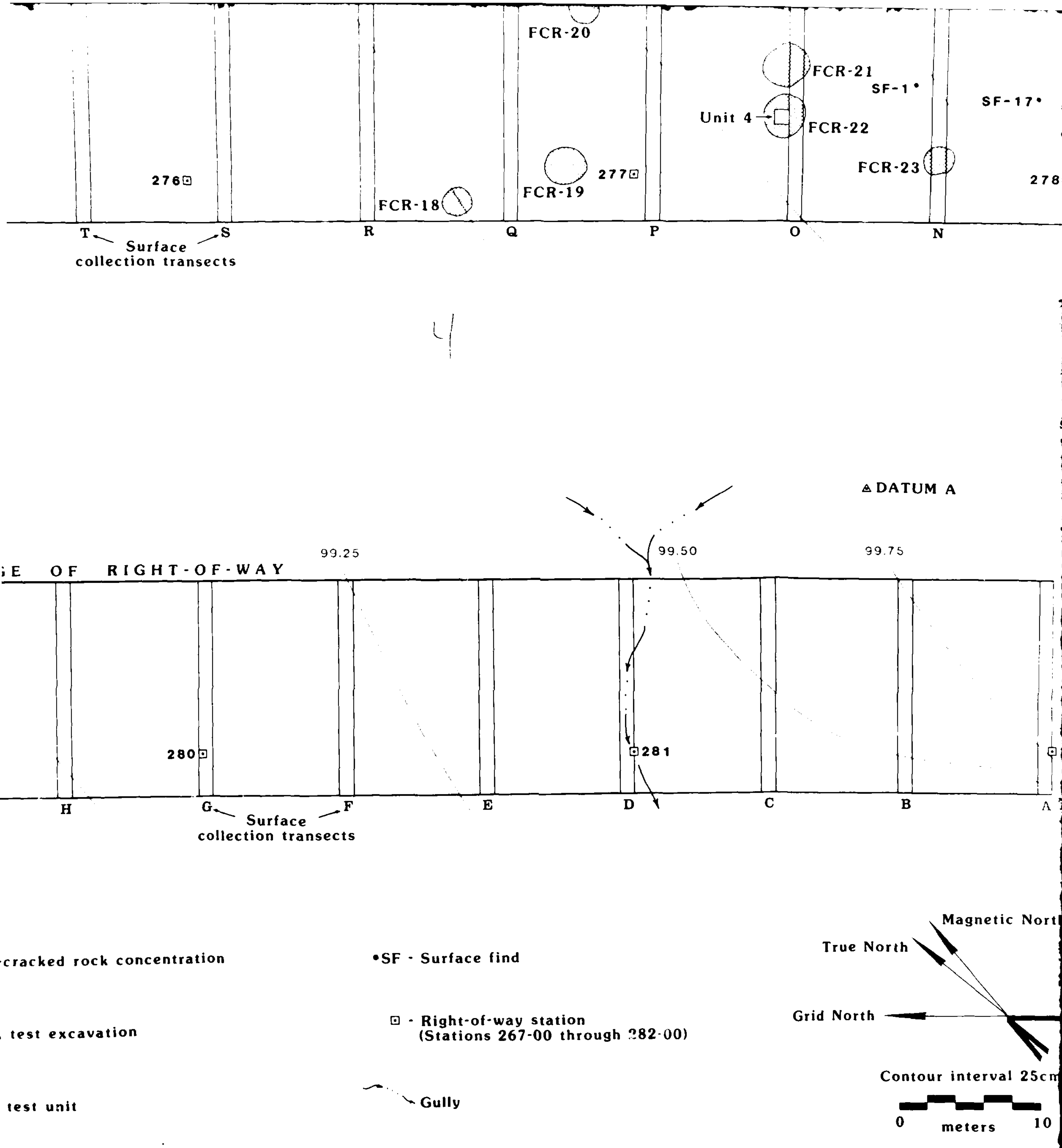


Figure 2.3. Topographic map of the project right-of-way



right-of-way showing cultural features, surface transects, and excavation locations

END

DATE
FILMED

1-87

DTIC