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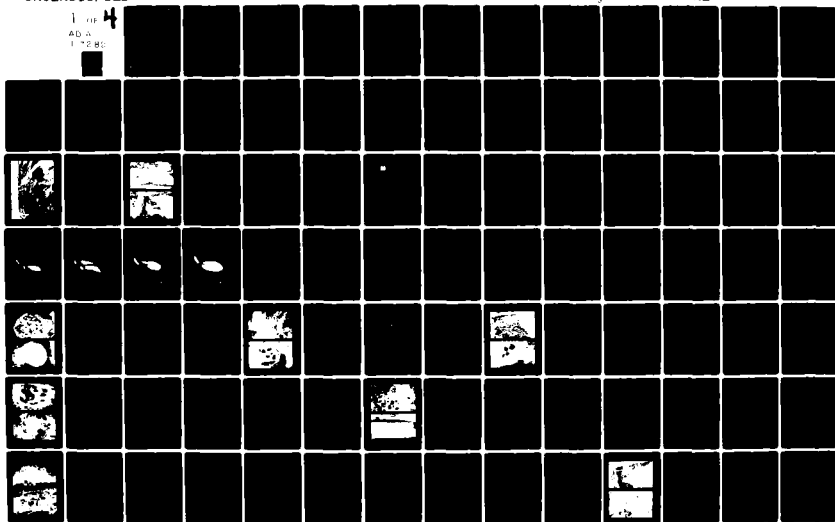
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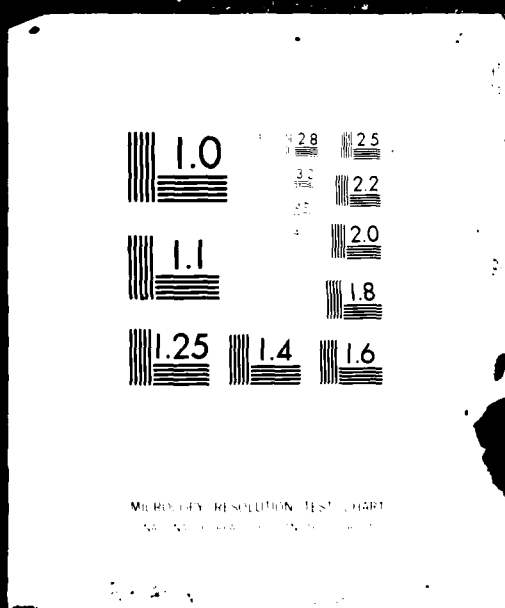
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ARCHAEOLOGICAL INVESTIGATIONS
AT THE
SAN GABRIEL RESERVOIR DISTRICTS,
CENTRAL TEXAS

VOLUME 4

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This report presents the results of archaeological investigations conducted by North Texas State University at two Corps of Engineers reservoirs on the San Gabriel River in Central Texas. The archaeology project consisted of site survey, evaluation, and data recovery of endangered cultural resources at North Fork and Granger Reservoirs. Eighty new prehistoric and one hundred historic sites were recorded, of which nine prehistoric and thirteen historic sites had further study. Additional research involved the Hoxie Ranch, and evaluations		

of a Paleo-Indian site (41WM419), and the Cervenka Site (41WM267).

The two reservoirs, located in different environmental zones, offered an opportunity to examine varying human adaptations. First, the cultural patterns of the two reservoirs were delineated. Next, the adaptive patterns and artifact assemblages were compared to determine if the two reservoirs were part of the same cultural area.

Contributions to Central Texas archaeology include: 1) the chronology of human occupation has been augmented by thirty-seven new radiocarbon dates; 2) an alternative to current models of prehistoric adaptation for the area is proposed; 3) an interpretation of the occurrence of burned rock middens has been presented; 4) an evaluation of the "phase" concept in Central Texas indicated the geographical boundaries of the phases varied through time.

ARCHEOLOGICAL INVESTIGATIONS AT THE LOEVE-FOX,
LOEVE AND TOMBSTONE BLUFF SITES IN THE
GRANGER LAKE DISTRICT OF CENTRAL TEXAS

by

Elton R. Prewitt

with an Appendix by:

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Texas Archeological Survey
The University of Texas at Austin
Austin, Texas

1981



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ABSTRACT

The findings made during the 1978 archeological investigations of three sites in the Granger Lake District are reported. The investigations were carried out by the Texas Archeological Survey of The University of Texas at Austin under terms of an agreement with The Institute of Applied Sciences, North Texas State University. This work represents a continuation of cultural resource mitigation sponsored by the Fort Worth District, U.S. Army Corps of Engineers. The Granger Lake District is located on the San Gabriel River in eastern Williamson County, central Texas.

Extensive excavations at the Loeve-Fox Site (41WM230) revealed a series of discrete episodes of occupation extending from the middle Archaic Round Rock Phase (2,600 - 3,400 years B.P.) through the late Neolithic Toyah Phase (200 - 650 years B.P.). A variety of features and artifacts which vary through time was identified; horizontal patterning of these features and materials was noted in nearly all the identified and isolated temporal phases of occupation. Of particular significance is the finding of a cremation with associated conch columella bead in the San Marcos Phase, the identification of a series of cremations as a component of an Austin Phase cemetery, and the discovery of an articulated bison skeleton in the Toyah Phase. The horizontal patterning is most completely evident in the Twin Sisters Phase where at least three episodes of site use are identified and each episode exhibits similar feature patterning. The patterning is interpreted to reflect a circular encampment composed of extended kind groups similar to historically documented Plains Indian encampments. A significant variation through time includes an interpretation that the importance of hunting is high during the Round Rock Phase, then declines slightly in the San Marcos Phase and by the Twin Sisters Phase represents a relatively minor part of the subsistence activities; however, during the Toyah Phase, the apparent importance of hunting rises abruptly to the level formerly noted for the Round Rock Phase.

More limited excavations at the Loeve Site (41WM133) yielded evidence of a discrete episode of camping during the early Archaic Circleville Phase (7,000 - 8,500 years B.P.). The patterning of features and debris suggests a hunting and gathering encampment which was situated on a gravel point bar. The site assumes unquestionable regional significance in that it represents the first time in Central Texas that an apparent living surface with intact features and debris, including two Angostura-like projectile points, has been exposed and recorded for this temporal phase of occupation.

The brief investigations at the Tombstone Bluff Site (41WM165) revealed that the artifacts associated with the late Paleoindian Stage through early Archaic Stage Circleville, San Geronimo, Jarrell and Oakalla phases are limited to the disturbed plowzone. No features or intact deposits were found at this site; however, the materials collected are considered to be significant and are described in detail.

ACKNOWLEDGMENTS

The time, effort and patience given by many people have enabled the successful completion of this project. I extend special thanks to the foremost supporter of the work in the Granger Lake District: Clarence Loeve, the former owner of the Loeve Site and discoverer of the Loeve-Fox and Tombstone Bluff sites, has been of invaluable assistance during the course of this project. The field crew of the Texas Archeological Survey during the 1978 excavation season turned in a remarkably professional performance in the execution of their duties; these people are thanked for their professionalism and dedication to duty under frequently adverse conditions. The crew included the following people:

Duford W. Skelton, Assistant Archeologist	
Kristin A. Kuckleman, Junior Assistant Archeologist	
Harold G. (Woody) Wooldridge, Backhoe Operator	
Terry L. Mitchell, Photographer	
Ray D. Kenmotsu, Botanist	
Bill Bryant	
Maureen Cavanaugh	Neal Morris
Molly Godwin	George Nelson
Lourdes Hennebry	Patricia Neuhaus
Steve Kotter	Denise Palmer
Jane Laurens	Charles Schulze
Diana (Dino) Lowrey	Richard Wilshusen
Maxine Morris	Steve Zeman

The interest in the Loeve-Fox Site was phenomenal; approximately 20 persons volunteered from one-half to five days of work each at the site, and literally hundreds of people visited the Loeve-Fox and Loeve sites during the course of the fieldwork. These included casual visitors from the local area, professional and avocational archeologists, three University of Texas at Austin classes, three secondary school classes from Taylor and Baytown, a Texas Department of Highways and Public Transportation class, numerous staff members from both the Fort Worth District Office and the Southwest Division Office of the Corps of Engineers, and over 200 local residents who attended the open house held in conjunction with the 1978 Granger Homecoming activities. All of these people are thanked for their interest, support and assistance.

The assistance provided by Ranger Kenneth Howell of the Georgetown Field Office of the Corps of Engineers is particularly appreciated. Leroy Werchan and his colleagues from the Soil Conservation Service were frequent visitors, and their assistance in examining the local soils is greatly appreciated. Kenneth Schroeder of Taylor did an excellent job of removing the overburden from the Loeve Site with his bulldozer.

Dr. T.R. Hays, Olin McCormick, Dwayne Peter, Dan Prikryl and Pegi Jodry of North Texas State University were frequent visitors during the project; their assistance is appreciated.

Personnel of the Texas Archeological Survey who assisted in the preparation of this final report are gratefully acknowledged. David S. Dibble and Melinda Giles provided administrative support. Douglas B. Comstock photographed the artifacts and prepared the photographic plates. Carole R. Fabac supervised the drafting, assisted by Ingrid Dierlam, Leland C. Bement and Herbert H. Eling. Personnel of Prewitt and Associates, Inc. who worked in cooperation with the TAS staff include Linda Nance and Barbara Nagel, co-typists of the draft manuscript. Linda Nance typed the final manuscript. I would especially like to express my appreciation to the staff of Prewitt and Associates, Inc. who assisted in many ways during the preparation of this report, particularly in terms of assuming additional responsibilities and workloads in order to allow the author sufficient time from a busy schedule to work on the manuscript. Sue Andrews and Margaret Howard catalogued the photographs from the entire field season.

Finally, I would like to thank my wife, Kerza A. Prewitt, for the continued patience and moral support she has provided throughout the project.

Sincere thanks are extended to everyone who has helped this project reach a successful conclusion.

INTRODUCTION

Archeological investigations within the Granger Lake District were resumed in January 1978. Previous archeological work in the Granger Lake District has been extensive; the reader is directed to a summary of these investigations contained in Volume 1 of this series. The current effort, reported here, was a joint venture between the Texas Archeological Survey of The University of Texas at Austin and the Institute of Applied Sciences of North Texas State University. The work was funded by the Fort Worth District Office of the United States Army Corps of Engineers. This volume deals with those three sites for which the Texas Archeological Survey was responsible: the Loeve Site (41WM133), the Tombstone Bluff Site (41WM165), and the Loeve-Fox Site (41WM230). Individual responsibilities were distributed as follows: David S. Dibble, Principal Investigator; Elton R. Prewitt, Project Archeologist; Duford W. Skelton, Assistant Archeologist; and Kristin A. Kuckleman, Junior Assistant Archeologist. Skelton also provided laboratory assistance during the initial cataloging and data compilation stage of the project.

The Granger Lake Archeological District encompasses the general area within and adjacent to the limits of Granger Lake. This lake (filled in 1980-81) is formed by the impoundment of waters behind Granger Dam which is located on the middle reaches of the San Gabriel River in eastern Williamson County, Texas. The dam is located at river-mile 31.9 approximately 15.5 kilometers northeast of Taylor and 10.8 kilometers east-southeast of Granger. The dam impounds water on the mainstem San Gabriel River and a major left bank tributary, Willis Creek.

The San Gabriel River is an east-northeast-flowing segment of the Brazos River Basin, and Willis Creek is an east-southeast-flowing tributary which enters the San Gabriel River near the outlet works of Granger Dam. The lake is expected to be maintained at an elevation of 153.3 meters (504 feet) above mean sea level (msl). The 4.5-kilometer-long rolled earthfill dam has a spillway crest elevation of 160.6 meters (528 feet) above msl and rises about 35 meters (115 feet) above the streambed. Granger Lake inundates approximately 21 kilometers (13.5 miles) of the San Gabriel River streambed to near the community of Circleville, and 10.7 kilometers (7 miles) of the Willis Creek streambed to near Granger.

The Granger Lake District is situated in the Taylor Prairie zone of the Black Prairie which parallels the Balcones Escarpment to the west (Fenneman 1938:108 and Fig. 27). The underlying geologic formations are composed of the Mesozoic-age Taylor Group which consists of various marls and clays (Sellards, Adkins and Plummer 1932:455-479). Soils within the area are generally composed of the dark calcareous cracking clayey Houston Black-Heiden-Austin Association and include Pellusterts, Chromusterts and Haplustolls (Godfrey, McKee and Oakes 1973). The flora and fauna are characteristic of the Texan biotic province as defined by Blair (1950:100-102).

Archeological investigations within the Granger Lake District were initiated in 1963 when the Texas Archeological Salvage Project (now the Texas Archeological Survey) conducted a reconnaissance survey of the reservoir basin (Shafer and Corbin 1965). A testing program designed as a follow-up to that reconnaissance was carried out in 1968 when three sites were tested by the Texas Archeological Salvage Project (Eddy 1973). This work included a significant testing of the Loeve Site; additional investigations at this locality are reported herein. No further work was carried out until 1972 when Clarence Loeve reported the Loeve-Fox Site; testing began on that site in the Fall of 1972 and continued until the Spring of 1974 when the Corps of Engineers took possession of the property (Prewitt 1974). This was followed by additional survey activities by Texas A&M University in 1976, then limited testing at three sites by that institution in the same year. In the following year, 1977, additional testing was carried out at three more sites by Texas A&M University (Bond 1978). This was followed in 1978 by the present project in which North Texas State University tested some major sites, carried out additional survey and minor testing at several sites in the District, and conducted an historical site survey within the District, and in which the Texas Archeological Survey conducted investigations at the three sites reported in this volume.

The organization of the present report reflects the relative amounts of work carried out at each of the three sites. The greatest amount of work was concentrated at the Loeve-Fox Site (1,110 person-days) with lesser amounts expended on the Loeve Site (128 person-days) and the Tombstone Bluff Site (17 person-days). The current excavations at these sites began on January 9, 1978, and continued through June 2, 1978. In addition to the person-days noted above, 52 person-days of volunteer efforts were expended on the Loeve-Fox and Loeve sites; this includes individuals from the Austin area who wished to assist in the investigation effort.

The approach taken in the current investigation program reflects the findings made during the 1968 to 1974 period of investigations. Specifically, Eddy (1973) was unable to gain an adequate exposure of the lower components at the Loeve Site because of the massive volume of overburden; this problem was resolved through the use of heavy machinery to remove most of the overburden and provide a working platform which allowed greater access to those components which were felt to merit extensive attention. At the Loeve-Fox Site, the opinion expressed by the author in the previous report on that site was pursued; specifically, it was suggested that further investigations should be directed toward "[i]solation of possible living surfaces through large areal excavations" (Prewitt 1974:116). This concept of stripping large contiguous areas to try to isolate episodes of occupation is at variance with the usual field procedures employed in Central Texas where excavations have been limited to tiny "keyholes." The limited test pit approach provides few archeological data aside from the establishment of chronologic succession of artifacts. An attempt to gain a comparison of patterning through the exposure of two large areas at the Loeve-Fox Site was stymied by a conflict with one provision of the Corps of Engineers research design for the San Gabriel River projects; simple chi-square

tests of the distributions of lithic debris in two excavation units (XU2 and XU3) which was collected during the 1972-74 excavations showed an identical vertical relationship. This was considered to be repetitive in terms of the COE scope of services for this project, and consequently, requests for further work in XU2 were not allowed. Existing fiscal constraints prevented expansion into additional excavation units to test promising patterns evident in areas exposed by XU2.

Despite these limitations, the work accomplished at the Loeve-Fox Site produced significant data which is likely to have an enormous impact on future investigation techniques employed on terrace sites in the region. The amount of work carried out at the Loeve Site was disappointingly limited; however, the results obtained are no less exciting than the findings at the Loeve-Fox Site. The greatest disappointment was encountered at the Tombstone Bluff Site where it was found that all the cultural materials were contained in the plow zone and that no intact cultural deposits remained at the site. Even so, the materials collected from the surface provide useful information regarding early occupations in the Granger Lake District.

THE LOEVE-FOX SITE (41WM230)

SITE DESCRIPTION

The Loeve-Fox Site is located on the left bank of the eastward-flowing San Gabriel River in eastern Williamson County approximately 3.5 kilometers east-northeast (downstream) of the crossroads community of Circleville and about 7.6 kilometers south-southeast of the farming community of Granger (Fig. 1). The deep alluvial terrace is covered with a grove of native pecan trees, although parts of the northern end of the site support a thicket of hackberries and dense brush.

On the east, the site is bounded by the present channel of the San Gabriel River which flows northward at this point. To the south, the site limits coincide with a fossil river channel scar which serves as a chute for periodic floodwaters. The southwest to west side of the site is bounded by a cleared pasture which was formerly cultivated. The northwest to north margin of the site coincides with another floodwater chute which probably represents a fossil (Pleistocene) river channel scar. To the northwest of this channel scar, the valley wall slopes upward to the adjacent gently undulating blacklands of the Taylor Prairie. Extensive deposits of Uvalde Gravels are banked against the valley wall adjacent to the prairie.

The site is on a low north-northeast-trending rise of the floodplain. A sharply incised lateral gully transects the northern end of the site; this feature is modern according to local informants. The flowing springs, one near the mouth and one near the head, are associated with the gully.

Extensive casual excavations were conducted at the site by Mr. Clarence Loeve prior to the initiation of controlled excavations in 1972. Three major areas were excavated by Mr. Loeve; the largest is in the main site area and extends north to south from XU3 to XU2, on the west to XU1, and on the east to a shallow slough which extends from south to north through the center of the site. In this area, the depths of disturbance rarely exceed 1 to 1.5 meters. The next largest area of disturbance is that part of the site which lies north of the modern gully. No controlled excavations have been carried out in that portion of the site. A minor area of disturbance is located between the shallow slough and the river channel between XU5 and XU6. Many of the artifacts recovered by Mr. Loeve in these excavations were included in the artifact descriptions in the previous report of work at the Loeve-Fox Site (Prewitt 1974). Additional discussions and descriptions of the site may be found in that report.

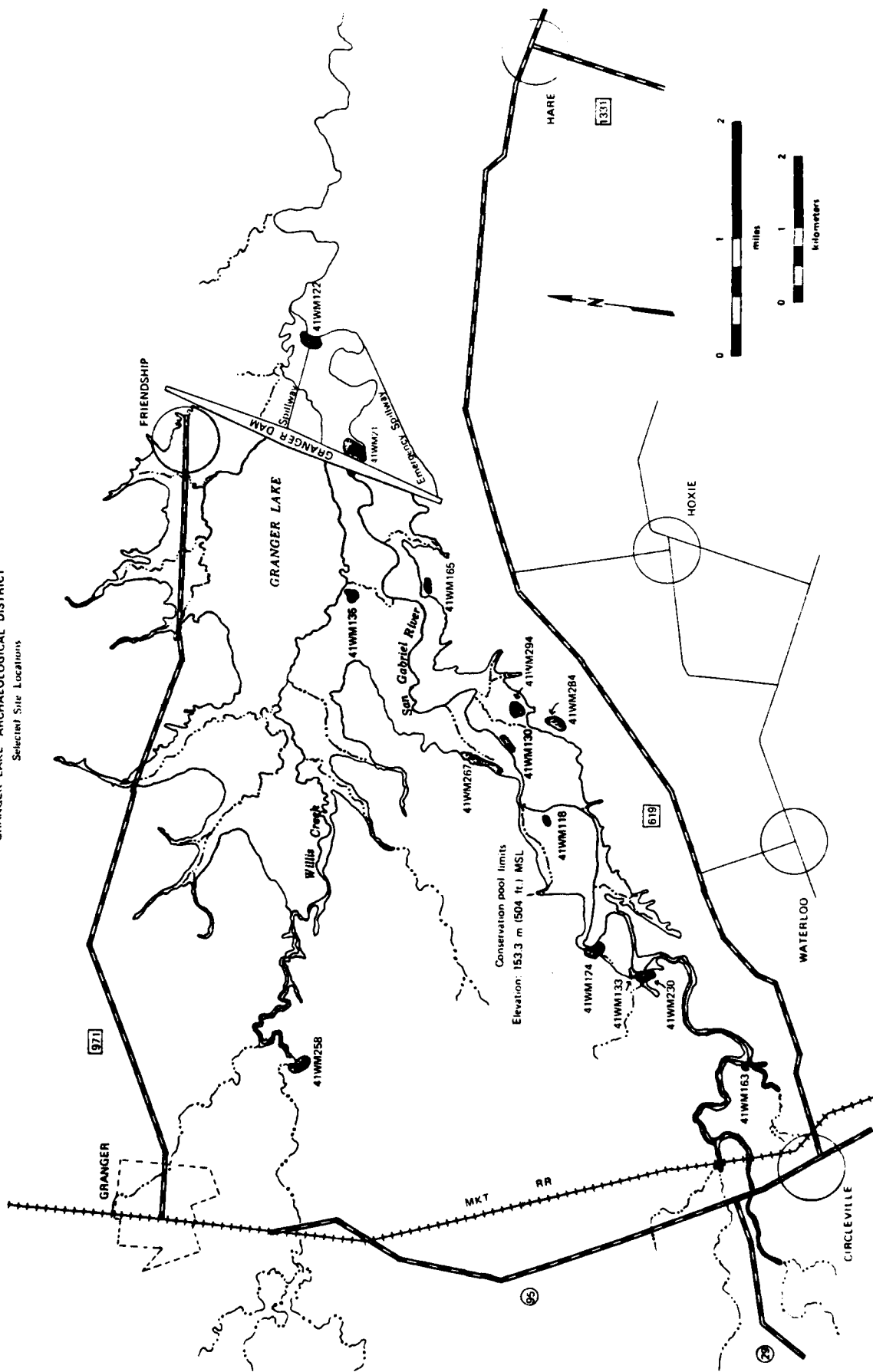
EXCAVATION PROCEDURES

The sampling strategy and excavation procedures employed at the Loeve-Fox Site during the 1978 investigations represent a continuation of the program begun in 1972. In the report on the previous work at the site, it was suggested that the approach which should be taken in further investigations should be directed toward massive stripping of the terrace deposits in an effort to isolate possible living surfaces through large areal excavations (Prewitt 1974:116).

Vertical and horizontal controls established at the site during previous seasons were in feet; this system was changed to the metric system for the current work. The old elevation datum designated as an arbitrary 100 feet was relabeled to designate 100 meters. All elevation references relate to this datum. Similarly, the old grid point designated as N1000/W1000 feet was relabeled as N1000/W1000 meters. The orientation of the grid system remains unchanged so that the previous major baselines along the N1000 and W1000 axes coincide with the metrically designated baselines. Grid designations increase to the north and to the west; the southeast corner of each excavation square is used to identify the pit.

Major areas of excavation are designated as Excavation Units (abbreviated XU); the physical size of a given XU may vary tremendously. For example, XU7 is a single 2x2-meter pit while XU3 measures 8x16 meters and encompasses 32 of the 2x2-meter units. Each of the XU's are assigned an arbitrary sequential number; currently, nine XU's have been opened at the site. The 1978 season excavations were concentrated in XU1, XU3, XU5, XU7, XU8 and XU9. Minor cleanup work was started in XU2; however, problems with statistical repetition of lithic debris which contradicted a provision in the Corps of Engineers' research design resulted in the abandonment of work in XU2 for the 1978 season. See Figure 2 for the location of the XU's. A separate Unit Journal was maintained for each XU in addition to the Site Journal.

FIGURE 1
GRANGER LAKE ARCHAEOLOGICAL DISTRICT
Selected Site Locations



The basic units of excavation were 2x2 meters with the grid coordinate at the southeast corner serving as the designator for the unit. These were the primary recordkeeping and investigative units. The 2x2-meter units were further subdivided into 1x1-meter cells which were designated as NW, NE, SE or SW; artifact provenience was maintained by cell. The northwest 50x50-centimeter subcell of the NW cell of each 2x2-meter unit was designated for fine-screen processing and matrix sample collection.

Each identified feature, whether cultural or natural in origin, was treated independently in the sense that a set of notes was maintained for features which was separate from the level reports and Unit Journals. Intrafeature provenience was maintained by cell and unit, but materials from features were kept separate from the remainder of the cell(s).

Vertical increments of excavation consisted of 10-centimeter-thick arbitrary levels. All elevations for level control were established with the aid of a transit and stadia; line levels and hand tapes were not considered to be adequate for the maintenance of precise vertical controls.

With the exception of feature fill and the NW subcell of the NW cell of each 2x2-meter unit, all excavated soil was washed through 1/4-inch mesh hardware cloth to accomplish basic artifact recovery. Matrix samples from the NW subcells and the features were collected, then the remainder of the fill in each case was washed through a nested set of screens which consisted of a 1/4-inch mesh screen atop a window screen. Provenience for the coarse and fine fractions was kept separate.

Documentation of the excavations included several categories and levels of recordkeeping. Written records include a general Site Journal, Unit Journals for each XU, level reports for each 2x2-meter Unit, a Feature Index, feature notes, a photographic index and an inventory of artifacts. Graphic records include black-and-white and color photographs, measured plan drawings and measured profile drawings.

Two other types of excavations were carried out at the site; these include exploratory backhoe trenches (BHT's) and Backhoe Ramps (BHR's). Nineteen backhoe trenches were dug into various parts of the site in an attempt to delineate the general site boundaries; ten backhoe trenches had been excavated during the previous work (Fig. 2). Two backhoe ramps were excavated during the 1978 season; BHR1 was oriented northwest-southeast and was placed at the southeastern corner of XU3 in order to facilitate access to the deep test excavations carried out in that area. The ramp was placed so that it extended through deposits which had been previously excavated by Mr. Loeve. BHR2 was oriented east-west roughly along the N985 to N990 gridline. Again, an area previously disturbed by Mr. Loeve (at least in the upper deposits) was selected in order to minimize the loss of intact cultural deposits. However, the purpose of BHR2 was to obtain a large profile exposure and to provide penetration of some of the deeper and earlier deposits at the site.

Legend

 Back hoe trench

XU Excavation unit



Figure 3. General view of XU3, excavation in progress. View is looking north from photographic platform in pecan tree near south end of the XU. Note the recent gully in the background (brush-line). Deep test excavated in 1972-1974 is in lower right of the photograph. Crewmember in foreground is cleaning F-51 Arcuate Hearth. F-44 Small Basin Hearth is exposed and pedes-
taled in lower left of photograph.



Figure 4. General views of XU7 and BHR2

- a. Crewmember recording floor plan of XU7. View is looking east from bottom of the recent gully.
- b. View of BHR2 looking east. Machine excavation of the ramp is less than half completed.



FIGURE 4

Features encountered within the backhoe trenches and ramps were recorded to the extent possible; however, limited data were collected from them and are used to the extent possible in this report. Charcoal samples for radiocarbon assay were collected only from features rather than from general occupation levels.

All artifacts and materials collected were sent to the NTSU field laboratory for processing and cataloging. Following the cessation of fieldwork, all materials except the faunal debris and human skeletal materials were returned to the facilities of the Texas Archeological Survey at Austin. Final processing, cataloging and analysis were accomplished at the Survey facilities. All notes, drawings, photographs and other materials are presently housed at the Survey; they will be permanently stored at the Texas Archeological Research Laboratory of The University of Texas at Austin.

CHRONOLOGY SCHEME

The work of many people spanning decades of research in Central Texas archeology forms the basis of the chronological scheme employed for the Loeve-Fox Site analysis. Basic designators for the recognized cultural units are taken primarily from Jelks (1962), Weir (1976a, 1976b) and Prewitt (n.d.), although it must be emphasized that the definitions of numerous other researchers are integrated, either consciously or unconsciously, into the final scheme as it is herein used.

Regional chronologies for Central Texas have been proposed, discarded, superceded, or refined for many years. Beginning with Pearce's (1932) simple chronological divisions, increasingly complex and varied schemes have appeared in the literature; examples are Sayles (1935), Kelley (1947a, 1947b), Suhm, Krieger and Jelks (1954), Johnson, Suhm and Tunnell (1962), Sorrow, Shafer and Ross (1967), Johnson (1967), Eddy (1973), Prewitt (1974) and Jelks (1978).

An overriding problem in dealing with these varied proposed schemes is a lack of a common general concept of how comparable cultural units should be defined or employed. While it is true that the majority of researchers in recent years have relied on some variation of the Midwestern Taxonomic System (McKern 1939) or that of Willey and Phillips (1958), there is still a great divergence of intent and usage from report to report.

In an attempt to allow easier usage of this report, a general delineation of terms used herein is provided. The stratigraphic associations at the site (see Table 1) are viewed as a local sequence in the sense defined by Willey and Phillips (1958:24-25). Similarly, phases are roughly equivalent to the definitions provided by Willey and Phillips (1958:22-24). The individual expressions within each cultural/natural stratum at the site are viewed in terms of Willey and Phillips' definition of a component (1958:21-22). It should be interjected here that, based on the stratigraphic evidence at Loeve-Fox, certain previously proposed phases have been divided; the definitions of these phases

TABLE 1
GENERAL CHRONOLOGY SCHEME, CENTRAL TEXAS

Period	Phase/Years B.P.	Index Markers
Neoarchaic	Toyah 200 - 650	<u>Perdiz</u> , <u>Cliffton</u> arrow points, plano-convex end scrapers, four-bevel bifacial blades, <u>Leon Plain</u> ceramics, bison, cemeteries, large flat hearths
	Austin 650 - 1250	<u>Scallorn</u> , <u>Granbury</u> arrow points, cemeteries, large basin fire hearths, burned clay/charcoal pits
Archaic	Driftwood 1250 - 1400	<u>Mahomet</u> dart points, <u>Hare</u> bifaces, small basin fire hearths, burned clay/charcoal pits
	Twin Sisters 1400 - 1750	<u>Ensor</u> , <u>Fairland</u> dart points, <u>Erath</u> , <u>San Gabriel</u> bifaces, crushers, large, small and arcuate fire hearths, charcoal and ash-filled pits
	Uvalde 1750 - 2250	<u>Castroville</u> , <u>Marcos</u> , <u>Montell</u> dart points
	San Marcos 2250 - 2600	<u>Marshall</u> , <u>Williams</u> dart points, medium basin hearths, mussel shell concentrations, burned rock middens
	Round Rock 2600 - 3400	<u>Pedernales</u> dart points, medium basin fire hearths, lithic debris concentrations, mussel shell concentrations, burned rock middens
	Marshall Ford 3400 - 4000	<u>Bulverde</u> dart points, burned rock middens
	Clear Fork 4000 - 4600	<u>Nolan</u> , <u>Travis</u> dart points, burned rock middens
	Oakalla 4600 - 5000	<u>Tortugas taylor</u> , <u>I. baird</u> dart points, <u>Clear Fork</u> gouges
	Jarrell 5000 - 6000	<u>Bell</u> , <u>Andice</u> dart points, <u>Clear Fork</u> gouges, large fire hearths, bison
	San Geronimo 6000 - 7000	<u>Gower</u> , <u>Hoxie</u> , <u>Martindale</u> , <u>Wells</u> , early side-notched dart points

Table 1, continued

Period	Phase/Years B.P.	Index Markers
	Circleville 7000 - 8500	<u>Angostura, Meserve, Golondrina,</u> <u>Scottsbluff</u> projectile points
Paleoindian	Undifferentiated 8500 - ?	<u>Plainview, Folsom</u> projectile points

are the subject of a separate paper published in the Bulletin of the Texas Archeological Society (Prewitt 1981). In the proposed chronological scheme which is used in this section, the chronologically earlier phases are based on information from sites other than Loeve-Fox.

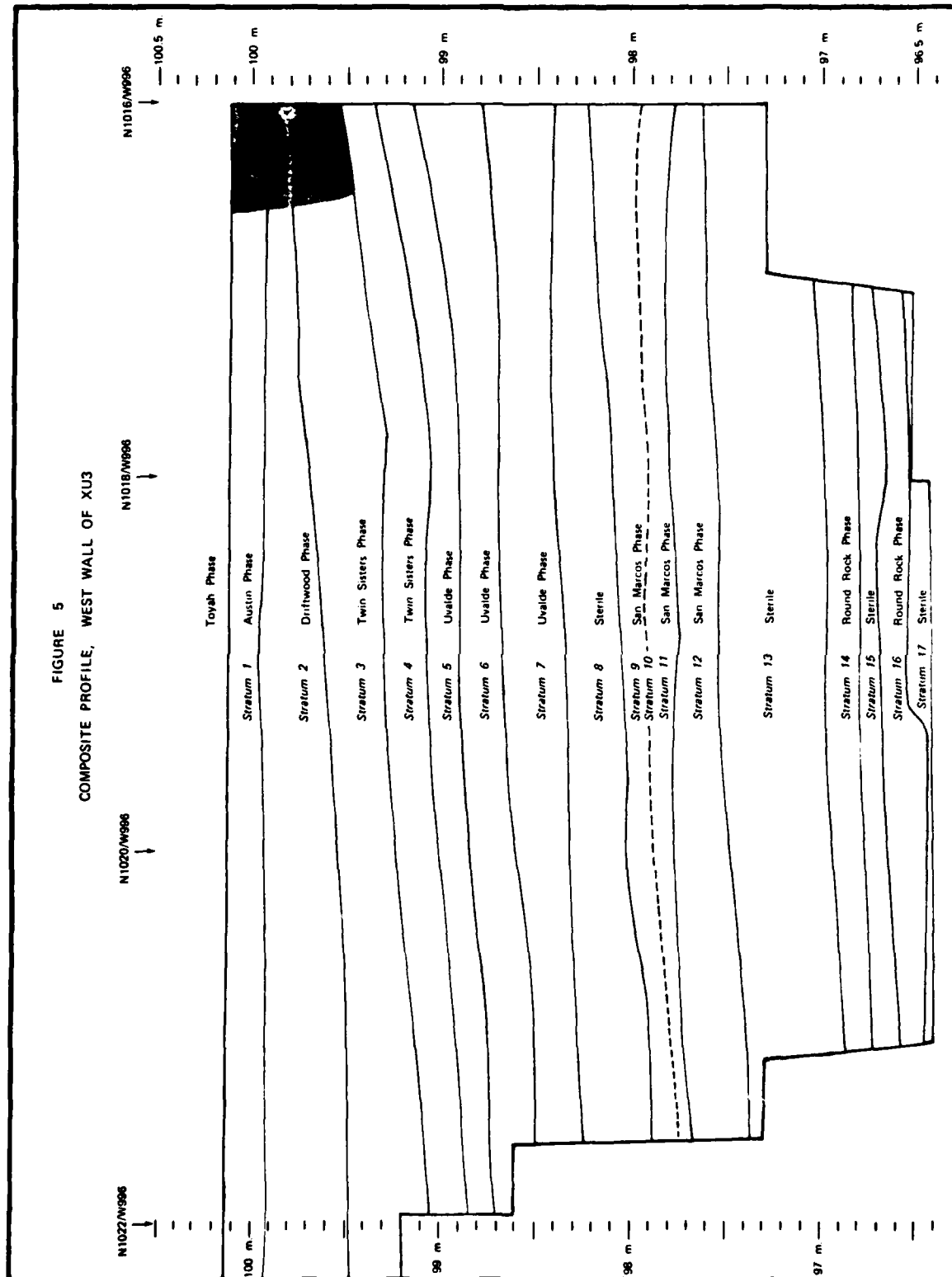
At this point the terms and definitions diverge from both McKern (1939) and Willey and Phillips (1958). Preferably viewed as developmental stages, the terms Paleoindian, Archaic and Neo-American have become entrenched in the regional literature under the guise of chronological periods. An exception is made for the term Neo-American which is felt to be somewhat vague and misleading; the term Neoarchaic as proposed by E. Mott Davis (Prewitt and Nance 1980:3-4) is preferred for those phases which are characterized by the presence of arrow points.

Arguments for and against the terms and concepts discussed above could be continued indefinitely, and it is expected that criticisms in varying degrees and sorts will be leveled at this report because of those selected for use herein. No claim is made that the scheme presented below is the final word, and indeed, as stated by Weir (1976b:63), it is neither intended nor desired that it be the final word on the subject. A chronological scheme is useful only so long as it has meaning and contributes to the understanding of past human history.

STRATIGRAPHY

In the initial excavations at this site, a series of eight strata were recognized and described (Prewitt 1974:16-18). The greatly expanded excavations of the current season's work has allowed recognition of additional strata and provided a basis for modification and refinements of the original stratigraphic interpretations. Twenty major strata are now recognized at the site and the uppermost two stratigraphic units are divided into a total of nine substrata. The recognized divisions are labeled numerically in reverse geologic order since the excavations have not yet penetrated to demonstrable lowest limits of the site.

The recognized stratigraphic units are not equally distributed throughout the site; thickness and relative elevations vary dramatically from one area to another. These variations are felt to reflect topographic characteristics as they changed through time. As noted above, some of the strata are separable into substrata within portions of the site;



however, other units are compressed and become inseparable from their higher and lower counterparts on some areas.

All of the stratigraphic units appear to have resulted from normal overbank flooding. Distributions of cultural debris and features reflect the topography through time while the density of cultural materials reflects the intensity of occupation. At no time during the archaeological history of the site does it appear that the cultural activities contributed significantly to the vertical accumulation of the terrace deposits. Rather, the rate of deposition from periodic flooding was such that stable surfaces never developed to the point where large amounts of human trash could accumulate. This is not to say that surfaces were never stable enough to allow development of weak genetic soil horizons for this did indeed occur at various times. General stratigraphic associations are summarized in Table 2.

Strata Descriptions

Brief descriptions of the recognized stratigraphic units are presented in this section. Detailed geomorphological studies have not been made at the site and thus preclude finer definitions of specific soil and sediment characteristics. The strata are presented in reverse order of their deposition; that is, they are described from the highest to the lowest.

Stratum 1

This complex depositional unit encompasses a total of seven substrata which represent the aggregate of sedimentation from the beginning of the Neolithic into the Historic to the present time. In the topographically higher positions of the site such as XU2, XU3 and the western end of BHR2 (all of which are along the W1000 gridline), S-1 is composed of a dark gray friable sandy clay which appears to represent a normal weakly developed A soil horizon commonly found in stream terraces. However, these deposits are telescoped into distinct substrata generally along the W985 gridline in an area which appears to represent an old filled shallow drainage channel. This telescoped situation generally holds true for the entire eastern side of the site to include XU5 and XU8 although the substrata are slightly higher in elevation and slightly thinned in vertical extent. The components of Stratum 1, designated by lower case alphabetical subscripts which are assigned in reverse depositional order, are briefly described.

Stratum 1a: A weakly developed A horizon, this surface stratum is composed of dark gray friable humic clay and contains historic artifacts; it appears to represent the results of a known episode of severe overbank flooding in 1921 and subsequent episodes of less intensive flooding.

Stratum 1b: Lenses of tan lamellar silt are discontinuously distributed in association with lenses of dark gray friable clay. This substratum is generally lacking in cultural materials and probably

TABLE 2
GENERAL STRATIGRAPHIC ASSOCIATIONS

Stratum 1a	Modern (including 1921 flood); A horizon
Stratum 1b	Sterile
Stratum 1c	Toyah Phase; buried A horizon (<u>Perdiz/Cliffton</u>)
Stratum 1d	Austin Phase (<u>Scallorn</u>)
Stratum 1e	Austin Phase (<u>Scallorn</u>)
Stratum 1f	Austin Phase; buried A horizon (<u>Scallorn</u>)
Stratum 1g	Sterile
Stratum 2a	Driftwood (<u>Mahomet</u>)
Stratum 2b	Sterile
Stratum 3	Twin Sisters (<u>Ensor</u>)
Stratum 4	Twin Sisters (<u>Ensor</u>)
Stratum 5	Uvalde (<u>Montell</u>)
Stratum 6	Nondiagnostic/unassigned
Stratum 7	Uvalde (<u>Castroville</u>)
Stratum 8	Nondiagnostic/unassigned
Stratum 9	San Marcos (<u>Marshall</u>)
Stratum 10	San Marcos (<u>Marshall</u>)
Stratum 11	San Marcos (<u>Marshall</u>)
Stratum 12	San Marcos (<u>Marshall</u>)
Stratum 13	Sterile
Stratum 14	Round Rock (<u>Pedernales</u>)
Stratum 15	Sterile
Stratum 16	Round Rock (<u>Pedernales</u>)
Stratum 17	Sterile
Stratum 18	Sterile
Stratum 19	Marshall Ford (?)
Stratum 20	Sterile

represents the intervening period between aboriginal and historical European occupation and use of the site.

Stratum 1c: This dark gray humic clay appears to represent a weakly developed A horizon which is associated with the Toyah Phase occupation.

Stratum 1d: Composed of a tan-gray friable clay with numerous snail shells, this substratum appears to be associated with a major episode of Austin Phase occupation.

Stratum 1e: Thinly distributed cultural materials indicate this gray friable clay is probably associated with diffuse Austin Phase occupations.

Stratum 1f: Another dark gray humic clay zone, this substratum appears to represent a weakly developed A horizon associated with the Austin Phase.

Stratum 1g: This sterile tan-gray sandy clay appears to represent minor overbank flooding which occurred between the end of the Driftwood Phase and the beginning of the Austin Phase occupations.

Stratum 2

Clearly separable into two substrata only in the area of BHT3, this depositional unit encompasses the entire duration of the Driftwood Phase use of the site. Over most of the site, S-2 is composed of gray sandy clay; however, in BHT3 this stratigraphic unit is separable into a gray sandy clay containing cultural debris (S-2a) which overlies a sterile gray sandy clay (S-2b).

Stratum 3

This widely distributed tan-gray sandy clay consistently contains cultural debris associated with the Twin Sisters Phase occupation of the site.

Stratum 4

Less intensively occupied than S-3, this grayish sandy clay which contains numerous snail shells and charcoal flecks is associated with the earliest Twin Sisters Phase occupation.

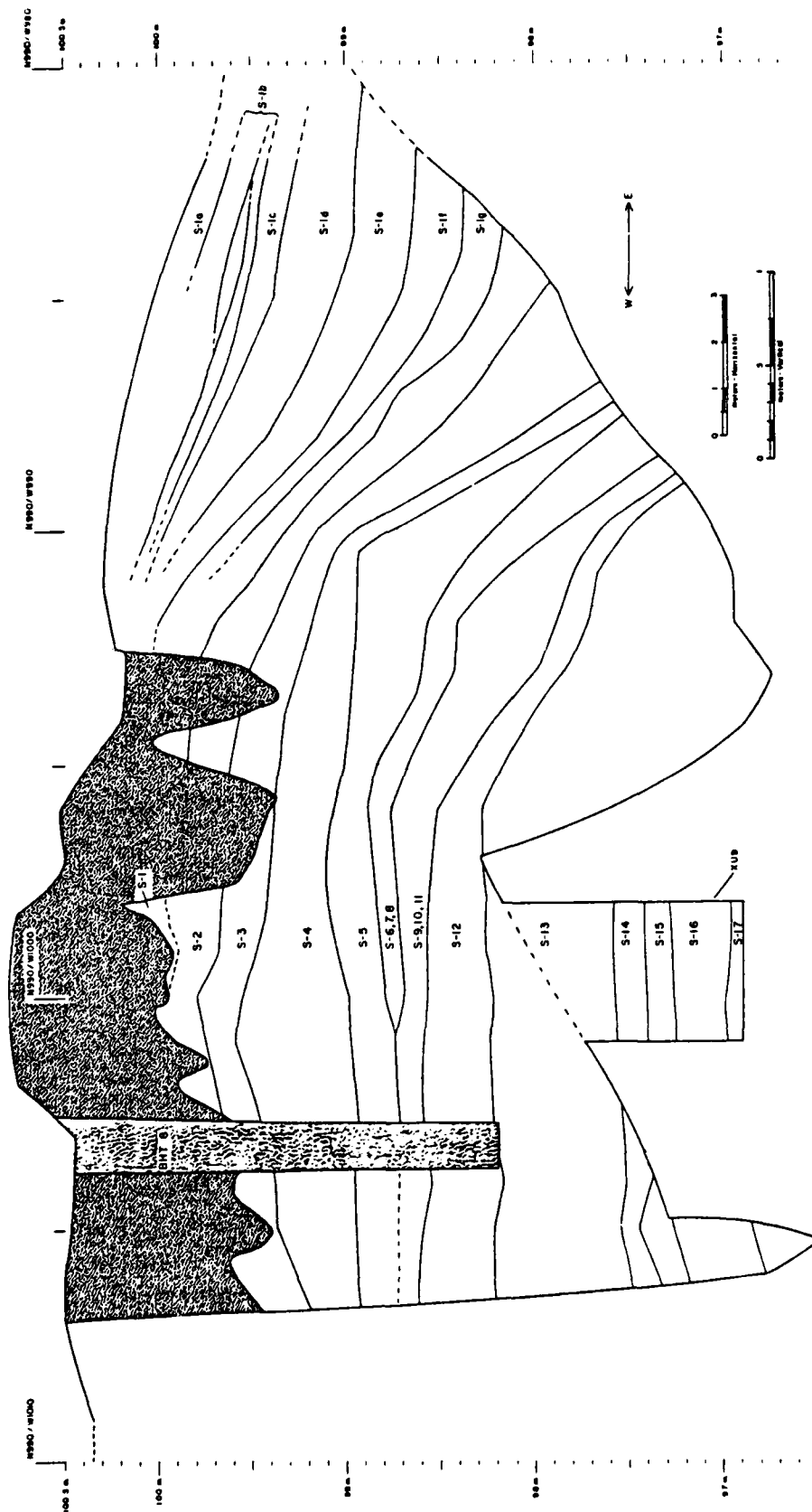
Stratum 5

A tan-gray sandy clay with sparse cultural debris included, this stratum is associated with the Uvalde Phase.

Stratum 6

Composed of grayish tan sandy clay, this stratum is practically devoid of cultural materials.

FIGURE 6
NORTH WALL PROFILE, BACKHOE RAMP 2
41WM230



Stratum 7

This tan sandy clay stratum contains sparse cultural debris assignable to the Uvalde Phase.

Stratum 8

Generally devoid of cultural materials, this stratum is composed of tan sandy clay.

Stratum 9

Thinly distributed debris associated with the San Marcos Phase is contained within this grayish tan sandy clay.

Stratum 10

This thin layer of cultural debris may represent a living surface accumulation rather than a unit of natural deposition. Although hardly more than a centimeter or two in thickness, this layer of cultural debris associated with tools diagnostic of the San Marcos Phase forms the boundary separating Stratum 9 from Stratum 11 in XU3. S-10 was not encountered in BHR3 with the result that S-9, 10 and 11 are lumped as a single stratigraphic unit in that area.

Stratum 11

A grayish tan sandy clay, this stratum contains materials associated with the San Marcos Phase.

Stratum 12

San Marcos Phase debris is contained within the tan sandy clay of this stratum.

Stratum 13

Composed of light tan sandy clay, this thick stratum is practically sterile of cultural materials.

Stratum 14

The grayish tan clayey sand which composes this stratum contains materials assignable to the Round Rock Phase.

Stratum 15

Although the light tan clayey sand of this stratum contains occasional artifacts, it is essentially sterile and separates two distinct occupational episodes within the Round Rock Phase.

Stratum 16

This light grayish tan clayey sand contains substantial quantities of cultural debris associated with the Round Rock Phase.

Stratum 17

Composed of light tan clayey sand, this stratum is culturally sterile.

Stratum 18

The friable tan sandy clay of this stratum is devoid of cultural materials.

Stratum 19

This medium gray compact clay encountered in a 1x1-meter-deep test in XU3 contains sparse flakes and burned rocks in its lower portions near the contact with S-20. No features or diagnostic artifacts were encountered, but it is assumed this stratum is associated either with an early Round Rock Phase occupation or with a Marshall Ford Phase occupation.

Stratum 20

The deepest recognized stratigraphic unit within the site, this stratum of sterile tan sandy clay was encountered in the bottom of the deep test probe in XU3. Neither the vertical nor the horizontal extent of this stratum was determined.

Paleotopography

The existence of a probable Pleistocene river channel scar along the west to northwest side of the site has been discussed in the previous report of work at this site (Prewitt 1974:18-21). It is postulated that the main portion of the Loeve-Fox Site (e.g., XU1, XU2, XU3 area) is situated along a fossil levee which parallels the channel scar (Prewitt 1974:18-20). The current investigations have produced no data which change these basic interpretations. However, some changes are necessary with regard to the interpretation of the north-south-trending slough which separates the main site areas from the areas nearest the present river channel (XU5, XU8) and the relationship of that slough to the modern east-west-trending gully and the Pleistocene channel scar.

Based on the profiles of BHT4, BHT14 and BHR2, it appears that what was previously thought to be a shallow slough is more likely a segment of a small filled tributary creek channel. Further, the existing sharply incised gully which transects the northern portion of the site is part of the same creek channel system. Although it is still not certain (due to the lack of detailed geomorphologic studies), it appears that by Round Rock Phase times the river had long before abandoned the old Pleistocene channel and was well on the way to developing the modern

expression of a cut-and-fill meander system channel within an aggrading valley fill. This proposed Round Rock Phase (and later) creek system is illustrated in Figure 7.

Floodplain sedimentation continued to occur through the successive phases of cultural occupation; of primary importance is the indication that greater amounts of sediment were deposited within the creek channel and the lower floodplain area between it and the main river channel than was deposited on the levee which forms the main site area. This created a telescoped effect in the deposits (as noted in Prewitt 1974:18-20) on the eastern side of the site and are particularly evident in the distribution of cultural debris in XU5 and XU8. The overall topographic effect of these varying depositional episodes through time has been to equalize the surface of the river terrace. Although the modern surface variations are gentle, they mirror the more acute expressions of earlier ages. The gully which transects the northern end of the Loeve-Fox Site is a modern feature (see discussion of the gully in Prewitt 1974:5) which appears to have pirated a segment of the fossil filled creek channel.

An appreciation of the dynamic nature of the streambed is important to the understanding of the site. The channel was well filled by the era of Twin Sisters (Fig. 8). This fossil channel and the lower floodplain that joins it to the east made the area a more desirable camp. By Austin Phase times the filling was so complete as to provide a virtually level surface and hearths were constructed within the confines of the fossil channel (Fig. 9).

Representative Soil Profile

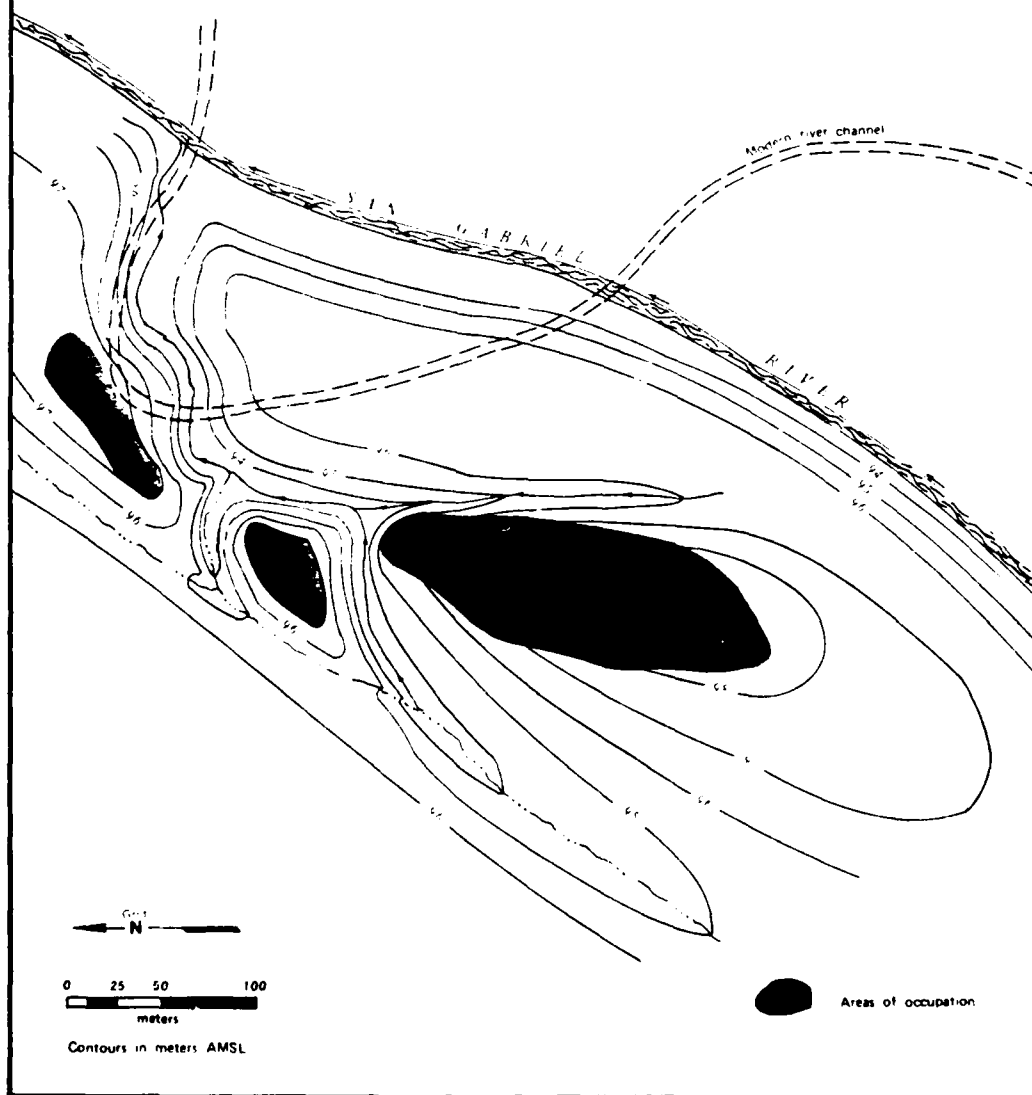
The soils exposed at the Loeve-Fox Site were examined briefly by Mr. Leroy Werchan, a soil scientist with the Soil Conservation Service of the United States Department of Agriculture. Mr. Werchan has kindly provided a description of the profile exposed in the southeastern corner of XU3 at approximate grid coordinates N1017/W996, and in the 1x1-meter-deep test at N1018/W999. The description is as follows:

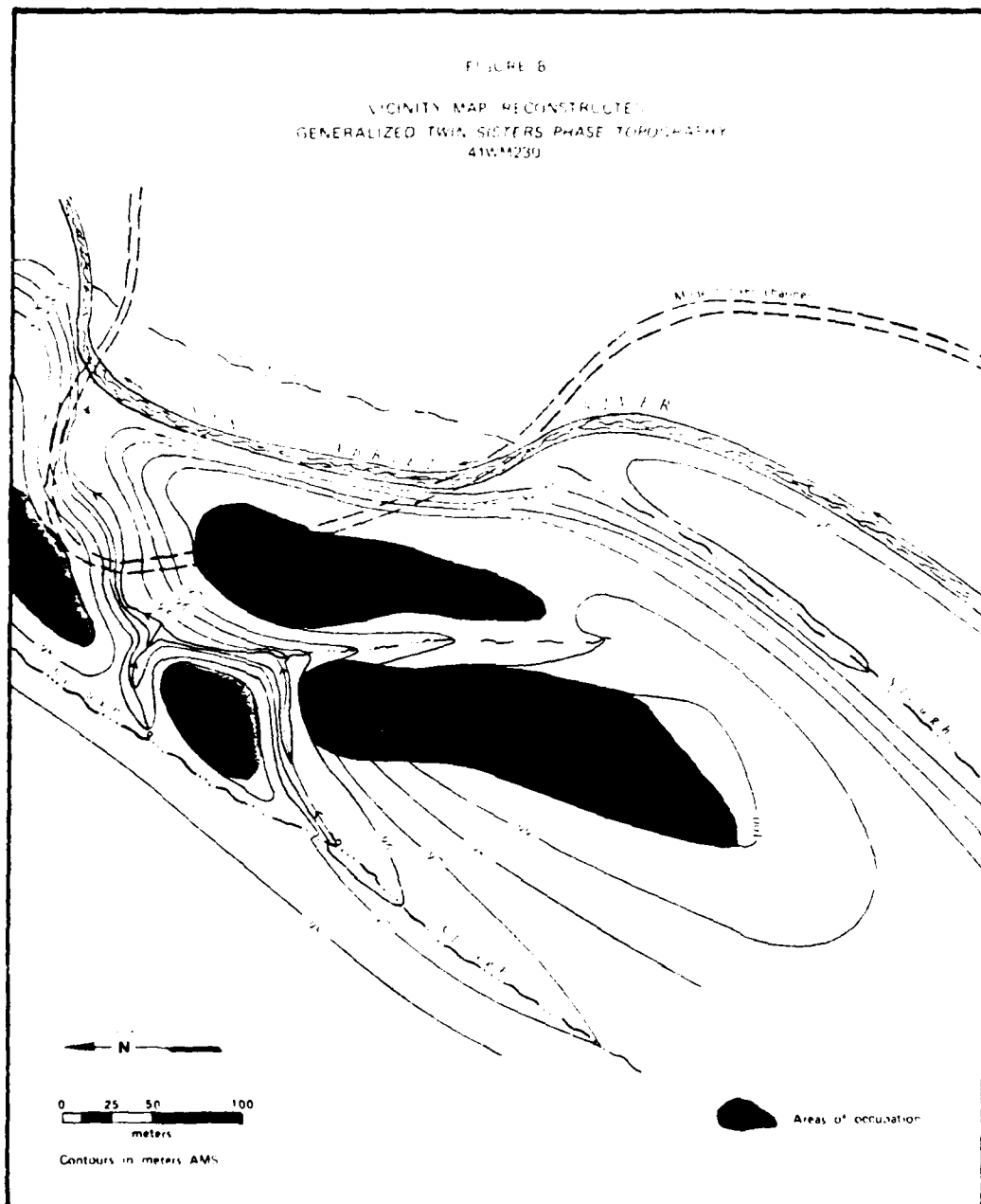
Pedon description of Oakalla silty clay loam as it occurs in the principal pit at the Loeve-Fox archeological site in the San Gabriel River bottomland site:

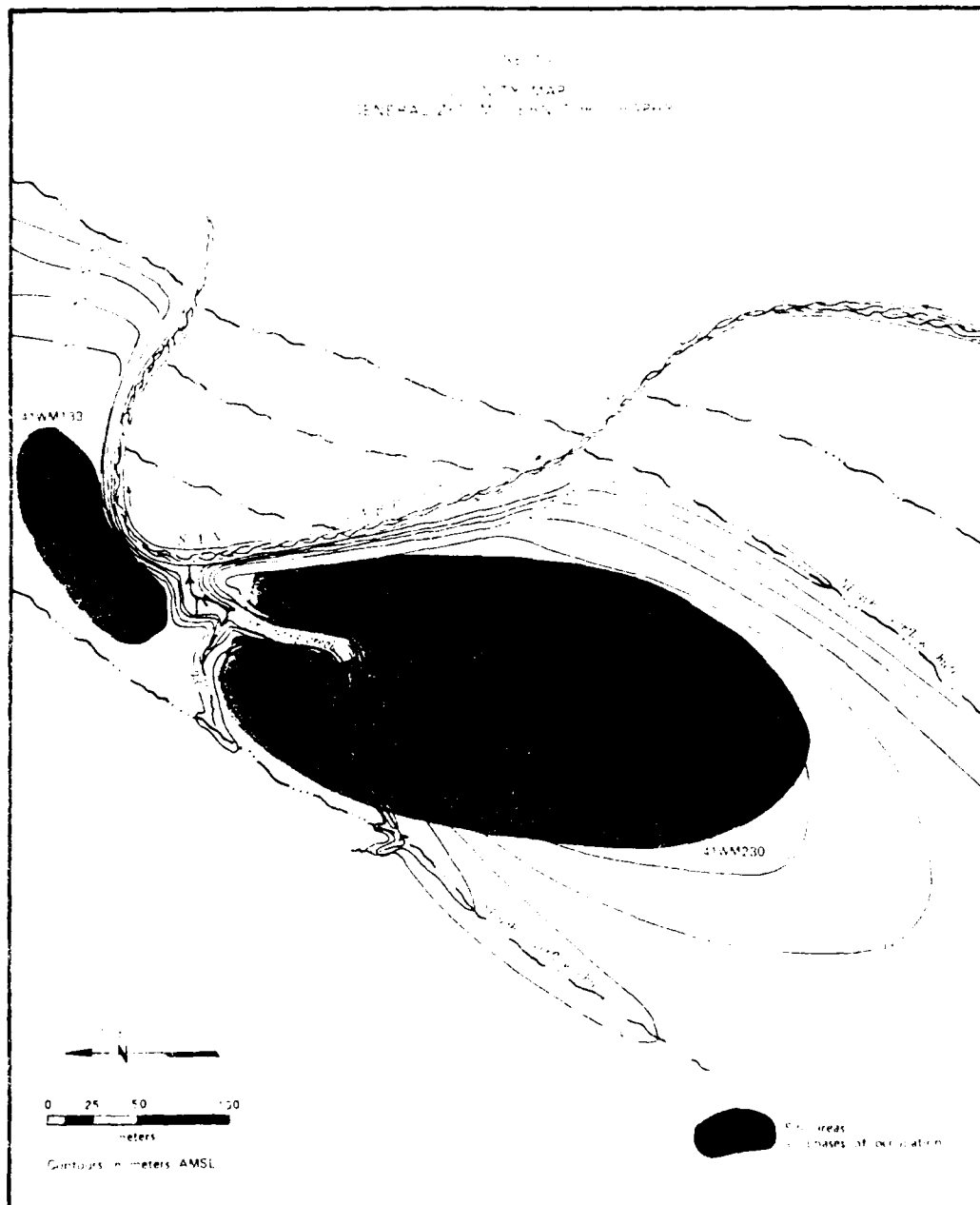
A11	100.10 to 99.72 meters elevation, brown (10YR 5/3) light silty clay loam, dark brown (10YR 3/3) moist; moderate, fine granular structure; hard; friable, strongly calcareous, moderately alkaline; (pH 8.0, CaCO ₃ equivalent: 46%); abrupt smooth boundary.
A12	99.72 to 99.52 meters elevation, grayish brown (10YR 5/2) silty clay loam; very dark grayish brown (10YR 3/2) moist; moderate, fine granular structure; hard, friable; strongly calcareous, moderately alkaline; (pH 8.0, CaCO ₃ equivalent: 50%); abrupt smooth boundary.

FIGURE 7

VICINITY MAP, RECONSTRUCTED
GENERALIZED ROUND ROCK PHASE TOPOGRAPHY
41WM230







- IIB2 99.52 to 99.44 meters elevation, pale brown (10YR 6/3) silt loam, brown (10YR 5/3) moist, weak, fine granular structure; slightly hard, friable; strongly calcareous, moderately alkaline; (pH 8.0, CaCO_3 equivalent: 49%), abrupt smooth boundary.
- A13 99.4 to 99.14 meters elevation, grayish brown (10YR 5/2) silty clay loam, very dark grayish brown (10YR 3/2) moist; moderate, fine granular structure; hard, friable; strongly calcareous, moderately alkaline; (pH 8.0, CaCO_3 equivalent: 58%), abrupt wavy boundary.
- C1 99.14 to 96.98 meters elevation, brown (10YR 5/3) silty clay loam, brown (10YR 4/3) moist, porous-massive structure; hard, friable; many fine CaCO_3 threads in the lower part; strongly calcareous, moderately alkaline; (pH 8.0, CaCO_3 equivalent: 47%), abrupt smooth boundary.
- C2 96.98 to 96.34 meters elevation; yellowish brown (10YR 5/3.6), dark yellowish brown (10YR 4/3.6) silty clay loam; porous-massive structure; hard, friable; strongly calcareous; moderately alkaline; (pH 8.0, CaCO_3 equivalent: 48%), abrupt smooth boundary.
- C3 96.34 to 95.66 meters elevation, light yellowish brown (10YR 6/4) silty clay loam, yellowish brown (10YR 5/4) moist; porous-massive structure; hard, friable; strongly calcareous; moderately alkaline; (pH 8.0, CaCO_3 equivalent: 53%), abrupt smooth boundary.
- C4 95.66 to 95.40 meters elevation, light yellowish brown (10YR 5.6/4) silty clay loam, yellowish brown (10YR 4.6/4) moist; porous-massive structure; strongly calcareous, moderately alkaline; (pH 8.0, CaCO_3 equivalent: not recorded).

Scattered snail shells noted over most of the profile. Other CaCO_3 equivalent studies in several other places indicate significantly higher CaCO_3 equivalent readings in cultural areas. Also noted in this pit were thin erratic lenses of silt, a few darker colored "clay balls," and some large subrounded stones. Archeological findings of bone, charcoal, hearths, etc. also noted.

These descriptions provided by Mr. Werchan correlate with the recognized strata in XU3 as follows:

<u>Soil Horizon</u>	<u>Stratigraphic Unit(s)</u>
A11	S-1, S-2
A12	S-3
IIB2	S-4
A13	S-5
C1	S-6 through S-13

<u>Soil Horizon</u>	<u>Stratigraphic Unit(s)</u>
C2	S-14 through S-16
C3	S-17, S-18
C4	S-19, S-20

RADIOCARBON DATING

Ten radiocarbon assays were reported from the Loeve-Fox Site for the 1972-74 excavations. An additional seven assays have been made for this site by the Radiocarbon Laboratory of The University of Texas at Austin. The assay results for all 17 samples are provided in Table 3; included in the tabulation are corrected date figures based on the dendrochronologic calibrations of Damon, Ferguson, Long and Wallick (1974: 350-366). Figure 11 illustrates the range of each of the dendrochronologically corrected assays.

The dates are internally consistent as far as their compatability with established date ranges of the various phases of the Archaic and Neoarchaic stages in Central Texas (Nance n.d.). Three minor inconsistencies are apparent in the assay results. The plus-or-minus factor for sample Tx-1924 is simply too great for the date to be meaningful; the assay results for this sample should be ignored. The remaining two inconsistencies are of a different order in that they relate to inter-phase superposition.

Sample Tx-1926 from F-11 in XU2 is 370 years younger (median date) than sample Tx-1922 from F-5 in XU2. While both features are unquestionably associated with S-3a of the Twin Sisters Phase, F-11 is stratigraphically lower than F-5 and is associated with a set of other features which represent an episode of occupation which slightly predates a similar set of associations with F-5. Further, the date range for sample Tx-1926 is more consistent with what is expected for Driftwood Phase occupations. No suitable explanation can be offered for this minor inconsistency at the present time; it can only be hoped that further excavations can be carried out in XU2 in the future to help clarify this problem.

The assay of Sample Tx-3404 from F-44 in S-2 of XU3 which is associated with the Driftwood Phase yielded a median date which is roughly 350 years too old. This dates of 1640 $\pm$ 140 B.P. is perfectly compatible with the general range of Twin Sisters Phase dates; however, it should have yielded a date which is slightly younger than those from S-3a representing the later episodes of Twin Sisters Phase occupations. Again, no suitable explanations are offered for this inconsistency.

Overall, the 16 usable dates from the Loeve-Fox Site present a remarkably clear delineation of the time ranges represented in the Twin Sisters, Driftwood and Austin phases of the Loeve-Fox Site. It is regrettable that assays for other occupational phases identified at the site were not obtainable; however, a paucity of lump charcoal in the Round Rock, San Marcos, Uvalde and Iyah phase features precluded successful assay attempts.

TABLE 3
RADIOCARBON ASSAYS, LOEVE-FOX SITE

Sample No.	B.P. Date	Arizona Correction	B.C./A.D. Date	Feature Association	Stratum	XU	Cultural Phase
Tx-1764	1080 ± 60	1060 ± 80	A.D. 870 ± 60	F-4	1	2	Austin
Tx-1765	850 ± 100	550 ± 105	A.D. 1100 ± 100	F-4	1	2	Austin
Tx-1766	1600 ± 110	1580 ± 115	A.D. 350 ± 110	-	3a	3	Twin Sisters
Tx-1767	1480 ± 170	1460 ± 170	A.D. 470 ± 170	-	3a	3	Twin Sisters
Tx-1922	1670 ± 100	1660 ± 105	A.D. 280 ± 100	F-5	3a	2	Twin Sisters
Tx-1923	940 ± 60	930 ± 65	A.D. 1010 ± 60	F-36	1	1	Austin
Tx-1924	2100 ± 880	2140 ± 885	150 ± 880 B.C.	F-5	3a	2	Twin Sisters
Tx-1925	870 ± 60	870 ± 65	A.D. 1080 ± 60	F-36	1	1	Austin
Tx-1926	1300 ± 60	1280 ± 80	A.D. 650 ± 60	F-11	3a	2	Twin Sisters
Tx-1927	1480 ± 80	1460 ± 80	A.D. 470 ± 80	F-2	3a	3	Twin Sisters
Tx-2957	1550 ± 60	1530 ± 65	A.D. 400 ± 60	F-49	-(3?)	7	Twin Sisters (?)
Tx-3402	1250 ± 60	1230 ± 80	A.D. 700 ± 60	F-54	1	1	Austin
Tx-3403	1240 ± 50	1220 ± 70	A.D. 710 ± 50	F-61	1d	5	Austin
Tx-3404	1640 ± 140	1630 ± 145	A.D. 310 ± 140	F-44	2	3	Driftwood
Tx-3407	1960 ± 210	1970 ± 215	10 ± 210 B.C.	F-31	4	3	Twin Sisters
Tx-3409	1620 ± 60	1610 ± 70	A.D. 330 ± 60	F-69	3b	3	Twin Sisters
Tx-3410	1790 ± 50	1790 ± 60	A.D. 160 ± 50	F-99	4	SHR2	Twin Sisters

The nine samples from Twin Sisters Phase contexts suggest that period of occupation began about 1750 years B.P. and ended at about 1400 years B.P. The minor internal inconsistencies noted above notwithstanding, it appears that the Loeve-Fox Site was occupied intermittently during the full extent of the Twin Sisters Phase.

A similar case may be made for the six Austin Phase assays although there is a hint that there may be a slight hiatus toward the end of the Austin Phase. There are also hints that at least two discrete episodes of site use are identifiable within the Austin Phase. Sample Tx-3402 from F-54 cremation (part of the F-1 cemetery) and sample Tx-3403 from F-61 Large Rock Hearth in XU5 both indicate an early Austin Phase episode of use. In contrast, the two samples from F-4 Medium Rock Hearth in XU2 (Tx-1764 and Tx-1765) and the two samples from F-36 Charcoal-filled Pit associated with I-23 burial in F-1 cemetery (Tx-1923 and Tx-1925) all indicate an occupational episode later in the Austin Phase. Yet, there is still a 100 to 150 year hiatus before the presumed beginning of the subsequent Toyah Phase at about 650 years B.P. (Prewitt 1976:Fig. 1; Nance n.d.).

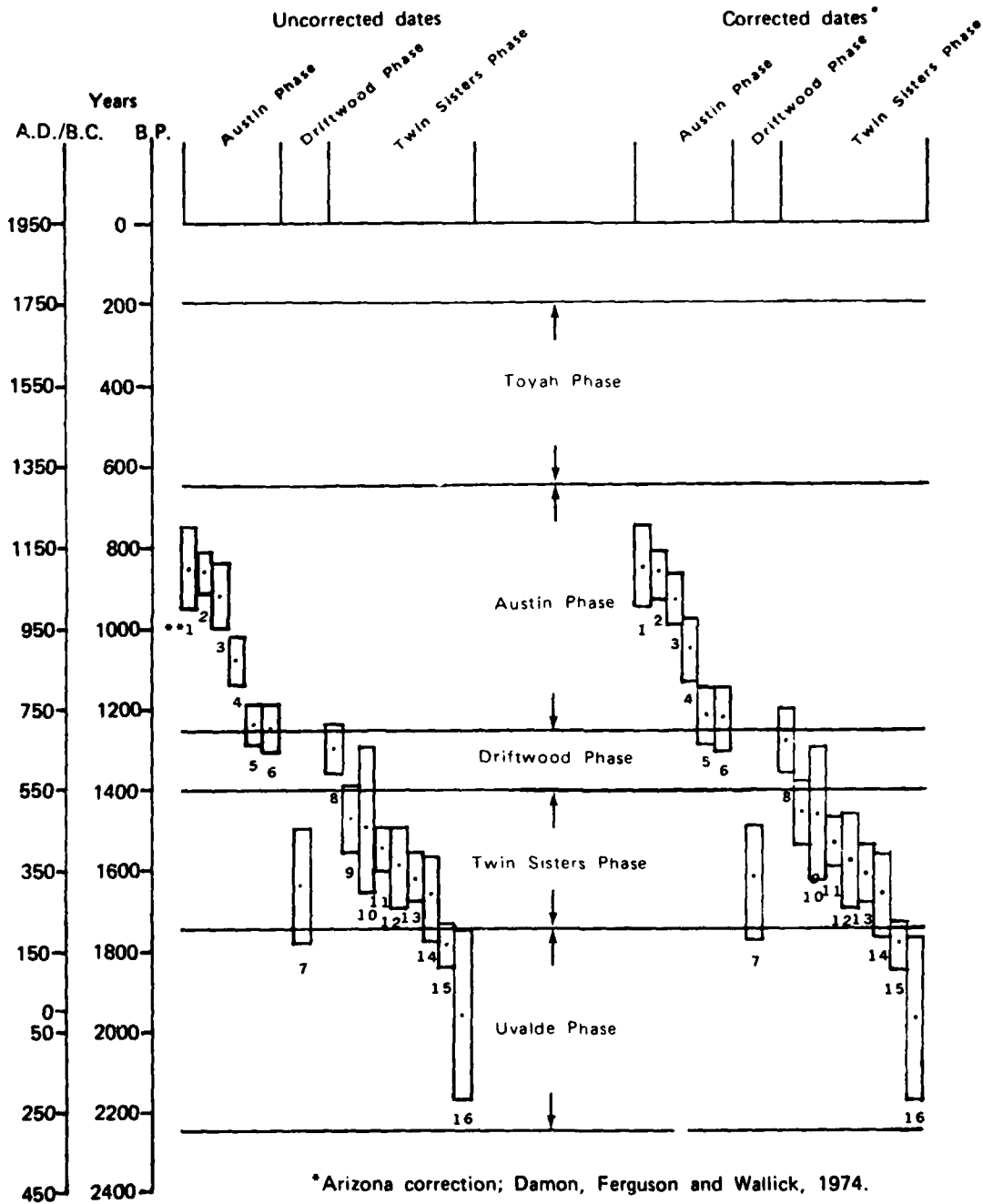
Reviews of general radiocarbon chronology trends in Central Texas have been presented in both of the previously published discussions of this site (Prewitt 1974, 1976). There have been numerous additional assays reported in the intervening time; however, it is beyond the scope of this report to provide another comprehensive review. This task has been undertaken by Ms. Linda Nance as the subject of a Master's Thesis in anthropology at The University of Texas at Austin.

FEATURE DESCRIPTIONS

"... cultural features are types of facilities representing a major investment of a social unit and as such are extremely important indicators of the nature of the activities conducted at a given location." (Binford 1970:16)

This statement by Binford summarizes one of the major basic assumptions which underlay the approach taken toward the investigation of the 130 features identified at the Loeve-Fox Site. Features are assumed to be nonportable elements which reflect specific, definable cultural activities, and the spatial configurations of feature loci should be related to the structure of the cultural system in which they are employed. The goals of the present investigations were to document the form, composition and distribution of features with a view toward examining feature patterns within isolatable episodes of site use, variations of patterning between chronologically distinct episodes of site use, covariations of functionally disparate features, and covariations of feature patterning and artifact distributions. The focus, then, was to isolate and document features as an initial step towards understanding the cultural processes which were responsible for their construction and subsequent use.

FIGURE 11
RADIOCARBON ASSAY RANGES
LOEVE-FOX



*Arizona correction; Damon, Ferguson and Wallick, 1974.

**Numbers refer to Tx sample numbers as indicated in Table
Dots indicate median of date range; 1 sigma deviation

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Field recording procedures employed for feature documentation include initial recognition, horizontal extent, internal composition, cross section and associations. The matrix within each feature was processed as a separate unit from the surrounding matrix in order to retain specific provenience. In addition, feature matrix was washed through fine-mesh window screen in order to enhance debris retrieval. Although the features excavated during the 1972-1974 seasons were treated differently, in that the matrix was not washed through window screen, observations of the extent, form and composition allow the morphological comparisons. This analysis incorporates those previously excavated features so that a more complete discussion of feature distributions may be presented. It should be noted that the groupings employed in the previous report have been altered slightly to reflect the increased data collected during the 1978 season.

The large number of features encountered during the course of the various investigations at the Loeve-Fox Site are best presented in an abbreviated format rather than in narrative form. They are segregated into four major groupings based on general characteristics; these groups are: (1) cooking/heating features, (2) mortuary features, (3) other cultural features, and (4) natural features. Each of these major groupings is further subdivided on the basis of internal composition. Where appropriate, finer divisions are prescribed on the basis of discrete morphological characteristics. In essence, a feature "typology" has been devised which is intended to reflect demonstrable variations observed at this site and which will allow accurate comparisons of features encountered at other sites in the area.

Narrative descriptions of the succeeding detailed groupings are presented in this section; however, only representative or unusual features are treated in detail. A summary of all the features in each group is presented in tabular form following the narrative descriptions.

Cooking/Heating Features

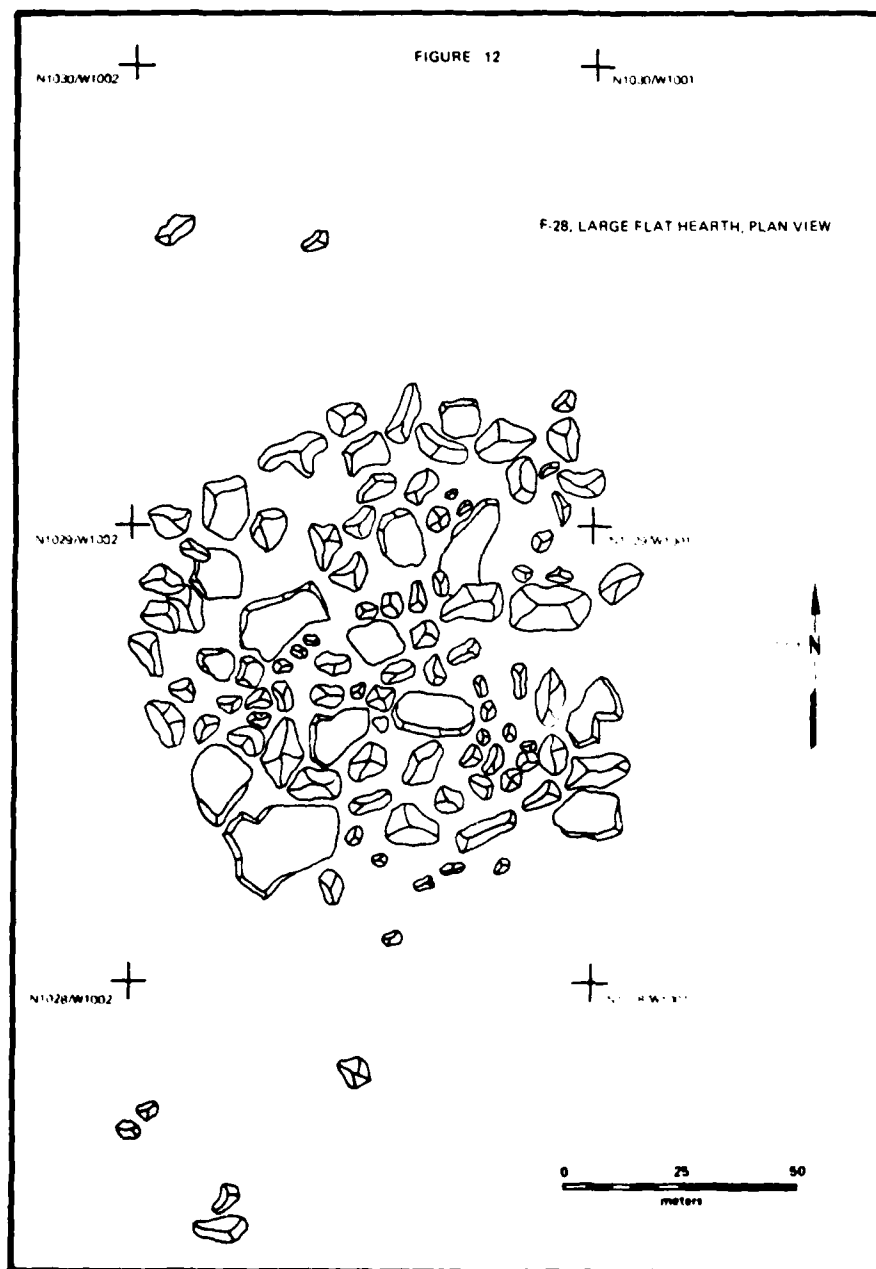
This broad grouping includes those features which are assumed to have served as facilities for cooking various foodstuffs or for the production of heat for other purposes. The grouping is divided into two major morphological categories: Rock-lined Hearths and Burned Clay/Charcoal features. Each of these categories is further divided into generalized types which are based upon form.

Rock-lined Hearths

Distinguished by the presence of spatially patterned, thermally altered cobbles, these features vary considerably in their form and size. Six varieties of rock-lined hearths are recognized and described as morphological variations within that type.

Large Flat Hearths (3 examples; Fig. 12)

Description: These features are circular arrangements of contiguous and frequently overlapping stones which exhibit intensive



discoloration and fracturing due to thermal alteration. Although the stones were placed in a formal arrangement, no subsurface pit is detectable. Presumably, these hearths were constructed upon the available ground surface with no pit preparation.

Composition: The primary elements consist of burned rocks and rock spalls. Both hearths associated with the Toyah Phase are composed primarily of conglomerates while the San Marcos Phase example is composed primarily of limestone cobbles. Charcoal and burned clay lumps are sparse in these features; none exhibit any evidence of intensive burning of the surrounding soil matrix.

Dimensions:

<u>Feature Number</u>	<u>Recognized Elevation</u>	<u>Base Elevation</u>	<u>Maximum Length</u>	<u>Maximum Width</u>	<u>Maximum Depth</u>
28	100.18	100.06	110	104	12
76	99.6	99.42	105	N.D.	18
87	97.72	97.56	125	35+	16

Provenience:

<u>Feature Number</u>	<u>XU</u>	<u>Grid Coordinates</u>	<u>Stratum</u>	<u>Cultural Phase</u>	<u>Remarks</u>
28	3	N1028.73/W1001.46	1a-c	Toyah	
76	BHT13	-	1a-c	Toyah	E. wall, BHT13, not excavated
87	3	N1019.7/W997.2	12	San Marcos	

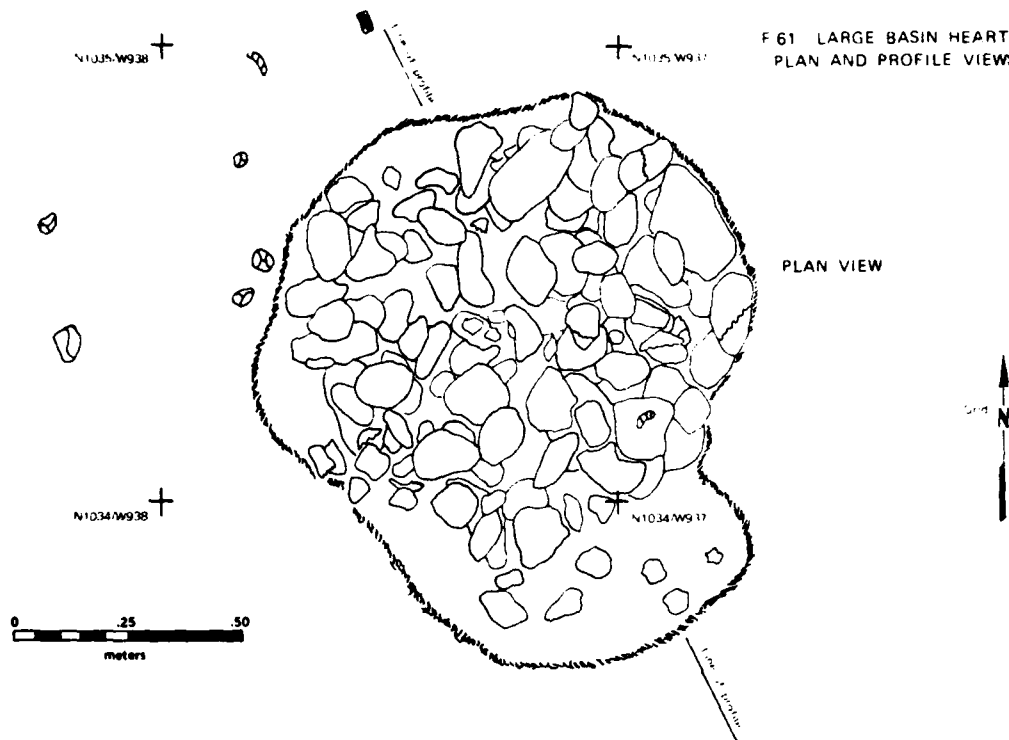
Large Basin Hearths (9 examples; Figs. 13 through 18)

Description: Similar in plan form to the previous variety in that these features are formal circular arrangements of contiguous thermally altered stones; however, this variety exhibits a distinctive basin shape in cross section. Frequently these features exhibit multiple layering of the burned rocks and intensive burning of the surrounding soil matrix. In one example, F-61 associated with the Austin Phase, the firing of the surrounding matrix was of such an intensive nature that the impressions of digging sticks were preserved. There seems to be little doubt that these hearths were constructed in shallow pits which were excavated with the aid of digging sticks.

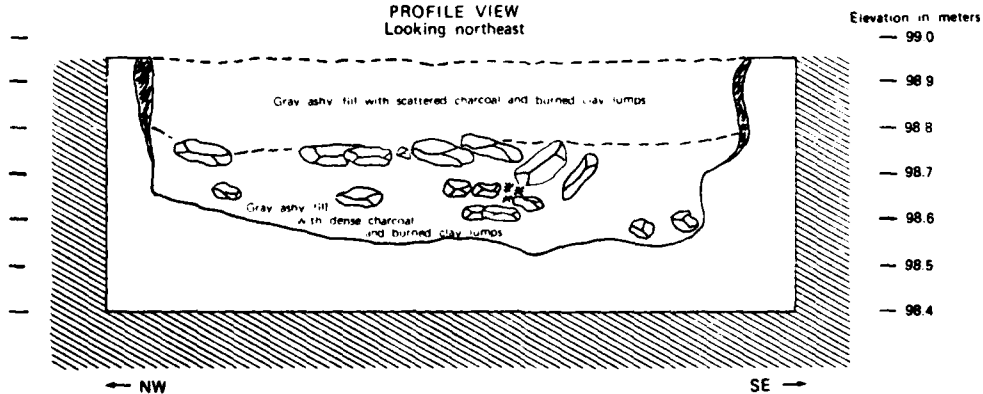
Composition: The primary elements consist of numerous burned rocks and rock spalls; however, this variety of hearth tends to contain substantial quantities of charcoal, ash and burned clay lumps. The hearth stones are generally composed of limestone cobbles, although it appears that at least one example of large fossil marine shells (*Exogyra porlerosa*) are included within each hearth. The general contents of one hearth, F-99 (Figs. 17 and 18) associated with the Twin Sisters Phase, differs somewhat in that a number of items were deliberately placed

FIGURE 13

F 61 LARGE BASIN HEARTH.
PLAN AND PROFILE VIEWS



PROFILE VIEW
Looking northeast



Legend:

-  Burned rock
-  Flint
-  Mussel shell
-  Charcoal fleck
-  Scorched soil

Figure 14. Large basin hearth; F-61 photographs

- a. First clearing of F-61 completed, looking northeast. Note burned clay ring around most of the hearth and the digging stick marks preserved in the burned clay.
- b. View of F-61 looking west after burned rocks were removed. Note the absence of digging stick marks in the floor of the feature.



FIGURE 14

within the hearth after the final firing of the hearth. Included are a variety of ornaments, tools and chipping debris which suggests a special use of this particular hearth.

Dimensions:

<u>Feature Number</u>	<u>Recognized Elevation</u>	<u>Base Elevation</u>	<u>Maximum Length</u>	<u>Maximum Width</u>	<u>Maximum Depth</u>
5	99.50	99.02	116	110	48
12	99.04	98.78	104	61+	26
30	99.57	99.33	150	140	24
31	99.47	99.29	140	130	18
61	99.08	98.55	108	108	53
77	98.7	98.3	120	N.D.	40
99	99.15	98.94	165	135	21
104	99.25	99.06	115	95	19
106	99.44	99.12	110	90	32

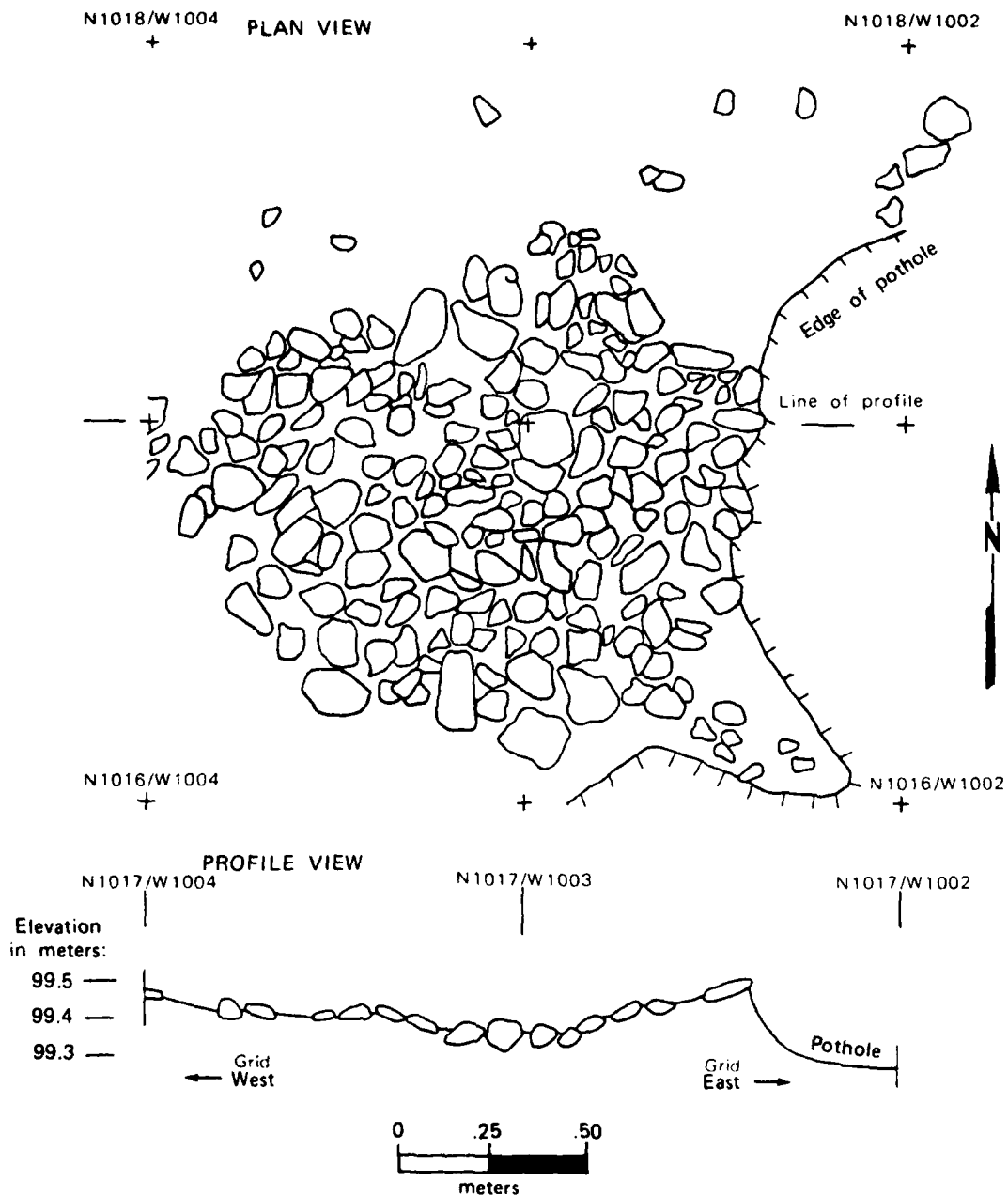
Provenience:

<u>Feature Number</u>	<u>XU</u>	<u>Grid Coordinates</u>	<u>Stratum</u>	<u>Cultural Phase</u>	<u>Remarks</u>
5	2	N969.76/W1000.76	3a	Twin Sisters	1670 $\pm$ 100 (Tx-1922) 2100 $\pm$ 800 (Tx-1924)
12	2	N968.3/W1001.68	3b	Twin Sisters	
30	3	N1016.8/W1003.15	3b	Twin Sisters	
31	3	N1015.65/W1001.1	4	Twin Sisters	1960 $\pm$ 210 (Tx-3407)
61	5	N1034.4/W937.2	1d	Austin	1240 $\pm$ 50 (Tx-3403)
77	BHT15	-	1d-g	Austin	N. wall, BHT15, not excavated
99	BHR2	N988.52/W995.52	4	Twin Sisters	1790 $\pm$ 50 (Tx-3410)
104	BHR2	N988/W1002.08	4	Twin Sisters	
106	BHR2	N986/W1006.47	3	Twin Sisters	

Medium Basin Hearths (15 examples; Fig. 19)

Description: The primary differences between these features and the preceding variety are size and intensity of use; medium hearths are those which range from 61 to 100 centimeters in diameter. These features consist of formal circular arrangements of stones within shallowly excavated basins. Scorching of the surrounding matrix is generally light with none of the intensive burning common to the large hearths.

FIGURE 15
F-30 LARGE BASIN HEARTH
PLAN AND PROFILE VIEWS



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Figure 16. Large and small basin hearths; F-30 and F-41 photographs

- a. Overhead view of F-30 large basin hearth; north is to the top of the photograph.
- b. Overhead view of F-41 small basin hearth; northwest is to the top of the photograph. Note the lack of intensive burning of the surrounding matrix and the root mold in the center of the feature.



FIGURE 16

Composition: Again, the primary elements are burned rocks, charcoal and burned clay lumps. These elements are relatively abundant even though there seems to be scant evidence of intensive in-place burning within the surrounding matrix.

Dimensions:

<u>Feature Number</u>	<u>Recognized Elevation</u>	<u>Base Elevation</u>	<u>Maximum Length</u>	<u>Maximum Width</u>	<u>Maximum Depth</u>
2	99.58	99.25	97	73	28
4	99.86	99.70	85	73	16
16	99.2	98.74	70	58	38
78	96.92	96.77	92+	60+	15
81	98.92	N.D.	78+	47+	N.D.
84	99.03	N.D.	60+	30+	N.D.
96	96.89	96.75	80	60	14
100	99.08	98.92	70	50	16
105	99.35	99.1	88	80	25
107	97.95	97.82	76	63	13
109	97.61	97.45	80	60	16
114	97.2	97.05	90	80	15
145	98.2	98.05	85+	N.D.	15+
148	99.92	99.65	80	N.D.	27
149	99.62	99.32	90	N.D.	30

Provenience:

<u>Feature Number</u>	<u>XU</u>	<u>Grid Coordinates</u>	<u>Stratum</u>	<u>Cultural Phase</u>	<u>Remarks</u>
2	3	N1018.59/W997.74	3a	Twin Sisters	1480 ± 80 (Tx-1927)
4	2	N969.92/W997.41	1d-g	Austin	1080 ± 60 (Tx-1764) 850 ± 100 (Tx-1765)
16	2	N970.44/W1002.07	3b	Twin Sisters	
78	BHT15	-	3	Twin Sisters	
81	BHT19	-	3	Twin Sisters	
84	BHT20	-	3	Twin Sisters	
96	BHT25	N1013.4/W998.25	16	Round Rock	
100	BHR2	N988/W998	4	Twin Sisters	
105	BHR2	N987/W1004.25	4	Twin Sisters	
107	3	N1018.07/W999.6	10-11	San Marcos	
109	3	N1017.7/W999.65	12	San Marcos	
114	9	N989/W1000.7	16	Round Rock	
145	BHR2	N990/W983.75	2	Driftwood	N. wall, BHR2; not excavated
148	BHR2	N990/W998.95	2	Driftwood	N. wall, BHR2; not excavated

FIGURE 17

F-99 LARGE BASIN HEARTH
PLAN AND PROFILE VIEWS

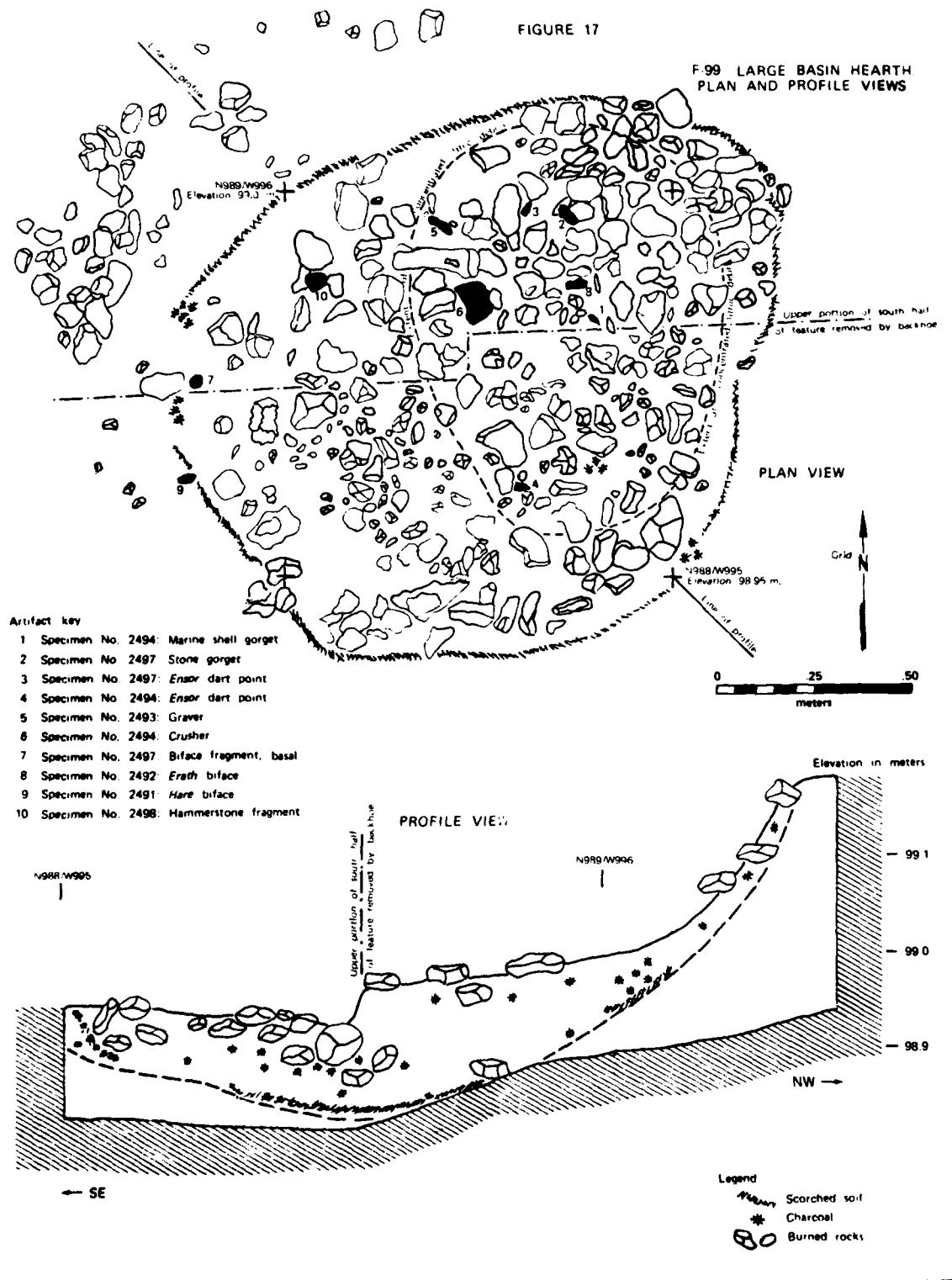


Figure 18. Large basin hearth; F-99 photographs

- a. Initial cleaning of F-99 in BHR2 completed, looking west.
- b. Overhead view of stone gorget in F-99; southeast is to the top of photograph.

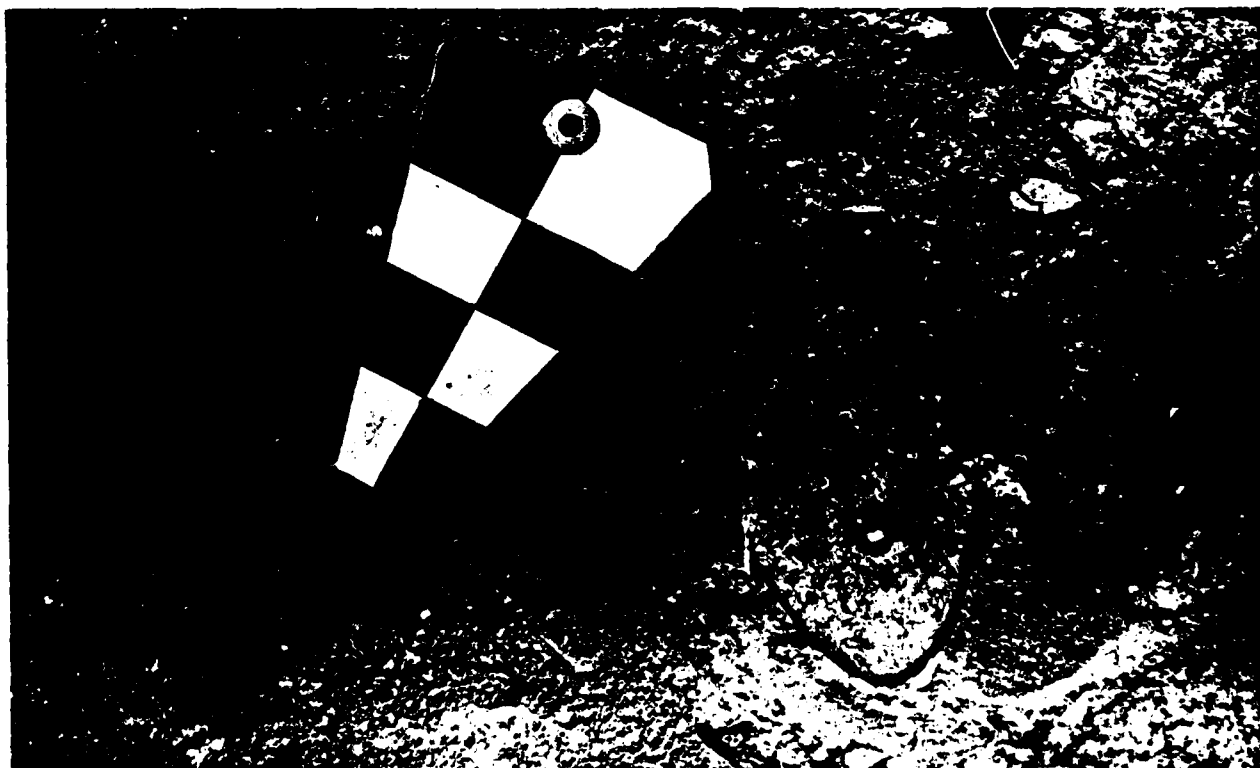


FIGURE 18

<u>Feature Number</u>	<u>XU</u>	<u>Grid Coordinates</u>	<u>Stratum</u>	<u>Cultural Phase</u>	<u>Remarks</u>
149	BHR2	N990/W1001.62	3	Twin Sisters	N. wall, BHR2; not excavated

Small Basin Hearths (27 examples; Figs. 20 through 22)

Description: The variety includes those stone-lined hearths which are less than 60 centimeters in maximum diameter. As with the larger hearth varieties, these features are circular (or oval) in plan form and are basin-shaped in cross section (with one exception -- F-101 may be flat). The component stones are contiguous and often overlapping; frequently there are two layers of stones within the features. These formal circular arrangements of burned rocks appear to have been placed within shallowly excavated basins.

Composition: Burned limestone cobbles compose the primary element within these features. The intensity of heating varies somewhat, but is generally much less than in the larger hearths; this is based upon the degree of fracturing of the component cobbles and the general lack of scorched soil surrounding the hearths. Only F-44 exhibits intensive burning of the surrounding matrix. Charcoal flecks and burned clay lumps are present in each of the small basin hearths; however, most of them contain only sparse amounts of these elements while a very few of these features contain significant quantities of charcoal and burned clay.

Discussion: Subjectively, there may be at least two distinct varieties of hearth included within this group. Ten of the examples which occur in the Twin Sisters Phase strata exhibit very low intensity firing of the stones and contain small amounts of charcoal and burned clay. An examination of the distribution of these ten hearths evokes a sense that these may represent small "warming hearths" located near the entry or within small brush shelters. The remainder of the small hearths appear to represent normal cooking activities.

Dimensions:

<u>Feature Number</u>	<u>Recognized Elevation</u>	<u>Base Elevation</u>	<u>Maximum Length</u>	<u>Maximum Width</u>	<u>Maximum Depth</u>
6	99.75	99.60	46	23+	15
9	99.60	99.47	52	33+	13
32	99.07	98.83	43	N.D.	24
41	99.64	99.49	43	38	15
44	99.78	99.56	45	45	22
46	99.38	99.20	45	43	18
49	94.63	94.51	52	40	12
67	99.36	99.20	45	40	16
68	99.33	99.20	29	23	13
71	99.35	99.24	40	35	11

FIGURE 19

F-4 MEDIUM BASIN HEARTH,
PLAN AND PROFILE VIEWS

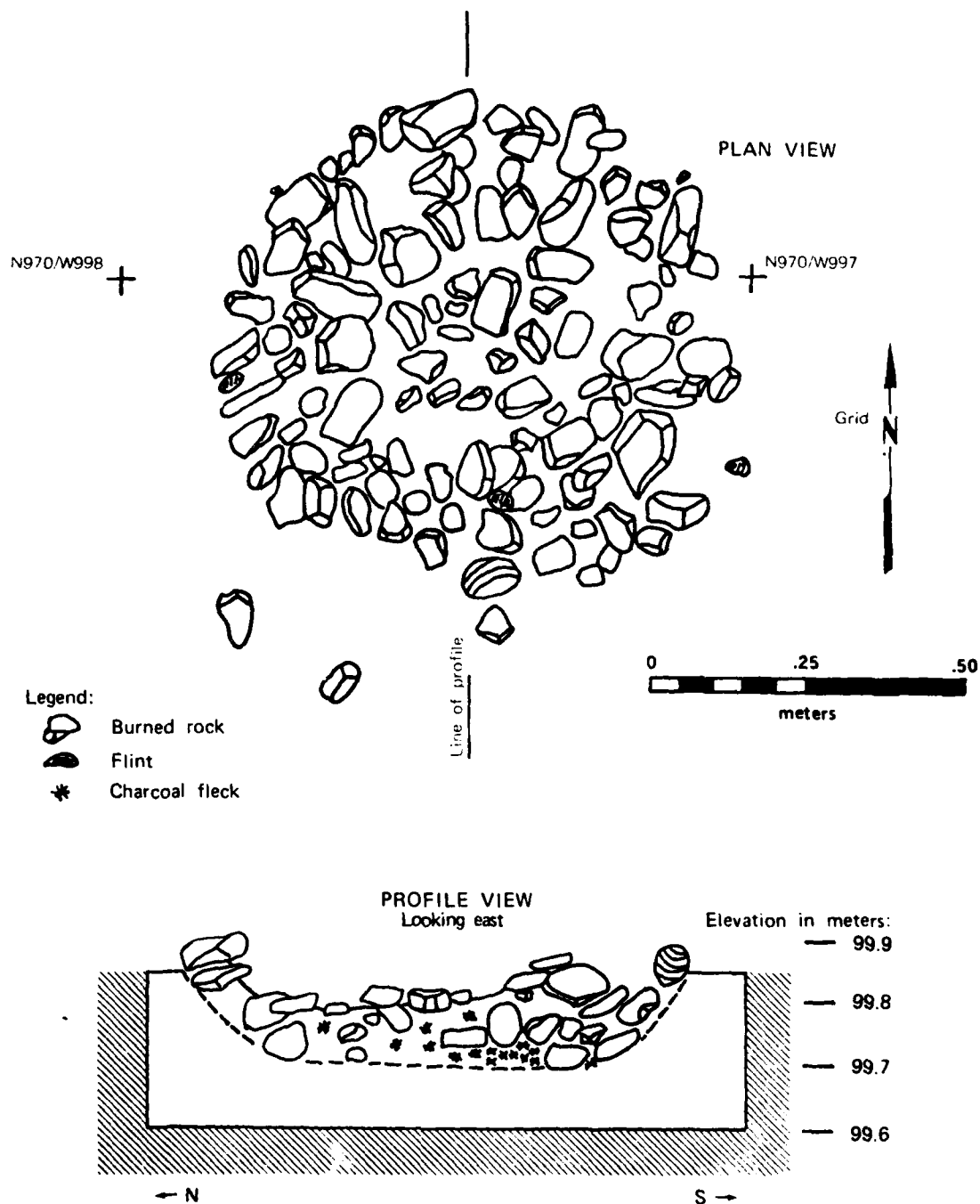


FIGURE 20

F-41 SMALL BASIN HEARTH,
PLAN AND PROFILE VIEWS

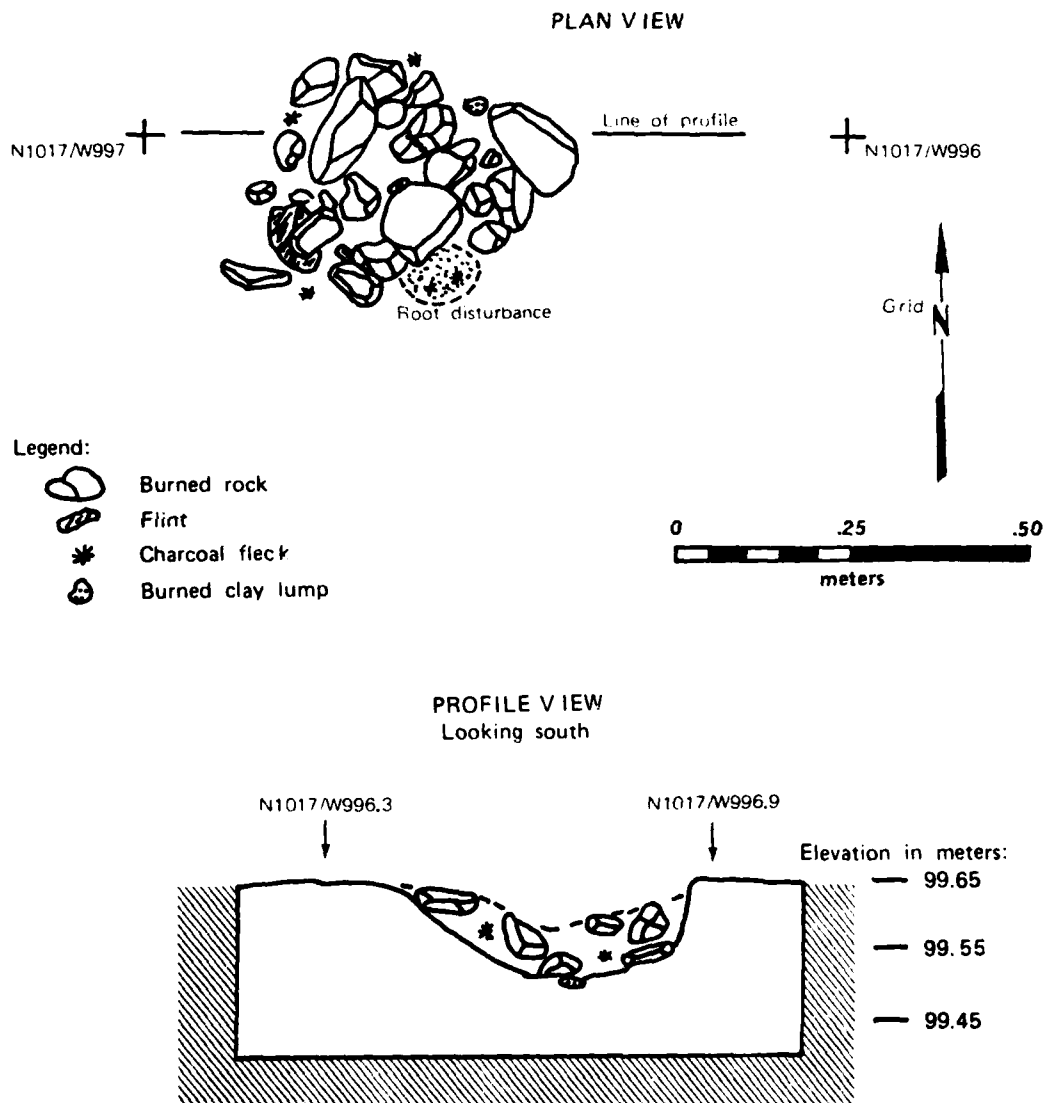


FIGURE 21

F-68 and F-71 SMALL BASIN HEARTHNS,
PLAN AND PROFILE VIEWS

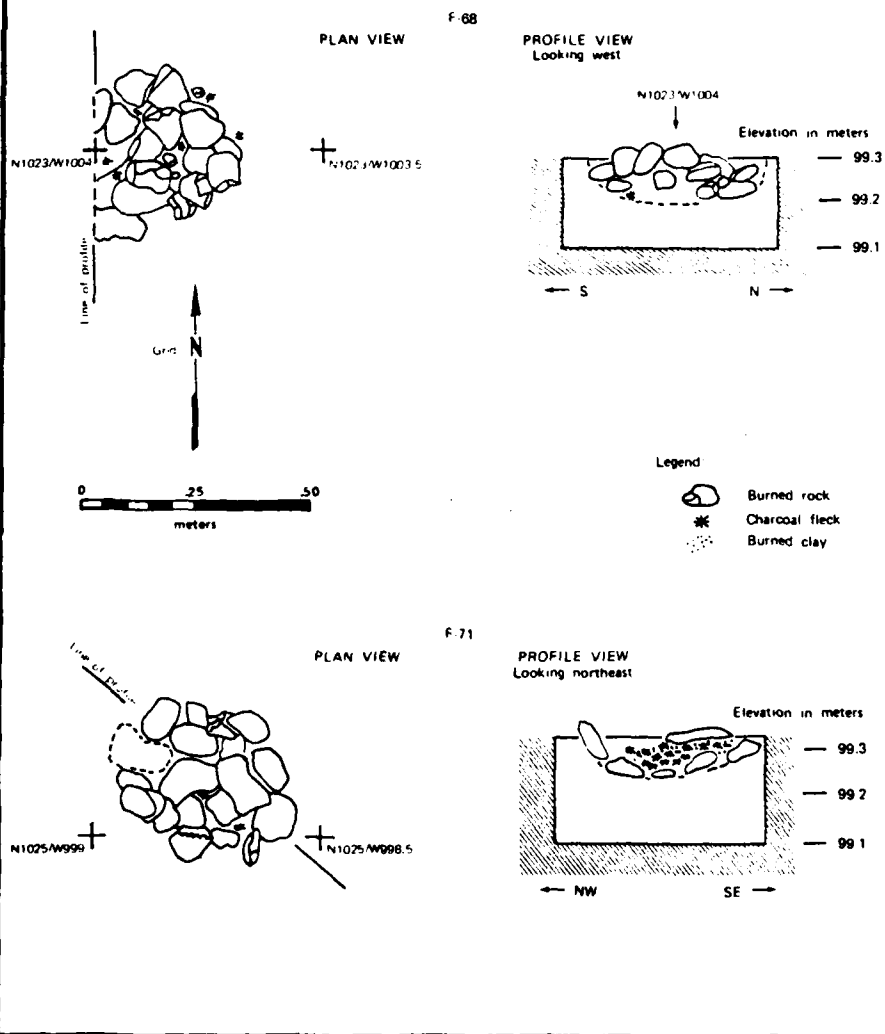


Figure 22. Small basin hearths; F-68 and F-71 photographs

- a. Oblique view of F-68, looking west, after clearing. Note absence of intensive burning of matrix.
- b. Overhead view of F-71 following final clearing. South is to the top of photograph. Note the lack of intensive burning of the matrix.



FIGURE 22

<u>Feature Number</u>	<u>Recognized Elevation</u>	<u>Base Elevation</u>	<u>Maximum Length</u>	<u>Maximum Width</u>	<u>Maximum Depth</u>
80	98.20	98.05	50	N.D.	15
83	99.30	99.18	40	35	12
86	99.37	99.22	40	37	15
101	99.0	98.90	44	22+	10
102	98.15	97.97	49	34	18
103	99.10	99.0	45	45	10
113	97.43	97.30	55	45	13
116	96.65	96.55	55	40	10
119	99.21	99.09	35	15+	12
120	99.35	99.21	25	15+	14
123	94.61	94.51	48	45	10
128	99.58	99.43	52	37	15
129	99.58	99.43	36	N.D.	15
136	99.13	98.97	55	43	16
147	99.33	99.20	37	N.D.	13
150	99.40	99.22	45	N.D.	18
151	97.15	96.92	57	N.D.	23

Provenience:

<u>Feature Number</u>	<u>XU</u>	<u>Grid Coordinates</u>	<u>Stratum</u>	<u>Cultural Phase</u>	<u>Remarks</u>
6	2	N968.1/W1001.65	2	Driftwood	
9	2	N968/W1000.78	2	Driftwood	
32	BHT9	N932.95/W1000.0	3	Twin Sisters	E. wall, BHT9; not excavated
41	3	N1016.97/W996.61	3a	Twin Sisters	
44	3	N1019.9/W1001.9	2	Driftwood	1650 ± 140 (Tx-3404)
46	3	N1016.35/W996.75	4	Twin Sisters	
49	7	N1050.25/W971.5	-	Twin Sisters	1550 ± 60 (Tx-2952)
67	3	N1025/W997.9	3a	Twin Sisters	
68	3	N1022.95/W1003.85	3b	Twin Sisters	
71	3	N1025.2/W998.8	3a	Twin Sisters	
80	BHT14	-	2a	Driftwood	N. wall, BHT14
83	3	N1021.8/W1003.3	3b	Twin Sisters	
86	3	N1025/W1002.5	3a	Twin Sisters	
101	5	N1034/W936.1	1d	Austin	
102	3	N1016.5/W998.75	9	San Marcos	
103	BHR2	N987/W998	4	Twin Sisters	
113	9	N989.2/W1000.85	14	Round Rock	
116	3	N1019.5/W997.25	16	Round Rock	
119	3	N1024.2/W995.9	3b	Twin Sisters	
120	3	N1025.3/W1004.1	3a	Twin Sisters	
123	7	N1049.5/W972.15	-	Twin Sisters	
128	3	N1019.8/W997.8	3a	Twin Sisters	

<u>Feature Number</u>	<u>XU</u>	<u>Grid Coordinates</u>	<u>Stratum</u>	<u>Cultural Phase</u>	<u>Remarks</u>
129	3	N1019.08/W997.01	3a	Twin Sisters	
136	3	N1020.3/W999.58	4	Twin Sisters	
147	BHR2	N990/W997.75	4	Twin Sisters	N. wall, BHR2; not excavated
150	BHR2	N990/W1006.5	3	Twin Sisters	
151	BHR2	N989.5/W1005.4	16	Round Rock	

Arcuate Hearths (8 examples; Figs. 23 and 24)

Description: This distinctive hearth variety is best characterized as a semicircular arrangement of the component hearth stones situated around the rim of a small basin filled with charcoal, ash and burned clay. Overall, these features are circular in plan form and are basin-shaped in cross section.

Composition: Relatively few burned rocks are contained within these features; however, small burned rock spalls are plentiful within the ash, charcoal and burned clay lump pit fill. Moderate oxidation of the surrounding soil matrix occurs near the upper part of the basins. The charcoal and ash are normally concentrated near the bottom of the pits.

Discussion: The distinctive arrangement of the components of these features suggests they were used in a consistent manner. It appears that whatever food was being cooked was placed in the bottom of a shallow basin, then was covered with a layer of coals which in turn was covered with a layer of heated stones. Following the requisite cooking period, it appears the layer of rocks was raked to one side, then the food was removed in such a manner that residue from the coals (ash and charcoal) was allowed to settle to the bottom of the pit.

Dimensions:

<u>Feature Number</u>	<u>Recognized Elevation</u>	<u>Base Elevation</u>	<u>Maximum Length</u>	<u>Maximum Width</u>	<u>Maximum Depth</u>
3	99.22	98.87	64	61	35
11	99.29	98.83	55	37	46
18	98.96	98.73	43	43	23
51	99.59	99.42	65	36+	17
62	99.61	99.50	47	32	11
63	99.50	99.27	65	35	23
64	99.52	99.43	43	25	9
85	N.D.	N.D.	35+	28+	N.D.

Provenience:

<u>Feature Number</u>	<u>XU</u>	<u>Grid Coordinates</u>	<u>Stratum</u>	<u>Cultural Phase</u>	<u>Remarks</u>
3	3	N1019.17/W997.87	4	Twin Sisters	
11	2	N970.59/W998.63	3a	Twin Sisters	1300 ± 60 (Tx-1926)
18	3	N1020.18/W998.09	5	Uvalde	
51	3	N1022.4/W999.4	3a	Twin Sisters	
62	3	N1022.7/W998.15	3a	Twin Sisters	
63	3	N1018.5/W1003.2	3a	Twin Sisters	
64	3	N1023/W996.65	3a	Twin Sisters	
85	BHT20	-	3	Twin Sisters	Floor, BHT20; not excavated

Disrupted Hearths (6 examples)

Description: Concentrations of burned rocks which do not appear to be formally arranged are included within this category. In outline, these clusters of rocks vary from circular to irregular; four appear to rest on a flat surface while two may rest within shallow basins.

Composition: These features are recognized primarily as loose clusterings of burned rocks. Minor amounts of charcoal, burned clay lumps and small burned rock spalls are present in some of these features.

Discussion: It appears these features may represent the remnants of formal hearths which were disrupted through undetermined means. Alternatively, some of them may represent fortuitous aggregations of discarded burned rocks.

Dimensions:

<u>Feature Number</u>	<u>Recognized Elevation</u>	<u>Base Elevation</u>	<u>Maximum Length</u>	<u>Maximum Width</u>	<u>Maximum Depth</u>
13	99.10	99.06	76	46	10
14	99.14	99.06	67	55	8
26	99.45	99.38	36	36	7
27	99.50	99.42	33	33	8
65	99.43	99.20	109	52	23
108	97.40	N.D.	55	44	N.D.

Provenience:

<u>Feature Number</u>	<u>XU</u>	<u>Grid Coordinates</u>	<u>Stratum</u>	<u>Cultural Phase</u>	<u>Remarks</u>
13	2	N970/W999.21	3b	Twin Sisters	

FIGURE 23

F-51 ARCUATE HEARTH
PLAN AND PROFILE VIEWS

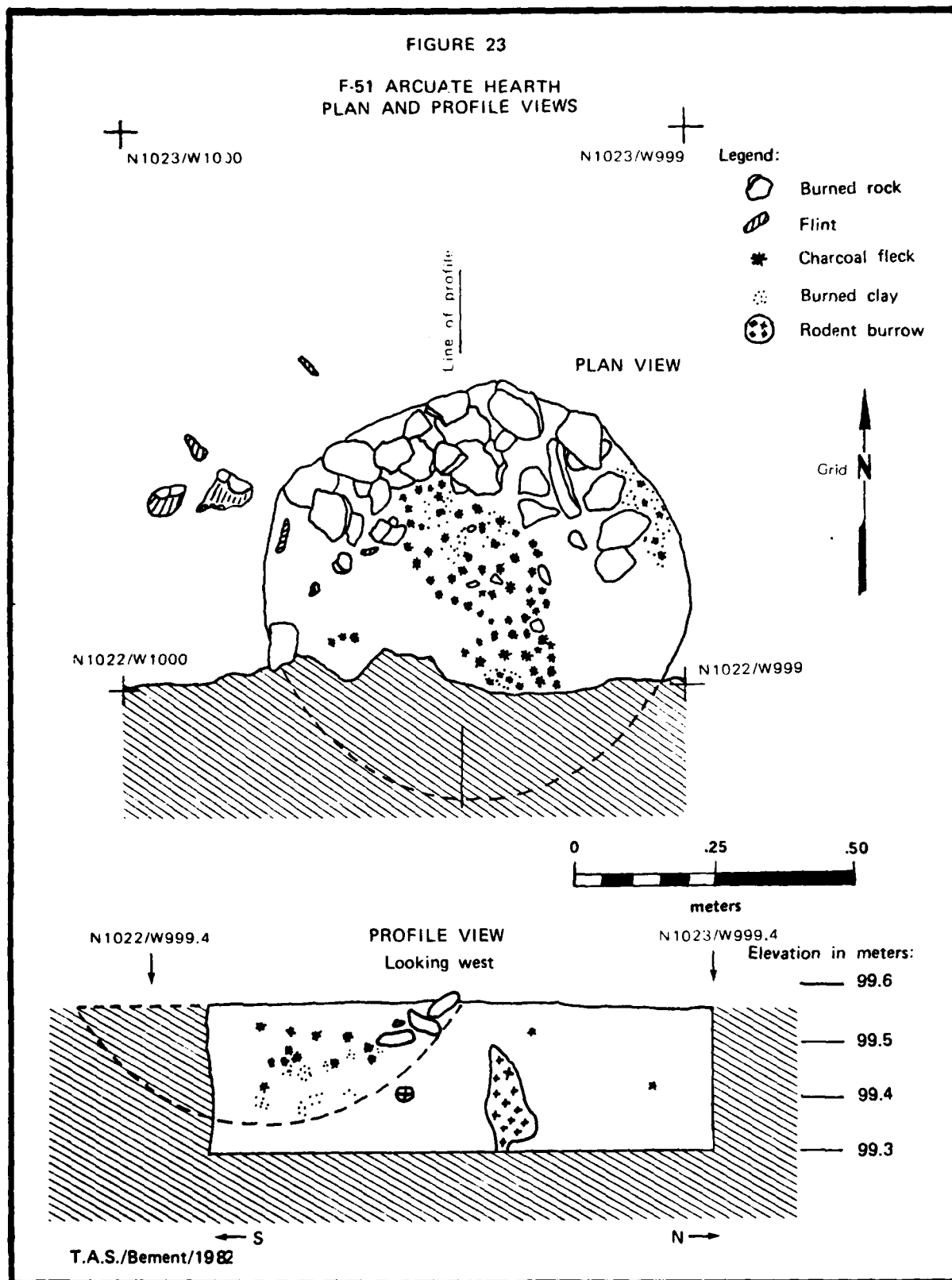


Figure 24. Arcuate hearth and burned clay/charcoal pit;
F-51 and F-69 photographs

- a. Overhead view of arcuate hearth F-51; south is to the top of photograph. Note the semicircular arrangement of the burned rocks and the charcoal and burned clay filled matrix.
- b. Cross section view of F-69 burned clay/charcoal pit, looking east. Note shallow basin shape.



FIGURE 24

<u>Feature Number</u>	<u>XU</u>	<u>Grid Coordinates</u>	<u>Stratum</u>	<u>Cultural Phase</u>	<u>Remarks</u>
14	2	N970.25/W998.26	3b	Twin Sisters	
26	1	N1001.22/W1010.06	2	Driftwood	
27	1	N1000.97/W1011.34	2	Driftwood	
65	3	N1024.5/W1001.05	3a	Twin Sisters	
108	BHR2	N988.9/W1001.8	14	Round Rock	

Burned Clay/Charcoal Features

These concentrations of burned clay and charcoal are segregated from the previously described cooking and heating features on the basis of a lack of burned rocks. Small rock spalls are frequent within the fill of these features; however, relatively complete burned cobbles are rare. Occasionally other items are found within the feature matrix.

Burned Clay/Charcoal Pits (26 examples; Fig. 25)

Description: Although they vary from circular to oval in outline, these features are, with one exception, basin shaped in profile. In general, they are similar to the arcuate hearths described above but lack the accompanying burned rock clusters. While these features vary markedly in size, they are remarkably consistent in form.

Composition: The primary component of these features is burned clay; charcoal content varies from the presence of a few tiny flecks to substantial quantities of lump charcoal. Ash is frequently present but not in large amounts. Small burned rocks rarely are found in these features. In F-10 a single mussel shell (Lampsilis sp.) was noted within the feature fill.

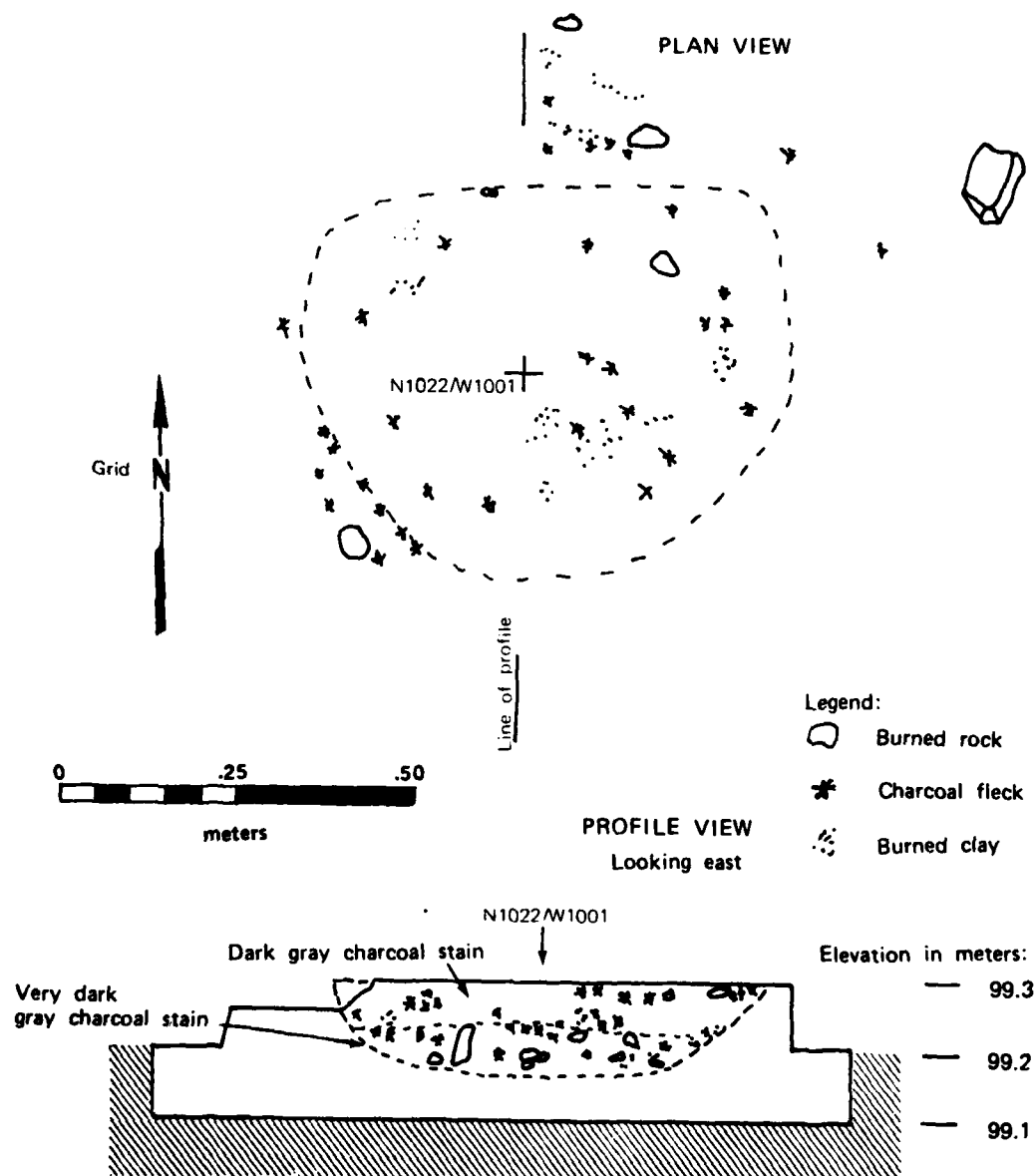
Dimensions:

<u>Feature Number</u>	<u>Recognized Elevation</u>	<u>Base Elevation</u>	<u>Maximum Length</u>	<u>Maximum Width</u>	<u>Maximum Depth</u>
10	99.54	99.27	36	26	27
17	99.17	98.96	55	46	21
20	98.86	98.61	82	38	25
33	98.64	98.09	73	N.D.	55
38	99.97	99.60	108	70	37
42	99.85	99.70	85	67	15
45	99.85	99.57	30	25	28
48	99.76	99.47	25	25	29
50	99.80	99.70	32	32	10
58	99.48	99.33	44	30	15
69	99.30	99.15	70	52	15
72	99.75	99.52	68	52	23
73	99.34	99.14	58	45	20
75	99.33	99.22	52	45	11
88	98.88	98.64	40	35	24
117	96.64	96.40	50	43	24

FIGURE 25

F-69 BURNED CLAY/CHARCOAL PIT

41WM230



T.A.S/Dierlam/1982

<u>Feature Number</u>	<u>Recognized Elevation</u>	<u>Base Elevation</u>	<u>Maximum Length</u>	<u>Maximum Width</u>	<u>Maximum Depth</u>
121	99.50	99.25	70	15+	25
122	99.72	99.55	29	21	17
124	94.60	94.48	85	60	12
125	94.64	94.44	85	20+	20
127	99.53	99.43	30	24	10
130	100.17	100.01	73	55	16
131	99.39	99.24	24	24	15
132	99.86	99.71	21	18	15
137	99.95	99.68	24	N.D.	27
138	99.67	99.47	42	N.D.	20

Provenience:

<u>Feature Number</u>	<u>XU</u>	<u>Grid Coordinates</u>	<u>Stratum</u>	<u>Cultural Phase</u>	<u>Remarks</u>
10	2	N970.65/W997.32	3a	Twin Sisters	Lampsilis sp. in fill
17	3	N1024.42/W998.54	4	Twin Sisters	
20	5	N1032.65/W934.47	1d	Austin	
33	BHT4	N1021.34/W1013.72	3	Twin Sisters	N. wall, BHT4; not excavated
38	3	N1031/W997.25	1d-g	Austin	
42	3	N1031.5/W1002.25	1d-g	Austin	
45	3	N1030.4/W999.6	1d-g	Austin	
48	3	N1022.75/W999.8	2	Driftwood	
50	3	N1022.35/W996.2	2	Driftwood	
58	3	N1020.2/W1002.5	3a	Twin Sisters	
69	3	N1022/W1001	3b	Twin Sisters	1620 ± 60 (Tx-3409)
72	3	N1031.2/W996.7	2	Twin Sisters	
73	3	N1023.75/W996.7	3b	Twin Sisters	
75	3	N1027.75/W999.2	3a	Twin Sisters	
88	5	N1032.75/W937.5	1e	Austin	
117	3	N1020/W997.5	16	Round Rock	
121	3	N1019/W995.9	3b	Twin Sisters	
122	3	N1020.2/W1003.4	2	Driftwood	
124	7	N1050/W970.8	-	Twin Sisters	
125	7	N1049.1/W971.7	-	Twin Sisters	
127	3	N1020.88/W997.32	3a	Twin Sisters	
130	2	N968.73/W997.68	1d-g	Austin	
131	2	N969.82/W999.06	2	Driftwood	
132	2	N969.64/W1002.5	1d-g	Austin	
137	2	N967.54/W996.95	1d-g	Austin	
138	3	N1024.95/W995.9	2	Driftwood	

Burned Clay/Charcoal Lenses (8 examples)

Description: These features vary from more or less circular to irregular in outline; they are essentially flat in cross section. It is possible some of these features represent intensive scorching of in situ soils; however, evidence of this is not conclusive.

Composition: Burned clay is the primary component which distinguishes these features. Charcoal is present in varying quantities and other materials such as rock spalls, bones and chipping debris are frequently contained within feature fill.

Discussion: One example, F-22, may represent intensive in situ scorching of the soil; however, this feature was obscured in the profile of BHT1 and was not excavated. This precludes definitive statements regarding its characteristics and possible functions. It is probable, however, that this and the other Driftwood, Austin and Toyah phase lenses represent debris scatters resulting from the maintenance of cooking features. The three Round Rock Phase lenses are probably of similar origin but are more conclusively associated with cooking/heating features.

Dimensions:

<u>Feature Number</u>	<u>Recognized Elevation</u>	<u>Base Elevation</u>	<u>Maximum Length</u>	<u>Maximum Width</u>	<u>Maximum Depth</u>
21	98.38	98.20	82	N.D.	18
22	97.53	97.26	128+	N.D.	27
37	100.13	100.08	200	55	5
47	94.85	94.75	180	150	10
111	97.10	97.03	30	25	7
112	96.99	96.92	85	80	7
118	96.53	96.50	100	80	3
133	100.24	100.17	122	61+	7

Provenience:

<u>Feature Number</u>	<u>XU</u>	<u>Grid Coordinates</u>	<u>Stratum</u>	<u>Cultural Phase</u>	<u>Remarks</u>
21	BHT1	N1032/W940.56	1g	Austin	N. wall, BHT1; not excavated
22	BHT1	N1032/W941.78	2a	Driftwood	
37	3	N1022.75/W1000.15	1d-g	Austin	N. wall, BHT1; not excavated
47	7	N1049.7/W970.8	-	Driftwood	
111	9	N987.55/W999	16	Round Rock	
112	9	N989.2/W998.7	16	Round Rock	
118	3	N1018.5/W998.5	16	Round Rock	
133	2	N970.44/W1003.14	1a-c	Toyah	

Mortuary Features

Two features are included within this category; the first is an Austin Phase cemetery while the second is an isolated San Marcos Phase cremation. Most of the noncremated interments have been described previously (Prewitt 1974:33-67; Butler 1974:122-131); however, these elements are included within this report in order that the cemetery may be presented as a unified complex feature.

Cemetery (Figs. 26 and 27)

The previous description of the cemetery (Prewitt 1974:33-51) dealt only with noncremated interments; reanalysis of the field notes and materials collected during the previous work reveals that two cremations were encountered at that time but were not recognized. The current work was specifically directed toward removing what was thought to be two additional noncremated interments; these remains were of a single individual (I-27); but in carrying out the excavations, it was discovered that a series of distinct cremated interments was located around the western edge of the noncremated remains. Discussions with the site's discoverer and initial investigator, Mr. Clarence Loeve, revealed that an undetermined number of probable cremations were excavated on the eastern side of the noncremated burials. Mr. Loeve's description of his findings during random excavations of that area suggests that the noncremated interments were encircled by a series of cremated interments.

Noncremated Burials (27 examples; Fig. 26)

Description: With one exception, the noncremated burials contained within the cemetery (F-1) are restricted to a 3-meter diameter circular area in XU1 which is centered approximately at grid coordinates N1002.5/W1018.75. The apparent preferred style of interment is flexed, although this varies from loosely or semiflexed to tightly flexed. Body position appears to have been of little concern; eight individuals were buried on their backs, six on their right sides, five on their left sides, two on their stomachs, and the remaining six are too disarticulated to determine their original positioning. Orientation of the body axis (spinal column) is generally north-south to northwest-southeast, although one individual is oriented east-west. The skulls are, with three exceptions, oriented to the north or northwest; the exceptions include the east-west oriented individual and two individuals associated with the later of two multiple interments. In the first exception, the skull is to the west, while in the latter two the skulls are to the southeast.

The two multiple interments each contain three individuals and represent both one of the earliest interments and one of the last. The skeletons of the earlier multiple interment are semiflexed; the bodies were placed in an apparently long narrow grave and in alternate right-left-right positions in such a manner that the knees of one individual rested on the general neck region of one of the other individuals. In the later multiple interment, the bodies were placed within a much smaller apparently oval grave. The lower individual was placed with the

FIGURE 26
AUSTIN PHASE CEMETERY,
XUI 41WM230

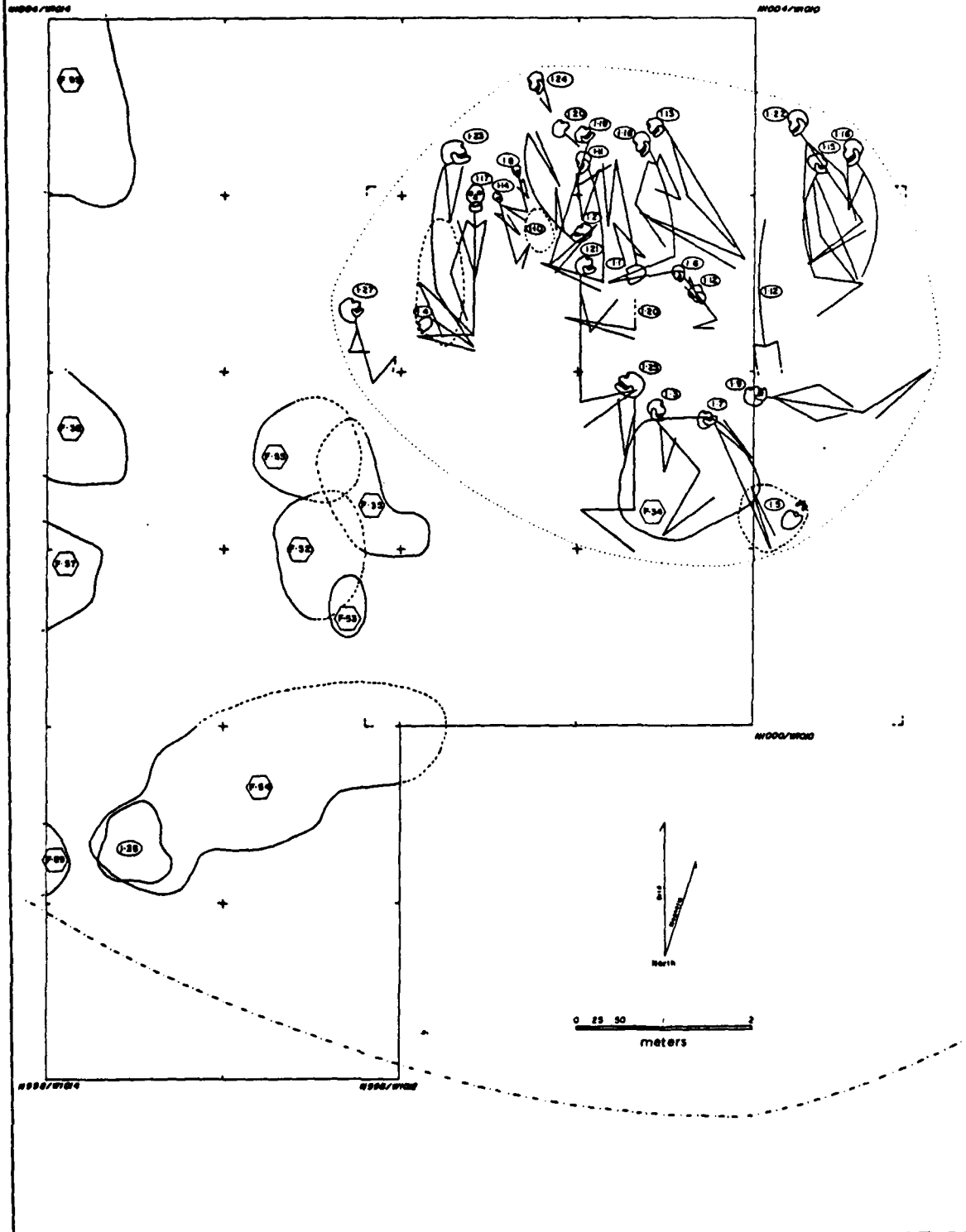


Figure 27. Austin Phase cemetery; F-1, C-9 and general XU1 photographs

- a. Detailed cross section view of cremation (C-9) in F-1 cemetery. View is looking west at wall of XU1. Note the charred bones and charcoal placed in a shallow basin pit and the lack of burning of the surrounding soil matrix.
- b. General view of XU1 excavations in progress, looking southwest. Round tags on west wall mark cremations exposed in the wall (C-8 to left, C-7 to right). C-9 is behind crewmember with shovel, and C-10 is in corner of XU1 behind the head of the crewmember to the right.

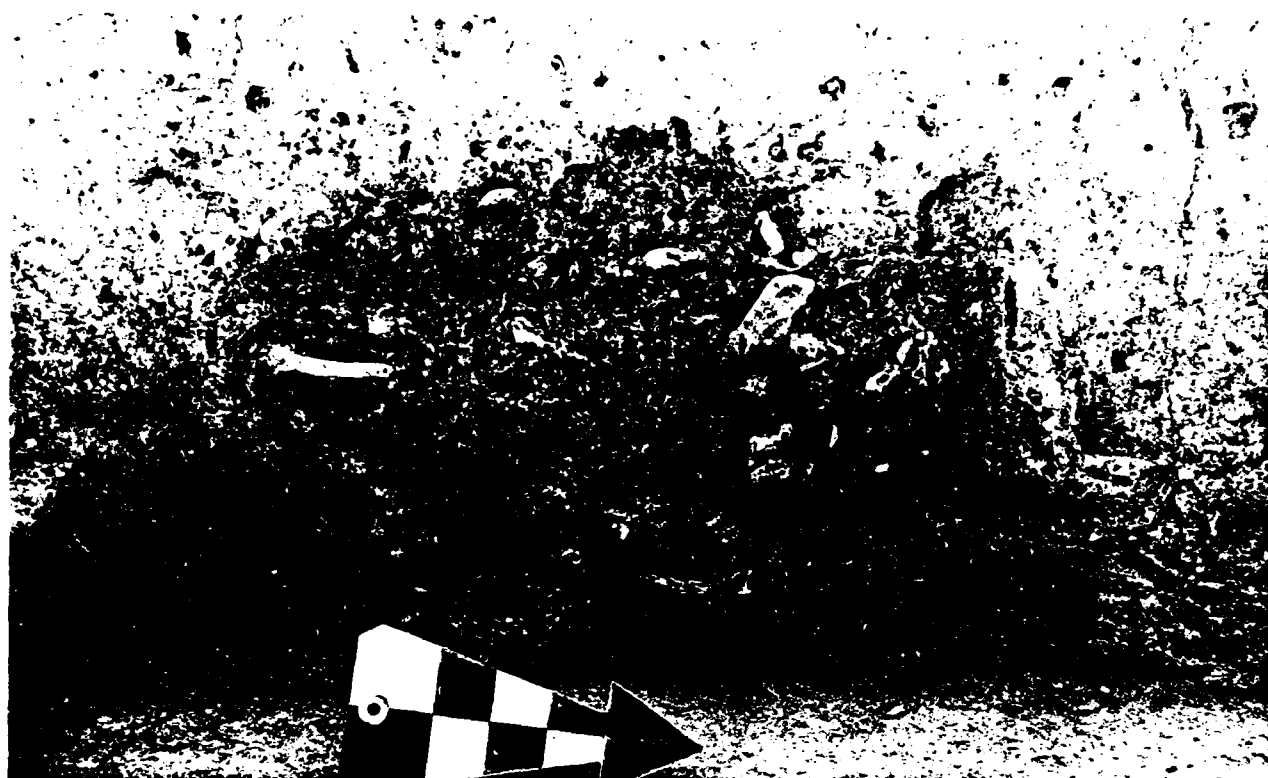


FIGURE 27

head to the northwest and the next two bodies were placed directly above but with the heads to the southeast. Both of the multiple interments contain one individual which shows evidence of human aggression.

A Scallorn type arrow point rested against the vertebral column of one of the individuals in the lower (earlier) multiple burial, while another Scallorn point is embedded within a vertebra of one of the individuals in the upper (later) multiple burial. Four of the individual interments also contained Scallorn points in positions which suggest they were the cause of death. Grave goods were generally absent; a triangular conch shell pendant resting adjacent to the ribs of one individual suggests that it may have been an intentionally placed (or worn) ornament. A freshwater mussel shell valve was lying on the chest of another individual; modifications of the shell are lacking but the positioning suggests it may have been intentionally placed on the body. Two deer parietals found generally within the upper limits of the cemetery may also be considered as grave goods; however, neither is conclusively associated with an interment. On one specimen, the antlers have been cut at the butt just above the parietal; the deteriorated condition of the second specimen precluded determination of whether the antlers had been cut.

Summary of Interment Data:

Ind. #	Interment Style	Sex	Age	Axis	Positioning
1	Tight flex	M	MA	SE-NW	Back
2	Tight flex	M	MA	SE-NW	Back
3	Tight flex	F	MA	NW-SE	Back
4	Disarticulated	M	MA	-	-
5	Disarticulated	M	YA	-	-
6	Semiflex	?	I	NW-SE	Right side
7	Tight flex	M	MA	NW-SE	Left side
8	Tight flex	?	I	NW-SE	Right side
9	Semiflex	F	MA	W-E	Stomach
10	Disarticulated	?	I	-	-
11	Tight flex	M	OA	NW-SE	Back
12	Semiflex	F	MA	N-S	Back
13	Tight flex	M	MA	NW-SE	Right side
14	Disarticulated	?	I	-	-
15	Semiflex	F	MA	N-S	Left side
16	Semiflex	F	YA	N-S	Right side
17	Tight flex	M	MA	N-S	Back
18	Semiflex	F	YA	NW-SE	Back
19	Tight flex	M	MA	N-S	Left side
20	Semiflex	M	OA	N-S	Right side
21	Semiflex	M	MA	N-S	Left side
22	Semiflex	M	MA	NW-SE	Back
23	Semiflex	F	MA	N-S	Stomach
24	Disarticulated	M	MA	-	-
25	Semiflex	M	YA	N-S	Right side
26	Disarticulated	?	I	-	-
27	Semiflex	?	SA	NW-SE	Left side

Provenience:

<u>Ind. No.</u>	<u>Grid Coord. Skull</u>	<u>Grid Coord. Pelvis</u>	<u>H.El.</u>	<u>L.El.</u>	<u>Remarks</u>
1	N1002.55/ W1010.7	N1003.2/ W1010.73	99.84	99.56	I-2 and I-11 associated; mussel shell on chest
2	N1002.8/ W1011	N1003.2/ W1011.28	99.77	99.65	I-1 and I-11 associated; <u>Scallorn</u> imbedded in vertebra
3	N1991.8/ W1010.8	N1001.45/ W1010.35	99.67	99.51	
4	N1002.3/ W1011.32	-	99.16	99.06	
5	N1001.15/ W1009.8	-	99.61	99.57	
6	N1002.58/ W1010.43	N1002.3/ W1010.28	99.57	99.56	
7	N1001.75/ W1010.3	N1001/ W1009.95	99.54	99.49	<u>Scallorn</u> in mouth
8	N1003.15/ W1011.35	N1002.9/ W1011.3	99.64	99.51	
9	N1001.85/ W1010	N1001.77/ W1009.4	99.44	99.27	
10	N1002.8/ W1011.22	-	99.54	99.49	
11	N1003.2/ W1010.97	N1002.5/ W1010.85	99.60	99.40	I-1 and I-2 associated
12	N1002.45/ W1010.33	N1002.15/ W1009.95	99.55	99.23	<u>Scallorn</u> between 2 vertebrae; distal tip of unidentified point between next 2 vertebrae
13	N1003.4/ W1010.58	N1002.65/ W1010.05	99.61	99.36	<u>Scallorn</u> in lower chest cavity; conch shell pendant outside chest cavity

Ind. No.	Grid Coord. Skull	Grid Coord. Pelvis	H.El.	L.El.	Remarks
14	N1003/ W1011.47	N1002.61/ W1011.35	99.43	99.38	
15	N1003.2/ W1009.65	N1002.55/ W1009.7	99.40	99.14	
16	N1003.3/ W1009.45	N1002.55/ W1009.45	99.41	99.20	
17	N1003.05/ W1011.6	N1002.2/ W1011.6	99.36	99.20	
18	N1003.35/ W1010.65	N1002.65/ W1010.45	99.31	99.18	
19	N1003.35/ W1011	N1002.6/ W1011.15	99.23	99.21	Scallorn adja- cent to verte- bra
20	N1003.4/ W1011.1	N1002.25/ W1010.68	99.40	99.17	I-21 and I-25 associated
21	N1002.6/ W1010.98	N1001.85/ W1010.98	99.25	99.15	I-20 and I-25 associated
22	N1003.45/ W1009.75	N1002.85/ W1009.4	99.30	99.14	
23	N1003.25/ W1011.7	N1002.45/ W1011.8	99.31	99.16	F-36 charcoal- filled pit associated; 940 ± 60 B.P. (Tx- 1923); 870 ± 60 B.P. (Tx-1925)
24	N1003.65/ W1011.25	-	99.33	99.16	
25	N1001.95/ W1010.7	N1001.25/ W1010.7	99.27	99.14	I-20 and I-21 associated; Scallorn adja- cent to verte- bra
26	N999.25/ W1013.55	-	99.85	99.77	Associated with F-54 cremation (C-5)
27	N1002.35/ W1012.3	N1001.95/ W1012.17	99.43	99.37	

Cremated Burials (10 examples; Fig. 26)

Description: The ten features designated as cremations in F-1 are, with one exception, distributed in a 3-meter-wide band surrounding the noncremated burials. The one exception, C-1, partially overlies four burials on the southern edge of the concentrated noncremated portion of the cemetery. These features are generally oval in plan view and are basin-shaped in cross section. The configuration of C-5 suggests that three separate interments are probably included within the defined limits of the feature. In addition, I-26 noncremated skeleton (infant) is mixed with the southwestern lobe of C-5. The cremations are distinguished by the presence of small burned bone fragments, charcoal flecks and lumps, and burned clay lumps. No scorching of the surrounding matrix was observed at any of the interments; it appears that the bodies were cremated elsewhere, then the remains were transported to the cemetery for interment in shallow pits.

Items which may be associated with the cremations as grave goods include three conch shell beads. One was found near C-7, one near or between C-5 and C-9, and one near the southwestern margin of C-5. None of the beads were found in place, and their associations are consequently unclear. The bead found near C-7 is unburned; however, both the other specimens are burned, and this suggests they may have been left on the bodies during the cremation process. Part of the difficulty of association lies with the fact that all three beads were recovered near the recognition surface of the cremations. It is possible that the beads were intentionally placed on top of the cremated remains at the time of interment; certainly this would explain the position of occurrence near the top of the interments and a resultant failure to recognize the cremations during excavations until after the beads had been removed.

Dimensions:

<u>Cremation Number</u>	<u>Recog. El.</u>	<u>Base El.</u>	<u>Max.L.</u>	<u>Max.W.</u>	<u>Max. Depth</u>
1	99.91	99.61	80	68	38
2	99.94	99.82	77	45	12
3	100.20	99.93	70	20+	9
4	99.93	99.73	35	20	20
5	99.98	99.70	175+	70+	28
6	100.20	99.85	55+	25+	25
7	99.95	99.67	60+	45+	28
8	99.93	99.67	60+	32+	26
9	99.91	99.65	40+	16+	26
10	100.00	99.70	100+	49+	30

Provenience:

<u>Cremation No.</u>	<u>Grid Coordinates</u>	<u>Association/Remarks</u>
1	N1001.38/W1010.38	
2	N1001.25/W1012.2	
3	N1000.95/W1012.5	
4	N1000.68/W1012.33	
5	N999.75/W1012.75	1250 $\pm$ 60 (Tx-3402); probably represents 3 interments; infant burial, I-26
6	N1001.55/W1012.55	
7	N1001.75/W1014	
8	N1000.85/W1014	
9	N999.25/W1014	
10	N1003.5/W1014	

Charcoal-filled Pit (1 example)

As previously described in Prewitt (1974:45), this northwest-southeast-oriented oblong pit with a concave bottom is the only distinct burial pit within the F-1 cemetery. The pit, labeled F-36, is associated with I-23 and is discernible due to the large quantities of charcoal included within the pit fill. Skeleton I-4 was disarticulated as a result of the excavation of F-36. It is possible that I-17 is associated with F-36, but it is not clear whether that individual was placed within the still-open pit after I-23 was interred or whether a slightly later pit (undetected) partially coincided with F-36.

Dimensions:

<u>F#</u>	<u>Recog. El.</u>	<u>Base El.</u>	<u>Max.L.</u>	<u>Max.W.</u>	<u>Max. Depth</u>
36	99.74	99.06	137	76	68

Provenience:

<u>F#</u>	<u>Grid Coordinates</u>	<u>Association/Remarks</u>
36	N1002.5/W1011.75	Burial pit for I-23; 940 $\pm$ 60 B.P. (Tx-1923); 870 $\pm$ 60 B.P. (Tx-1925)

Isolated Cremation (1 example)

Description: An apparently isolated cremated interment is exposed in the north wall of Backhoe Ramp 2. In cross section, it appears the cremated remains were placed within a shallowly excavated basin. No details of the plan view of this feature were obtained. F-140 is the only recognized human interment encountered outside of the Austin Phase Cemetery (F-1). It is within Stratum 12 which contains San Marcos Phase materials in other areas of the site. The feature was recognized during the final cleaning of the Backhoe Ramp wall; attention

was directed to it when a marine shell (conch columella) bead was dislodged from the feature fill.

Dimensions:

<u>F#</u>	<u>Recog. El.</u>	<u>Base El.</u>	<u>Max.L.</u>	<u>Max.W.</u>	<u>Max. Depth</u>
140	98.4	98.25	45	N.D.	15

Provenience:

<u>F#</u>	<u>XU</u>	<u>Grid. Coord.</u>	<u>Stratum</u>	<u>Cultural Phase</u>	<u>Remarks</u>
140	BHR2	N990/W996.05	12	San Marcos	Not excavated

Other Cultural Features

This general grouping subsumes all cultural features which were recognized at the site but which are not related to the two previous groupings. Four morphological categories are included in this residual group.

Lithic Debris Concentrations (3 examples)

Description: While it is recognized that these three features are not formally constructed cultural items, they appear to represent the residues of specific activities which were conducted within restricted areas. Each of them consists of densely concentrated accumulations of flint flakes which represent chipping debris. Two examples, F-142 and F-143, are generally circular in plan while F-144 is irregular in outline. All three concentrations are relatively thin (5 cm) in vertical extent.

Dimensions:

<u>F#</u>	<u>Recog. El.</u>	<u>Base El.</u>	<u>Max.L.</u>	<u>Max.W.</u>	<u>Max. Depth</u>
142	97.65	97.60	50+	50+	5
143	96.55	96.50	100	100+	5
144	97.15	97.10	200+	65+	5

Provenience:

<u>F#</u>	<u>XU</u>	<u>Grid. Coord.</u>	<u>Stratum</u>	<u>Cultural Phase</u>	<u>Remarks</u>
142	3	N1016.25/W998.25	12	San Marcos	
143	3	N1019/W998.25	16	Round Rock	
144	3	N988.5/W999.75	16	Round Rock	

Mussel Shell Concentrations (3 examples)

Description: One of these features, F-15, is a formal construct in that 26 mussel valves appear to have been placed within a shallow basin. As described in the previous report on this site (Prewitt 1974:68), the component valves probably are tools; a similar feature was reported by Mr. Loeve. In contrast, the remaining two examples, F-110 and F-146, appear to be informal concentrations of valves which probably represent the discarded residue of meals. The shells are loosely grouped in both instances; there appears to be no intentional arrangement of the valves. Debris from adjacent features (particularly burned rocks) is included within the feature matrix. Both of these features appear to be fortuitous piles of residue.

Dimensions:

<u>F#</u>	<u>Recog. El.</u>	<u>Base El.</u>	<u>Max.L.</u>	<u>Max.W.</u>	<u>Max. Depth</u>
15	99.04	98.93	23	20	11
110	97.7	97.6	35	35	10
146	97.6	97.4	22	20	20

Provenience:

<u>F#</u>	<u>XU</u>	<u>Grid. Coord.</u>	<u>Stratum</u>	<u>Cultural Phase</u>	<u>Remarks</u>
15	2	N970.35/W999.18	3b	Twin Sisters	
110	3	N1017.2/W999.65	12	San Marcos	
146	3	N1016.67/W997.5	12	San Marcos	

Pit (1 example)

Description: Previously described as a possible pit (Prewitt 1974:69), this basin-shaped depression is filled with laminated tan silt. It appears to originate near the bottom of Stratum 1; however, this may be a natural feature which developed around the base of a tree and which subsequently filled with silt.

Dimensions:

<u>F#</u>	<u>Recog. El.</u>	<u>Base El.</u>	<u>Max.L.</u>	<u>Max.W.</u>	<u>Max. Depth</u>
25	99.76	99.48	85	N.D.	28

Provenience:

<u>F#</u>	<u>XU</u>	<u>Grid. Coord.</u>	<u>Stratum</u>	<u>Cultural Phase</u>	<u>Remarks</u>
25	4	N1028.44/W987.8	1a-c	Toyah (?)	

Bison Skeleton (1 example; Figs. 28, 29 and 30)

Description: The articulated remains of a bison skeleton (F-66) encountered in Backhoe Trench 12 were partially exposed in XU8. Parts of the tail, rear legs and forelegs of the skeleton were removed by the backhoe excavations; most of the remainder of the skeleton lay to the west of the north-south-oriented backhoe trench, although portions of the extremities are visible in the east wall of the backhoe trench. The carcass rested on the left side following the death of the animal and was oriented with the head to the north-northwest and the pelvis to the south-southeast. Obvious major elements which are lacking include the cranium and the horn cores; the mandibles are in place although the atlas vertebra is slightly displaced. Other minor disarticulations include the right humerus and several of the right ribs. The positioning of the cervical vertebrae and the mandibles suggest the head was stretched out and back (toward the hump). Although the cranium is lacking, scattered apparent maxillary teeth and at least one external auditory meatus were noted in the area immediately west of the skeleton.

It is evident that the animal lay exposed on the ground surface until decomposition of the carcass had begun. Apparent carnivore teeth marks are visible on several of the bones; in particular, several teeth marks were noted on the disarticulated right humerus. Two probable carnivore mandible fragments were noted near the bison skeleton.

Artifacts in general association with the bison skeleton include seven identifiable arrow points and one arrow point fragment. Two arrow points are of the Young type, two are of the Cliffton type, and three are of the Perdiz type. None of the arrow points were observed in place; however, one specimen, Lot. No. 3035B (Perdiz type) was retrieved from the fill either barely within or just above the lower portion of the rib cage. Two other points, one Perdiz (Lot No. 3033) and one Cliffton (Lot No. 3008), were retrieved from the fill immediately west of the skeleton. All of these projectile points are made from fine-grained grayish chert; in fact, the similarity of the materials is striking and suggests the flakes these points were chipped from were struck from the same cobble. The color and texture of the chert closely resembles that of cobbles commonly found near Georgetown. In addition to the projectile points, sparse chipping debris (84 flakes) was scattered in and near the skeleton. Few of the flakes were immediately adjacent to or within the primary bone distribution; rather, they are distributed to the west of the skeleton and increase notably in density toward the southwest. It may be significant that many of the flakes appear to be of the same parent material as the arrow points.

Direct evidence of butchering is absent. The bones were examined closely in the field for nicks, cuts and scratches which could indicate that the carcass was dressed out; no such evidence could be found. Although most of the skeletal elements are remarkably well articulated, the ribs of the right side are somewhat disoriented and in some cases have been moved about sufficiently to indicate distinct displacement. It is conceivable that this disarrangement may have resulted from carnivore activities rather than from possible butchering techniques.

Figure 28. Bison skeleton; F-66 photographs

- a. General view of XU8, looking northeast. Initial exposure of bison skeleton in progress.
- b. Bison skeleton partially exposed, looking north.

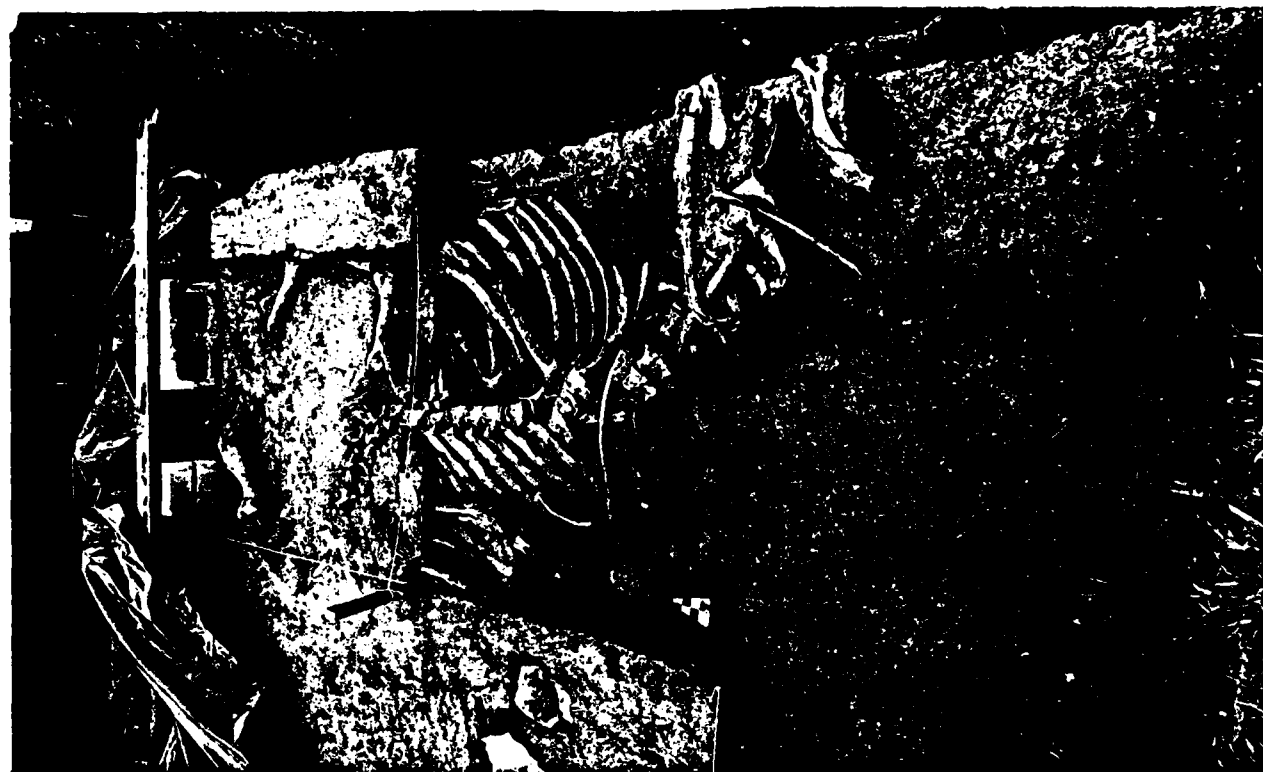
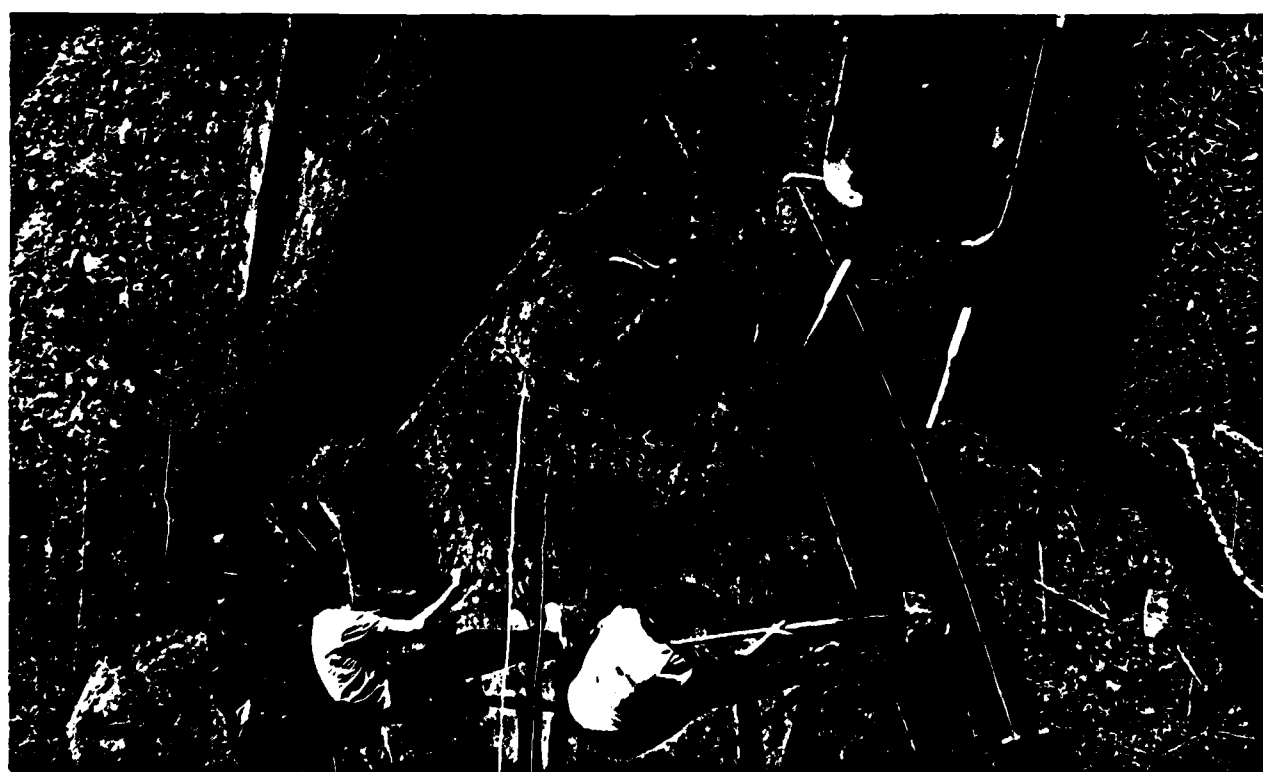


FIGURE 28



It is unclear at this point what caused the death of the animal represented by these skeletal remains. There is no direct association of any of the arrow points in the sense of positioning which is suggestive of a fatal wound. Neither is there any direct evidence of butchering although the disarticulation of several of the right ribs, the right humerus, the atlas vertebra, and the absence of the cranium (including horn cores) is rather suspicious. While there is a dark organic-rich stain which immediately underlies the skeleton, there is no evidence that the animal was mired in mud and subsequently died. Rather, the organic stain probably resulted from the decomposition of the carcass.

Provenience:

<u>F#</u>	<u>XU</u>	<u>Grid Coord.</u>	<u>Recog. El.</u>	<u>Base El.</u>	<u>Stratum</u>	<u>Cultural Phase</u>
66	8	N981.75/W941.25	99.65	99.4	1c	Toyah

Natural Features

Two groups of features which are interpreted as representing natural occurrences are included within this major category. It may be argued that both groupings reflect cultural activities; however, they are treated as natural phenomena for the nonce.

Burned Tree Roots (8 examples; Fig. 31)

Description: These features vary widely in size and in their physical appearance. Common characteristics include the presence of obvious mixed or disturbed soil, irregular and inconsistent outlines, tapering form in cross section, and the presence of in-place scorched soil and burned clay lumps of varying sizes. Charcoal is present in several of the burned tree roots.

It is noteworthy that all but one of these features (F-40) appear to originate at levels equatable with various prehistoric occupations. The oldest (F-24) appears to be associated with the Uvalde Phase in Stratum 6. There is a strong possibility that these represent trees which were intentionally burned by the various prehistoric occupants of the site; however, it is just as possible that they were torched by lightning or by lightning-induced prairie fires. The aberrant burned tree root originated near the present ground surface and is assignable to the recent Historic era. It also points out the real possibility that all these features may be the result of cultural activities -- Mr. Loeve identified F-40 as the remains of a dead pecan tree which he burned at the request of Mr. Fox during the mid-1960s.

Dimensions:

<u>F#</u>	<u>Recog. El.</u>	<u>Base El.</u>	<u>Max.L.</u>	<u>Max.W.</u>	<u>Max. Depth</u>
19	98.91	98.65	36	30	26
24	98.67	98.18	52	49	49

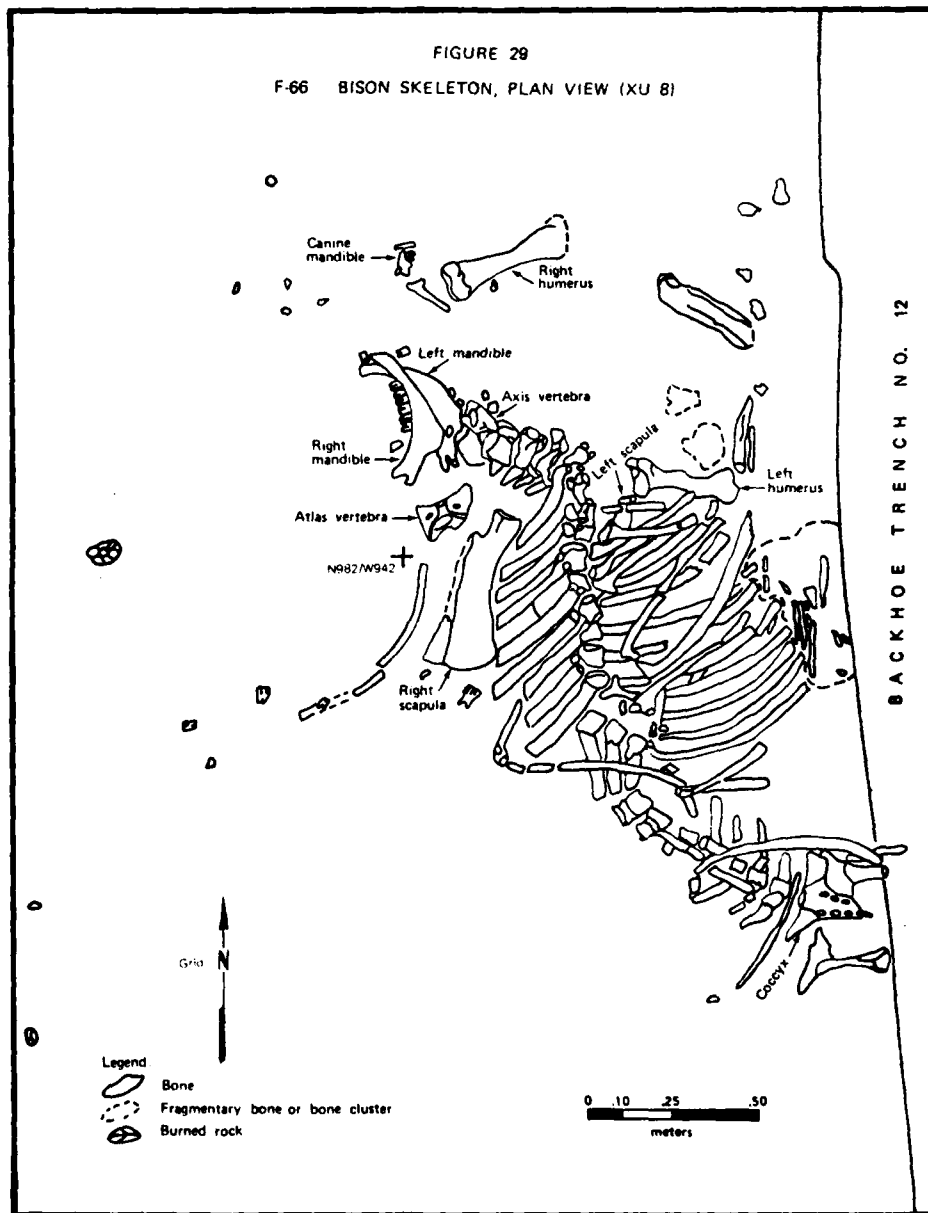


Figure 30. Bison skeleton; F-66 and dead cow photographs

- a. Final cleaning of bison skeleton in progress, looking northeast. Note the absence of the skull and horn cores although the mandibles are in place. Also note the position and good articulation of the elements of the skeleton.
- b. Recent dead cow near 41WM230, looking south. This photograph was taken about one week after the animal died during April 1978. Note the position of the carcass and compare it with that of the bison skeleton.

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NORTH TEXAS STATE UNIV DENTON INST OF APPLIED SCIENCES

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ARCHAEOLOGICAL INVESTIGATIONS AT THE SAN GABRIEL RESERVOIR DIST--ETC(U)

JUN 82 T R HAYS, E R PREWITT, B H BUTLER

DACW63-78-C-0012

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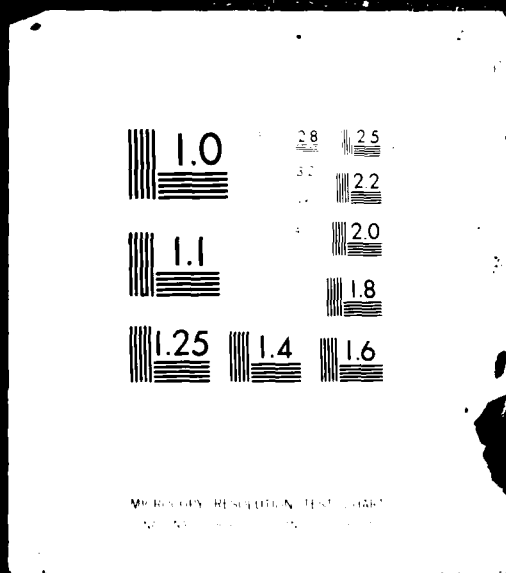




FIGURE 30

<u>F#</u>	<u>Recog. El.</u>	<u>Base El.</u>	<u>Max.L.</u>	<u>Max.W.</u>	<u>Max. Depth</u>
39	99.78	99.1	68	52	68
40	99.9	99.1+	95	75	80+
43	99.2	98.6+	160	83	60+
59	99.09	98.52	55	33	57
70	99.89	97.70	75	60	219
134	100.19	99.74	36	24	45

Provenience:

<u>F#</u>	<u>XU</u>	<u>Grid. Coord.</u>	<u>Stratum</u>	<u>Cultural Phase</u>	<u>Remarks</u>
19	3	N1021.03/W998.6	5	Uvalde	
24	3	N1019.99/W998.84	6	Uvalde	
39	3	N1019.95/W1003.15	2	Driftwood	
40	3	N1020.8/W996.85	1a-c	Historic	Burned by C. Loeve, mid-1960s
43	3	N1020.75/W996.4	3b	Twin Sisters	
59	5	N1030.5/W937.65	1d	Austin	
70	3	N1017/W999.5	2	Driftwood	
134	3	N1018.22/W1001.49	1a-c	Toyah	

Snail Shell Concentrations (9 examples; Fig. 32)

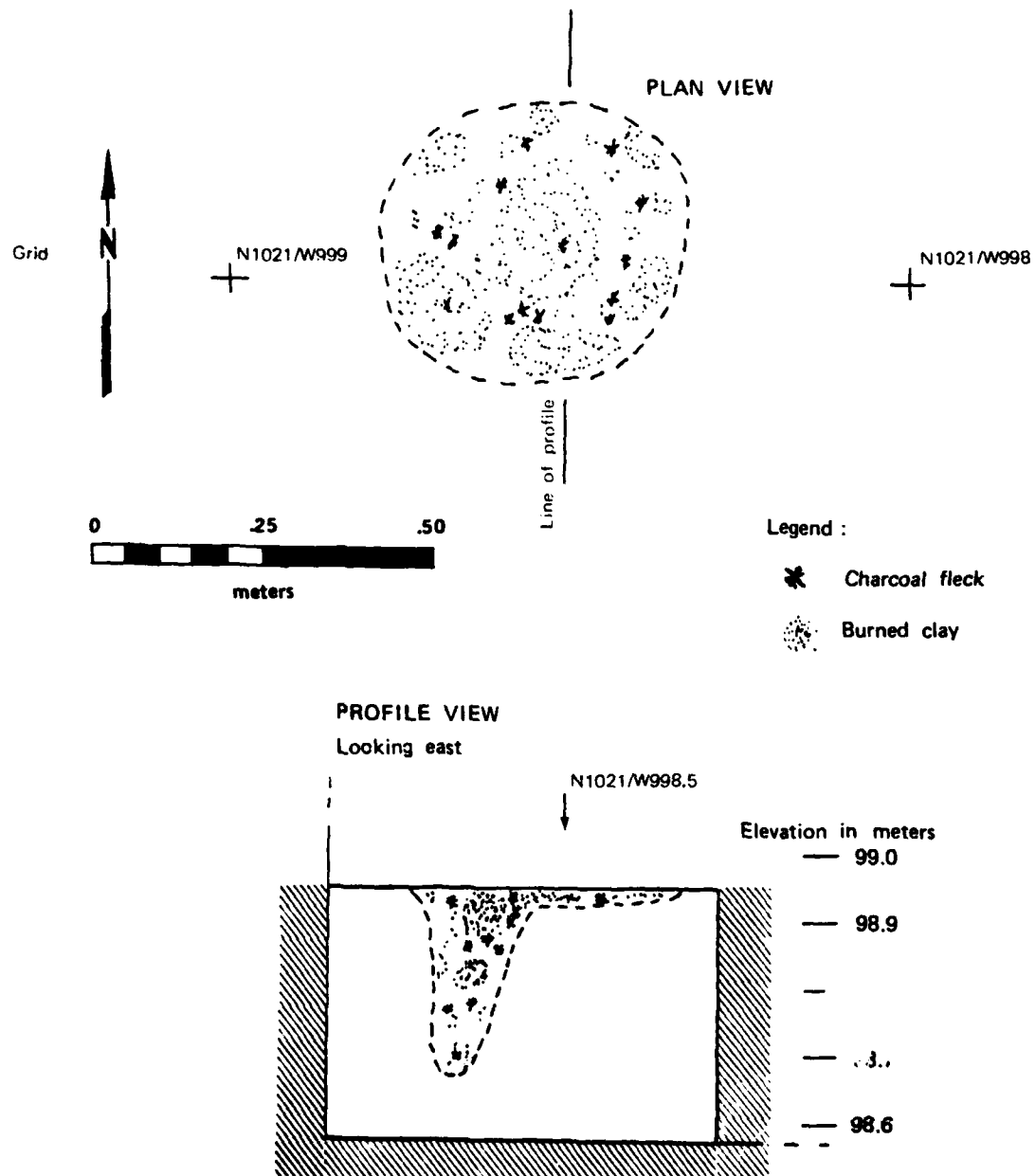
Description: As with the previous category of features, it could be argued that these irregular concentrations of snail shells may represent cultural rather than natural features. The size, outline and depth of the clusters vary widely; several are suggestive of rodent burrows or dens in general form. The component shells appear to be primarily Rabdotus sp. and Polygyra sp. Charcoal flecks, small burned rock spalls and chipping debris frequently occurs within and near the shell clusters.

As noted above, it is not clear whether these combinations of snail shells represent the remains of gastropods intentionally collected for use as food or whether they represent naturally occurring clusters which accumulated in pockets or rodent burrows as a result of overbank flooding. Observations of flooding characteristics noted during the excavations supports the suggestion that abating backwater results in the deposition of snail shells in generalized clusters. A third alternative is that the concentrations occur as a result of rodent burrowing activities.

Dimensions:

<u>F#</u>	<u>Recog. El.</u>	<u>Base El.</u>	<u>Max.L.</u>	<u>Max.W.</u>	<u>Max. Depth</u>
82	99.3	99.27	75	50	3
90	99.35	99.2	70	50	15
92	99.93	99.8	25	8	13
98	99.1	99.05	30	30	5

FIGURE 31
F-19 BURNED TREE ROOT
PLAN AND PROFILE VIEWS



T.A.S./Dieriam/1982

Figure 32. Snail shell concentrations; F-82 and F-92 photographs

- a. Overhead view of F-82; east is to the top of the photograph. Note general linear arrangement of the snail shells.
- b. Overhead view of F-92; east is to the top of the photograph. Note the distinct linear arrangement of the snail shells.

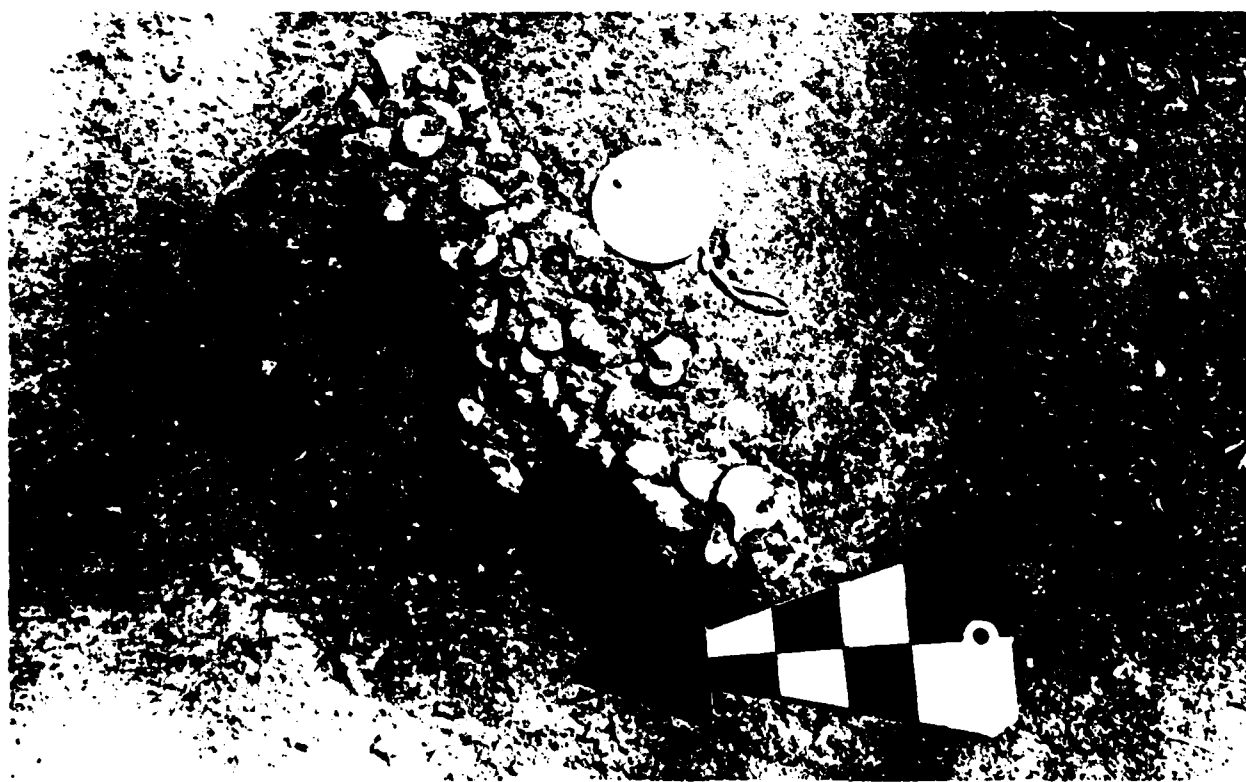


FIGURE 32

<u>F#</u>	<u>Recog. El.</u>	<u>Base El.</u>	<u>Max.L.</u>	<u>Max.W.</u>	<u>Max. Depth</u>
135	100.34	100.19	55	37	15
139	98.14	98.00	80	N.D.	14
152	98.72	98.62	30	N.D.	10
153	98.67	98.62	25	N.D.	5
154	97.55	97.50+	N.D.	N.D.	5+

Provenience:

<u>F#</u>	<u>XU</u>	<u>Grid. Coord.</u>	<u>Stratum</u>	<u>Cultural Phase</u>	<u>Remarks</u>
82	3	N1017.4/W1001.2	4	Twin Sisters	
90	3	N1029.75/W997.85	3a	Twin Sisters	
92	1	N999.4/W1012.4	1d-g	Austin	
98	3	N1025.45/W997.4	3b	Twin Sisters	
135	3	N1029.87/W1000.91	1a-c	Toyah	
139	3	N1020.25/W997	8	Uvalde	
152	BHR2	N990/W1004.55	6-11	Uvalde	N. wall; not excavated
153	3	N1017.62/W996	7	Uvalde	
154	BHR2	N990/W987.57	6-8	Uvalde	N. wall; not excavated

ARTIFACT DESCRIPTIONS

The artifacts recovered from the Loeve-Fox Site during the 1978 season of work are separated into two broad categories based upon parent material. Of the 44,596 items herein described, 44,577 are lithic and 19 are of shell and bone. Each of these large groups is divided into general categories based on overall treatment of the material. These are further divided into gross morphological descriptive groupings which are subdivided into specific groupings; the latter group corresponds to named formal types where appropriate.

Named projectile point styles generally follow the Suhm and Jelks (1962) tradition; however, in the case of Darl points, a proposal made in the as yet unpublished Rogers Spring Site report (Prewitt n.d.) is restated and calls for a division of Darl into the Hozie, Zephyr and Mahomet types. Named groups of bifaces are taken from various sources; two new type names, Hare and San Gabriel, are proposed for distinctive biface groups which commonly occur in the Granger Lake District.

Measurements of the artifacts are in millimeters except where degrees are provided for bit angles for some artifact groups. For all categories other than projectile points, an asterisk (*) denotes an incomplete measurement. In the case of projectile points, an asterisk (*) denotes an estimated measurement on a broken artifact. The abbreviations used for presenting projectile point measurements are taken from a standard coding form the author has devised in conjunction with an ongoing projectile point morphology project. These abbreviations are explained as follows:

ML = maximum length
 MW = maximum blade width
 MT = maximum thickness
 NW = neck width
 BW = base width
 HL = haft length (equates with stem length)
 BD = base depth (- = convex, 0 = straight, + = concave)
 BB = beveled blade
 BS = beveled stem
 EG = edge grinding (stem edges and/or base)
 S = serration

It should be noted that most of the materials recovered from within features are not included in these descriptions, and none of the materials from the fine screen fractions are included. These materials are stored at the Balcones Research Center in Austin as they came from the field. Financial constraints have thus far precluded analysis and inventory.

Lithics

CHIPPED STONE

Arrow Points

UNSTEMMED

Granbury (2 specimens; Fig. 33a-b)

Description: These are small triangular to subtriangular specimens, one of which is unifacially chipped. Both are varieties of Granbury points as proposed by Jelks (1962:35-36); there is one specimen each of the bono and parker varieties. Both specimens lack their distal tip.

Dimensions:

<u>Sp.#</u>	<u>ML</u>	<u>MW</u>	<u>MT</u>	<u>NW</u>	<u>BW</u>	<u>HL</u>	<u>BD</u>	<u>BB</u>	<u>BS</u>	<u>EG</u>	<u>Ser.</u>
2781	32*	16	4	16	16	4	-4	-	-	-	-
2745	32*	24	4	24	24	9	-9	-	-	-	-

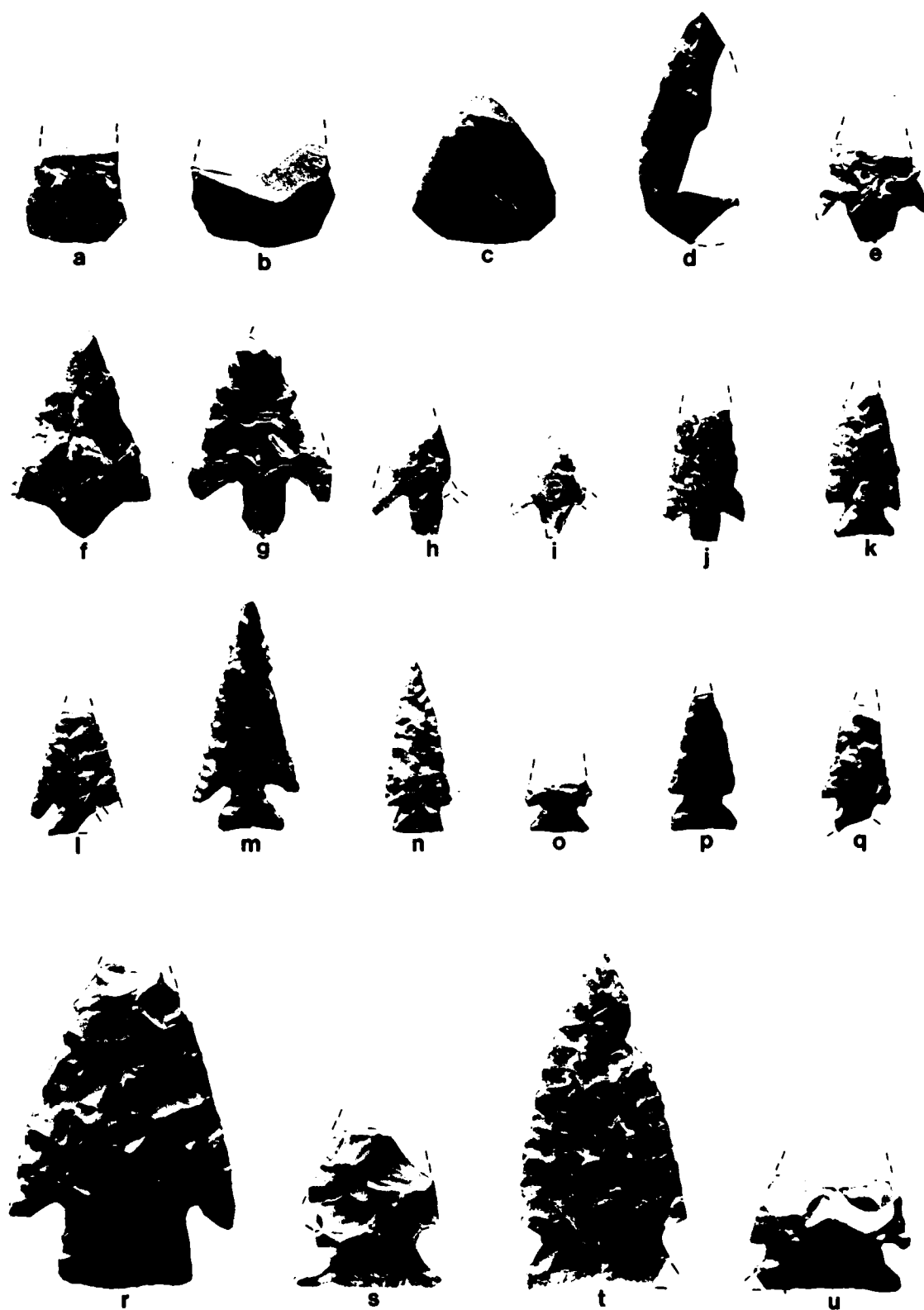
Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
2781	5	N1032/W938	SW	1d	99.2-99.1	
2745	5	N1032/W938	SE	1d	99.4-99.3	

Figure 33. Artifact photographs; arrow points and dart points

- a. Granbury bono
- b. Granbury parker
- c-d. Young
- e-f. Cliffton
- g. Perdiz morgan
- h. Perdiz whitney
- i-j. Perdiz
- k-m. Scallorn brangus
- n-o. Scallorn coryell
- p. Scallorn sattler
- q. Scallorn miscellaneous
- r. Castroville
- s-u. Ensor

FIGURE 33



Young (2 specimens; Fig. 33c-d)

Description: Both specimens are marginally flaked which conform to the description of this type provided by Suhm and Jelks (1962:295). The complete specimen is stubby and subtriangular with convex lateral edges and base. The unremoved striking platform forms one shoulder. The other specimen is fragmentary and lacks one lateral edge. The base is formed by the partially removed platform.

Dimensions:

<u>Sp.#</u>	<u>ML</u>	<u>MW</u>	<u>MT</u>	<u>NW</u>	<u>BW</u>	<u>HL</u>	<u>BD</u>	<u>BB</u>	<u>BS</u>	<u>EG</u>	<u>Ser.</u>
3026	40	20*	3	20*	20*	13	-13	-	-	-	-
3047	26	25	2	25	25	6	-6	-	-	-	-

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
3026	8	N980/W942	NW	1c	99.6-99.5	
3047	8	N982/W942	SW	1c	99.5-99.4	

STEMMED

Cliffton (2 specimens; Fig. 33e-f)

Description: These unifacially chipped specimens, one of which lacks the distal tip, compare favorably with the description of Cliffton points by Suhm and Jelks (1962:269). The fragmentary specimen exhibits a slightly more pronounced stem than is normally attributed to Cliffton, has small barbs on the blade (as opposed to squared shoulders), and may have been serrated.

Dimensions:

<u>Sp.#</u>	<u>ML</u>	<u>MW</u>	<u>MT</u>	<u>NW</u>	<u>BW</u>	<u>HL</u>	<u>BD</u>	<u>BB</u>	<u>BS</u>	<u>EG</u>	<u>Ser.</u>
3008	36	24	4	17	2	6	-1	-	-	-	-
3026	32+	20	3	10	5	6	-2	-	-	-	Y

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
3008	8	N980/W942	NE	1b	99.7-99.6	
3026	8	N980/W942	NW	1c	99.6-99.5	

Perdiz (4 specimens)

Description: Two of these specimens fall within the proposed varieties of Jelks (1962:24-26), one each of the morgan (Fig. 33g) and whitney (Fig. 33h) varieties. The other two are within the general Perdiz (Fig. 33i-j) range given by Suhm and Jelks (1962:283). Three of the specimens are unifacial and lack their distal tips; additionally, one of the three lacks the basal portion of the stem.

Dimensions:

<u>Sp.#</u>	<u>ML</u>	<u>MW</u>	<u>MT</u>	<u>NW</u>	<u>BW</u>	<u>HL</u>	<u>BD</u>	<u>BB</u>	<u>BS</u>	<u>EG</u>	<u>Ser.</u>
3033	39*	25	3	8	7	10	-3	-	-	-	-
3047	29*	18*	2	7	5	10	-2	-	-	-	-
2731	35*	14	2	6	4	7	-1	-	-	-	-
3035B	18	14*	2	6	2	5	-1	-	-	-	-

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
3033	8	N982/W942	SE	1c	99.6-99.5	
3047	8	N982/W942	SW	1c	99.5-99.4	
2731	5	N1032/W936	SW	1c	99.5-99.4	
3035B	8	N980/W940	NE	1c	99.5-99.4	

Scallorn (7 specimens)

Description: All of these specimens are within the ranges for Scallorn given by Suhm and Jelks (1962:285). Three fall within the brangus variety (Fig. 33k-m) proposed by Shafer, Suhm and Scurlock (1964:35-36). Two appear to be of the coryell variety (Fig. 33n-o) and one of the sattler variety (Fig. 33p) as proposed by Jelks (1962:27-30). The remaining specimen is too fragmentary for variety assignment. All of these points are bifacially chipped; five lack their distal tips and two exhibit fragmentary stems.

Dimensions:

<u>Sp.#</u>	<u>ML</u>	<u>MW</u>	<u>MT</u>	<u>NW</u>	<u>BW</u>	<u>HL</u>	<u>BD</u>	<u>BB</u>	<u>BS</u>	<u>EG</u>	<u>Ser.</u>
744	30*	14	3	7	11	6	+1	-	-	-	Y
2601	27*	17*	2	7	11*	5	+1	-	-	-	Y
2900	44*	19	4	6	12	8	+1	-	-	-	Y
2414	29	12	3	7	9	5	0	-	-	-	-
2584	20*	13*	2	7	10	5	0	-	-	-	-
2777	27*	13*	3	7	12	6	0	-	-	-	-
815	29*	12*	3	6	10*	6	0	-	-	-	Y

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
744	3	N1022/W998	SE	1d-g	100.1-100.0	Probably associated with F-37
2601	1	N998/W1012	SW	1d-g	99.9-99.8	
2900	5	N1032/W936	NE	1f&g	98.6-98.5	
2414	5	N1034/W936	SW	1d	99.0-98.9	
2584	1	N998/W1012	SE	1d-g	100.0-99.9	
2777	5	N1032/W938	NW	1d	99.2-99.1	
815	3	N1024/W998	SE	1d-g	100.0-99.9	

Miscellaneous Arrow Point Fragments (7 specimens)

Description: These are blade fragments which are assumed to be remnants of discarded arrow points. Three are burned, two exhibit serrations, and one is unifacially chipped.

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
822	3	N1026/W996	SW	1d-g	100.0-99.9	
2538	1	N998/W1012	NW	1a-c	100.3-100.2	
2541	1	N998/W1012	SE	1a-c	100.3-100.2	
2572	1	N1000/W1012	SW	1d-g	100.1-100.0	
2587	1	N1000/W1012	NW	1d-g	100.0-99.9	
2692	1	N1002/W1012	NW	3	99.3-99.2	
3023	8	N980/W942	NW	1c	99.6-99.5	

Dart Points

Castroville (1 specimen; Fig. 33r)

Description: This corner-notched dart point falls within the range given for Castroville by Suhm and Jelks (1962:173). The distal tip and a portion of one barb are lacking.

Dimensions:

<u>Sp.#</u>	<u>ML</u>	<u>MW</u>	<u>MT</u>	<u>NW</u>	<u>BW</u>	<u>HL</u>	<u>BD</u>	<u>BB</u>	<u>BS</u>	<u>EG</u>	<u>Ser.</u>
1972	66*	39*	9	21	24	14	-3	-	-	-	-

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
1972	3	N1016/W996	SW	7	98.5-98.4	

Ensor (12 specimens; Figs. 33s-u and 34a-g)

Description: These corner-notched specimens are within the range given by Suhm and Jelks (1962:189) for Ensor points. Six of them lack their distal tips and one specimen consists of a shoulder and stem fragment only. Two specimens are burned. One specimen (No. 1025/1836) consists of two fragments found in differing levels and units.

Dimensions:

<u>Sp.#</u>	<u>ML</u>	<u>MW</u>	<u>MT</u>	<u>NW</u>	<u>BW</u>	<u>HL</u>	<u>BD</u>	<u>BB</u>	<u>BS</u>	<u>EG</u>	<u>Ser.</u>
1025/											
1836	48*	29	5	20	23*	10	+1	-	-	-	-
1245	-	-	-	-	-	-	-	-	-	-	-
1467	51*	27*	6	17	24	9	0	-	-	-	-
1701	60	30*	5	19	28*	11	+2	-	-	-	-
1724	46*	27	5	19	26*	9	+1	-	-	-	-
1764	64*	24	7	14	25	10	0	-	-	-	-
1827	71*	27	6	16	26	10	0	-	-	-	-
1886	26	18	5	15	24	11	+2	-	-	-	-
1901	56	25	7	14	19	10	C	Y	-	-	Y
2494	73*	27	7	18	24	10	+1	-	-	-	-
2497	44	22	7	17	20	7	-2	-	-	-	-
2694	85	28	6	16	23	13	+1	-	-	-	-

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
1025/						
1836	3	N1024/W998	SW	2	99.8-99.7	
1836/						
1025	3	N1026/W998	NE	3b	99.2-99.1	
1245	3	N1018/W1002	SE	3a	99.6-99.5	
1467	3	N1026/W998	SE	3a	99.5-99.4	
1701	3	N1022/W1000	NE	3b	99.3-99.2	
1724	3	N1026/W996	NW	3a	99.3-99.2	
1764	3	N1016/W996	NE	4	99.2-99.1	
1827	3	N1024/W1002	NE	3b	99.2-99.1	
1886	3	N1020/W998	NE	4	99.1-99.0	
1901	3	N1020/W996	NE	4	99.0-98.9	
2494	-	BHR2	-	4	99.0-98.8	Found within F-99 hearth
2497	-	BHR2	-	4	99.0-98.8	Found within F-99 hearth
2694	1	N1002/W1012	NE	3	99.3-99.2	

Mahomet (formerly Darl type) (18 specimens; Figs. 34h-v and 35a-c)

Discussion: This grouping includes specimens which were formerly referred to as Darl points (Suhm and Jelks 1962:179). However,

Figure 34. Artifact photographs; dart points

a-g. Ensor

h-v. Mahomet

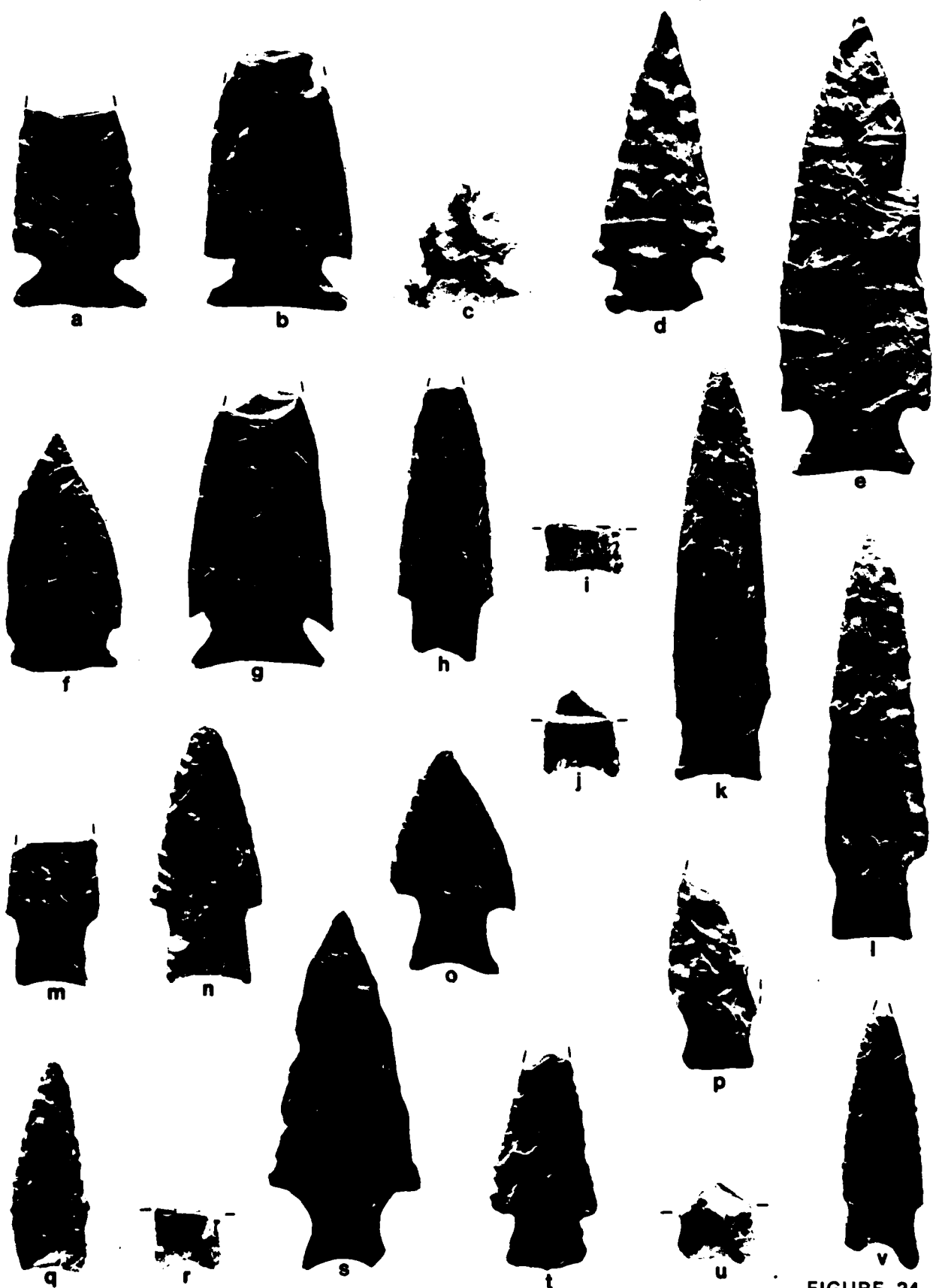


FIGURE 34

Figure 35. Artifact photographs; dart points

a-c. Mahomet

d-g. Marshall

h-n. Pedernales

o. Williams

FIGURE 35



increasing evidence in the Central Texas region indicates that the old term Darl encompasses distinctive groups of specimens which are of widely varying ages. In the Rogers Spring report, it is suggested that Darl be divided into three varieties which seem to correspond with chronologic and geographic variations (Prewitt n.d.). In keeping with this trend, it is here suggested that the term Darl be discarded and that the three proposed varieties, hoxie, mahomet and zephyr, be adapted as type designations. The following descriptions of these proposed types are taken (with minor rephrasing) from the Rogers Spring report.

Mahomet (Twin Sisters Phase, Central Texas)

Description: long narrow blades which are more lanceolate than triangular. Lateral edges are usually gently convex but may be straight. The blades are often alternately beveled; the bevel is normally gentle. Fine narrow oblique collateral flake scars often result in tiny serrations along the blade edges. Shoulders are usually distinct and often squared but never barbed. The stems are usually short and often rectangular, but the lateral edges vary from parallel to slightly expanding, and the bases vary from mildly concave to mildly convex. Lateral edges of the stems frequently exhibit alternate beveling, but rarely exhibit smoothing or grinding.

Hoxie (San Geronimo Phase, Central and East-Central Texas)

Description: Outline is the same or similar to that of Mahomet points. The resemblance stops there. Flaking is always cruder and never approaches the delicate nature of many of the Mahomet specimens. The blades are alternately beveled; the beveling is steep and rarely results in serrations along the lateral edges. The shoulders are distinct, often squared, but not barbed. The stems are rectangular with straight to mildly concave bases. Stem edges are usually alternately beveled and always exhibit some degree of smoothing or grinding. Although uncommon, the stem length may be exaggerated and measure up to one-half the total length of the specimen.

Zephyr (Undifferentiated middle [?] Archaic, West Central and North Central Texas)

Description: Blade varies from long and narrow as in the Mahomet and Hoxie types to moderately long and triangular. The lateral edges are always more steeply beveled than Mahomet points, but usually less so than Hoxie points. The flake scars on the bevel are often parallel and result in evenly serrated lateral edges; they are not as fine as the oblique scars often exhibited by the Mahomet type. The shoulders are squared; specimens which may have been resharpened often exhibit short barblike projections at the shoulders. The stems expand moderately and the bases are gently concave. The lateral edges are usually alternately beveled, and frequently exhibit smoothing or grinding. (Adapted from Prewitt n.d.).

This division of the Darl grouping should eliminate some of the confusion which results from discussing sites of disparate ages such as Loeve-Fox (where the specimens are late in time and are now called Mahomet) and Tombstone Bluff (where the specimens are early in time and are now called Hoxie).

Description: These 18 specimens conform to the Mahomet type as described above. Six specimens lack their distal tips (one of these is burned), and four are represented by stems only.

Dimensions:

Sp.#	ML	MW	MT	NW	BW	HL	BD	BB	BS	EG	Ser.
729	59*	18	6	11	12	11	+2	Y	-	-	Y
854	-	-	-	-	-	-	-	-	-	-	-
998	-	-	-	-	-	-	-	-	-	-	-
1000	81*	17	8	13	15	14	+2	Y	Y	-	-
1013	75	19	6	12	14	14	+1	Y	Y	-	Y
1102	54*	17	5	12	14	13	+1	Y	Y	-	-
1105	53*	21	5	15	16	14	+1	Y	Y	-	-
1123	41	24	7	12	16	14	+2	Y	Y	-	-
1143	56*	19*	6	12	14	10	0	Y	Y	-	-
1145	40	15	6	13	12	9	+1	Y	-	-	Y
1448	-	-	-	-	-	-	-	-	-	-	-
2333	66	28	7	13	16	14	+2	-	-	-	-
2584	51*	21	5	13	15	10	-2	-	Y	-	Y
2604	-	-	-	-	-	-	-	-	-	-	-
2606	52*	15	5	12	15	11	+5	Y	Y	-	Y
2610	57	17	7	13	15	12	+3	Y	Y	-	Y
2647	72	24	6	15	14	11	+1	Y	Y	-	Y
2653	74*	27	5	17	17	18	+2	Y	-	-	-

Provenience:

Sp.#	XU	2x2 Unit	Cell	Stratum	El.(m)	Association/ Remarks
729	3	N1018/W1002	NW	1	100.1-100.0	
854	3	N1016/W996	NE	2	99.9-99.8	
998	3	N1020/W1002	NE	2	99.8-99.7	
1000	3	N1020/W1002	SW	2	99.8-99.7	
1013	3	N1022/W1000	NE	2	99.8-99.7	
1102	3	N1018/W996	NE	3a	99.6-99.5	
1105	3	N1018/W1000	NW	2	99.7-99.6	
1123	3	N1020/W1000	SE	2	99.7-99.6	
1143	3	N1022/W1000	SE	2	99.7-99.6	
1145	3	N1022/W1002	NW	2	99.7-99.6	
1448	3	N1024/W998	SW	3a	99.5-99.4	
2333	3	N1018/W1002	NE	2	99.5-99.4	F-39 fill
2584	1	N998/W1012	SE	1d-g	100.0-99.9	
2604	1	N1000/W1012	NE	1d-g	99.9-99.8	
2606	1	N1000/W1012	SW	1d-g	99.9-99.8	

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
2610	1	N998/W1012	NW	2	99.8-99.7	
2647	1	N1002/W1012	NW	2	99.6-99.5	
2653	1	N998/W1012	NW	2	99.5-99.4	

Marshall (4 specimens; Fig. 35d-g)

Description: These basally notched specimens conform to Suhm and Jelks description of Marshall points (1962:211). All four specimens lack their distal tips; two lack one barb each, and the other two lack both barbs.

Dimensions:

<u>Sp.#</u>	<u>ML</u>	<u>MW</u>	<u>MT</u>	<u>NW</u>	<u>BW</u>	<u>HL</u>	<u>BD</u>	<u>BB</u>	<u>BS</u>	<u>EG</u>	<u>Ser.</u>
2079	70*	37*	10	18	17	17	+2	-	-	-	-
2093	61*	37*	6	17	19	11	+1	-	-	-	-
2106	57*	38*	7	15	16	14	+2	-	-	-	-
2133	90*	45*	6	19	21	14	+2	-	-	-	-

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
2079	3	N1018/W996	NW	10-11	97.9-97.8	
2093	3	N1018/W998	SW	12	97.8-97.7	
2106	3	N1016/W998	NW	12	99.7-99.6	
2133	3	N1018/W998	NE	12	97.6-97.5	

Pedernales (7 specimens; Fig. 35h-n)

Description: The seven specimens in this category exhibit the wide range of attributes ascribed to Pedernales by Suhm and Jelks (1962: 235-237). All but one specimen lack their distal tips; three specimens lack one shoulder each.

Dimensions:

<u>Sp.#</u>	<u>ML</u>	<u>MW</u>	<u>MT</u>	<u>NW</u>	<u>BW</u>	<u>HL</u>	<u>BD</u>	<u>BB</u>	<u>BS</u>	<u>EG</u>	<u>Ser.</u>
2297	56	34	7	16	16	17	+3	-	-	-	-
2486	100*	35	9	21	18	22	+3	-	-	-	-
3052	56*	27*	7	17	19	18	+3	-	-	-	-
3069	65*	29*	8	19	16	18	+5	-	-	-	-
3086	78	24	9	15	14	16	+3	-	Y	-	-
3092	65*	27	7	19	18	18	+5	-	-	-	-
3100	87*	24*	9	16	17	20	+2	-	-	-	-

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
2297	3	N1020/W998	SW	15+16	96.5-96.4	
2486	-	BHT25	-	15+16	ca. 96.5	
3052	9	N987.5/W998	SE	13	97.8-97.7	
3069	9	N987.5/W998	SW	14	97.5-97.4	
3086	9	N987.5/W1000	NE	16	97.3-97.2	
3092	9	N987.5/W998	SW	16	97.2-97.1	
3100	9	N987.5/W998	SW	16	97.1-97.0	

Williams (1 specimen; Fig. 35o)

Description: This corner-notched specimen falls within the ranges given by Suhm and Jelks for Williams points (1962:259). The distal tip and both barbs are lacking.

Dimensions:

<u>Sp.#</u>	<u>ML</u>	<u>MW</u>	<u>MT</u>	<u>NW</u>	<u>BW</u>	<u>HL</u>	<u>BD</u>	<u>BB</u>	<u>BS</u>	<u>EG</u>	<u>Ser.</u>
2110	60*	33*	8	17	19	13	-5	-	-	-	-

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
2110	3	N1016/W998	SW	12	97.7-97.6	

Miscellaneous Dart Points (2 specimens; Fig. 36a-b)

Description: The first specimen, No. 1435, lacks the distal portion. The blade appears to have been long and slender with convex lateral edges. Shoulders are very weak on this specimen and are formed by shallow side notches near the base. The base is concave. This piece does not appear to conform to any established typological category. The long narrow blade of Specimen No. 2092 is slightly asymmetrical with one gently convex lateral edge and moderately convex lateral edge. The shoulders are weak. The stem contracts gently with slightly convex lateral edges. The neck is slightly concave. A general resemblance to Kent points (Suhm and Jelks 1962:199) may be seen in this specimen, but at the present time it is felt no typological assignment should be made.

Dimensions:

<u>Sp.#</u>	<u>ML</u>	<u>MW</u>	<u>MT</u>	<u>NW</u>	<u>BW</u>	<u>HL</u>	<u>BD</u>	<u>BB</u>	<u>BS</u>	<u>EG</u>	<u>Ser.</u>
1435	79*	26	8	19	23	17	+2	-	-	-	-
2092	74	23	7	13	10	13	+1	-	-	-	-

Figure 36. Artifact photographs; dart points and bifacial implements

a-b. Miscellaneous dart points

c. Bifacial Clear Fork gouge

d-f. Erath bifaces

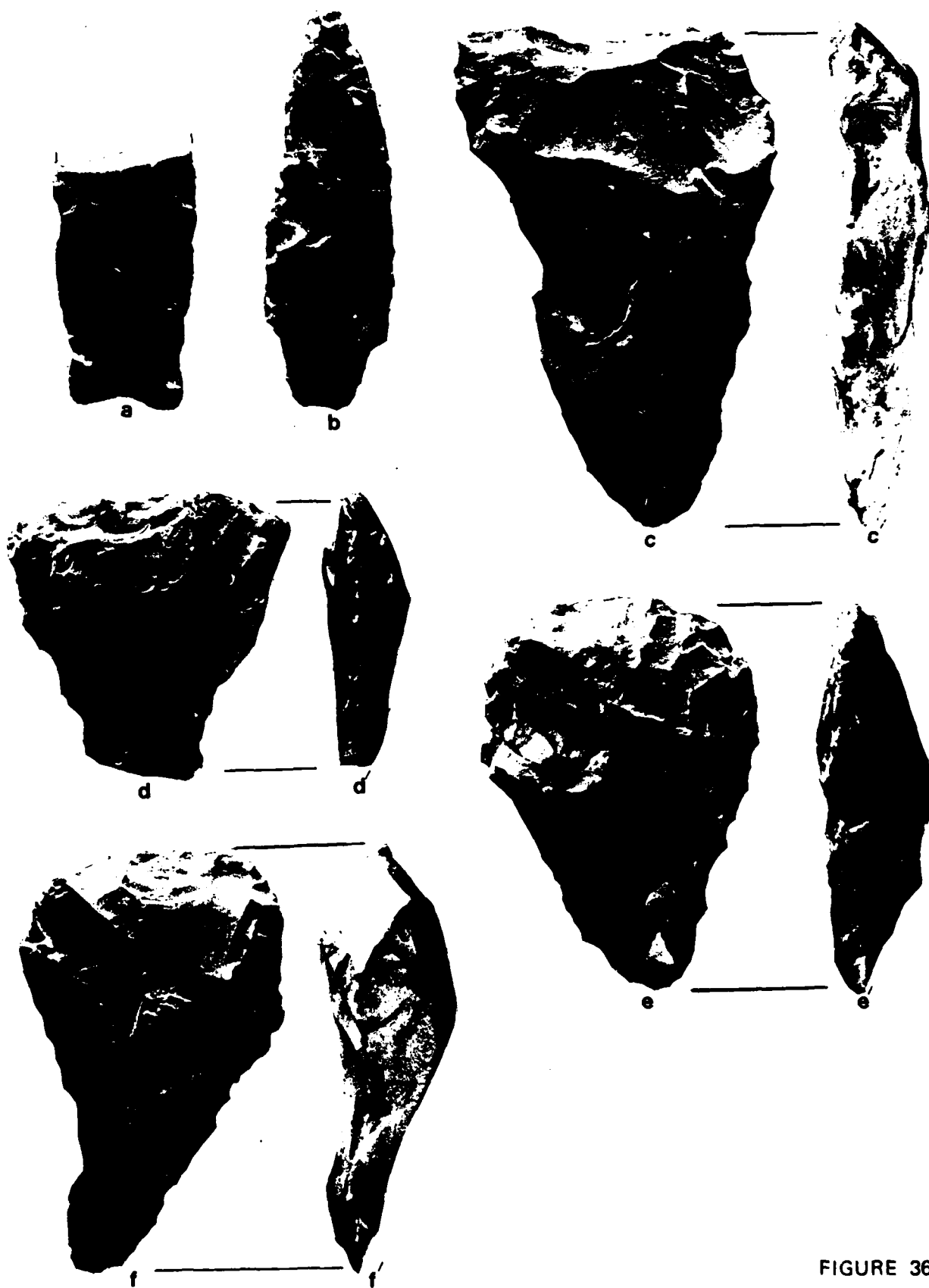


FIGURE 36

Provenience:

Sp.#	XU	2x2 Unit	Cell	Stratum	El.(m)	Association/ Remarks
1435	3	N1022/W1002	NE	3a	99.5-99.4	
2092	3	N1016/W998	SE	12	97.8-97.7	

Miscellaneous Dart Point Fragments (38 specimens)

Description: These fragments represent discarded remnants of apparent dart points. Distal tips (13), medial fragments (15), barbs (7), and probable stem sections (3) are represented. Four fragments from a single specimen (Specimen Nos. 1467, 1584, 1613 and 1615) are counted as one item even though the provenience is given for the individual pieces (these are indicated by an asterisk).

Provenience:

Sp.#	XU	2x2 Unit	Cell	Stratum	El.(m)	Association/ Remarks
1064	3	N1028/W998	NW	2	99.8-99.7	Distal tip fragment
1234	3	N1016/W1002	NW	3b	99.6-99.5	
1244	3	N1018/W1002	SE	3a	99.6-99.5	
1416	3	N1022/W996	NE	3a	99.5-99.4	
1572	3	N1022/W1002	NE	3b	99.4-99.3	
1849	3	N1028/W996	NW	3a	99.2-99.1	
2060	3	N1016/W998	SW	10+11	98.0-97.9	
2318	3	N1018/W1002	SW	3b	99.5-99.4	
2646	1	N1000/W1012	SW	2	99.6-99.5	
2669	1	N998/W1012	NE	2	99.4-99.3	
2679	1	N1002/W1012	NE	2	99.4-99.3	
3085(2)	9	N987.5/W998	SW	16	97.3-97.2	
973	3	N1016/W996	SE	3a	99.8-99.7	Medial frag.
1125	3	N1020/W1002	NW	2	99.7-99.6	
1191	3	N1028/W996	NW	2	99.7-99.6	
1206	3	N1028/W1002	NW	2	99.7-99.6	
1271	3	N1022/W998	NW	3a	99.6-99.5	
1283	3	N1022/W1000	NE	3a	99.6-99.5	
1467*	3	N1026/W998	SE	3a	99.5-99.4	
1579	3	N1024/W996	SW	3a	99.4-99.3	
1584*	3	N1024/W998	SW	3a	99.4-99.3	
1613*	3	N1026/W1000	NE	3a	99.4-99.3	
1615*	3	N1026/W1000	SE	3a	99.4-99.3	
1713	3	N1024/W998	SW	3b	99.3-99.2	
1731	3	N1026/W998	NE	3a	99.3-99.2	
1746	3	N1028/W996	SE	3a	99.3-99.2	
1857	3	N1028/W998	SE	3a	99.2-99.1	
1973	3	N1016/W998	NW	7	98.5-98.4	
2312	1	N1000/W1012	NE	1d-g	99.5-99.4	F-1, B-29 fill
2515	9	N987.5/W1000	NE	16	97.2-97.1	F-114 fill

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
1878	3	N1018/W996	NE	4	99.1-99.0	Barb fragment
2073	3	N1016/W996	SW	10+11	97.9-97.8	
2075	3	N1016/W998	NE	10+11	97.9-97.8	
2083	3	N1018/W998	SE	10+11	97.9-97.8	
2107	3	N1016/W998	NW	12	97.7-97.6	
2110	3	N1016/W998	SW	12	97.7-97.6	Stem fragment
2312	1	N1000/W1012	NE	2	99.5-99.4	
986	3	N1018/W1002	SW	2	99.8-99.7	
1380	3	N1018/W996	SE	3b	99.5-99.4	
2144	3	N1016/W996	SW	13	97.5-97.4	

Bifacial Implements

Clear Fork Gouge (1 specimen; Fig. 36c)

Description: This triangular specimen has a rounded poll; the lateral edges are slightly convex except that about midway down either side there is a shallow concavity fashioned by the removal of a single large flake from the ventral face. The distal end exhibits a steeply beveled slightly concave bit on the ventral face. The righthand corner of the bit has been broken and resharpened.

Dimensions:

<u>Sp.#</u>	<u>Max. L.</u>	<u>Max. W.</u>	<u>Bit Width</u>	<u>Bit Angle</u>	<u>Max. Thick.</u>
3346	93	57*	48*	75°	15

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
3346	BHT19	-	-	3	99.3	S. wall profile

Erath Bifaces (3 specimens; Fig. 36d-f)

Description: These tools vary from triangular to subtriangular in outline and are similar in form to Clear Fork gouges; however, the most salient attribute is a biconvex bit on each specimen. Each exhibits a constriction along the lateral edges similar to the Clear Fork gouge described above. The proximal end of one specimen is Tackling. Similar tools have been named Erath bifaces by Story and Shafer (1965:45-46, 114-115); in the previous Loeve-Fox Site report such specimens are referred to as Group XIV bifaces (Prewitt 1974:101); and Bond (1978:163) labeled a similar specimen as Category 3D, chipped celt/axe.

Dimensions:

<u>Sp. #</u>	<u>Max. L.</u>	<u>Max W.</u>	<u>Bit Width</u>	<u>Max. Thick.</u>
2492	52*	51	51	15
2644	72	51	42	20
3141	78	50	43	23

Provenience:

<u>Sp. #</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
2492	BHR2	-	-	4	99.0-98.8	F-99 hearth fill; broken
2644	1	N1000/W1012	NE	2	99.6-99.5	
3141	BHR2	-	-	4	99.1-98.9	Possibly associated with F-100 hearth

Hare Bifaces (9 specimens) (Proposed New Type) (Fig. 37a-i)

Description: These long narrow tools exhibit gently convex lateral edges, well-defined basal corners, and straight (5 specimens) to gently convex bases (4 specimens). Four specimens lack the distal tip and one specimen is serrated along one lateral edge. Seven of these tools are well made while two are somewhat cruder.

Discussion: It could be argued that these items represent Mahomet preforms since they occur primarily in the Driftwood Phase. However, I feel they are a distinctive finished tool type and that they replaced San Gabriel bifaces (see below) in whatever function that group of tools served. Similar specimens have been referred to as "parallel-edged knives" at Belton Reservoir (Shafer, Suhm and Scurlock 1964:67) and "Category 40, thinned biface preforms" at the Hoxie Bridge Site (Bond 1978:166-178).

Dimensions:

<u>Sp. #</u>	<u>Max. L.</u>	<u>Max. W.</u>	<u>Max. Thick.</u>
995	72	22	11
1164	72	21	7
1204	76	31	14
1343	83	30	6
1572	29*	21	6
2491	68	27	8
2595	38*	21	8
2637	35*	34	7
2714	45*	24	6

Provenience:

Sp.#	XU	2x2 Unit	Cell	Stratum	El.(m)	Association/ Remarks
995	3	N1020/W1000	SW	2	99.8-99.7	
1164	3	N1024/W1000	SW	2	99.7-99.6	
1204	3	N1028/W1000	SE	2	99.7-99.6	
1343	3	N1028/W1000	NE	2	99.6-99.5	
1572	3	N1022/W1002	NE	3b	99.4-99.3	
2491	-	BHR2	-	4	ca. 99.0	F-99 vicinity
2595	1	N998/W1012	NW	1d-g	99.9-99.8	F-54 and F-59 vicinity
2637	1	N998/W1012	NW	2	99.6-99.5	
2714	1	N1000/W1012	SE	3	99.1-99.0	

San Gabriel Bifaces (18 specimens) (Proposed New Type) (Figs. 37j-n and 38a-c)

Description: Broad and triangular in outline, these distinctive tools vary in overall size. Lateral edges vary from recurved to gently convex with sharply defined basal corners and mildly concave bases. Overall, the tools in this group are thin and well made; exceptions are attributable to flaws in the parent material which precluded further flake removal without serious danger of breakage.

Discussion: Similar to the case of Hare bifaces, it could easily be argued that this grouping represents rejected preforms for dart points, particularly the Ensor type, since they both are apparently restricted in time to the Twin Sisters Phase. Again, though, I would argue that these specimens represent finished tools which preceded Hare bifaces both in time and in function. Morphologically similar items found in early Caddoan sites have been termed Gahagan (formerly Copena) bifaces (Webb and Dodd 1939:Plate 27, Panel 1; Newell and Krieger 1949:173-174 and Fig. 60A-H; Shafer 1973:230). Shafer follows Kelley's (1947b:104) lead in suggesting these are the same as the Central Texas specimens here termed San Gabriel bifaces, and this has resulted in the use of the Gahagan term by Bond (1978:159-162) in his report on the Hoxie Bridge Site (41WM130). I feel this is misleading since it appears that San Gabriel bifaces are distinctly associated with the Twin Sisters Phase at the Loeve-Fox Site and probably occur in the same association at the Hoxie Bridge Site while the associations at the Britton Site (Story and Shafer 1965:112-113; labeled as Friday knives) are less conclusive. Radiocarbon assays suggest the Twin Sisters Phase extended from 1750 B.P. to about 1450 B.P. in Central Texas (see discussion, this report) while assays from the George C. Davis Site (a primary early Caddoan western border outlier) suggest intensive occupation at that site (Gahagan bifaces are included as a distinctive part of the material cultural expressions) from about 1150 B.P. to 750 B.P. (Story and Valastro 1977:Fig. 4). This belies suggestions of contemporaneity of these morphologically similar artifacts between two geographical/cultural areas and supports the concept that, to avoid misleading implications of cultural interrelationships, formal typological constructs should be temporally and geographically discrete.

Figure 37. Artifact photographs; bifacial implements

a-i. Hare bifaces

j-n. San Gabriel bifaces

FIGURE 37



Figure 38. Artifact photographs; bifacial implements and preforms

a-c. San Gabriel bifaces

d-i. San Gabriel biface preforms



a



b



c



d



e



f



g



h



i

FIGURE 38

Dimensions:

<u>Sp.#</u>	<u>Max. L.</u>	<u>Max. W.</u>	<u>Max. Thick.</u>
979	77	37	14
1021	52*	40	8
1145	36*	33*	6
1159	41*	35	7
1246	36*	37	6
1247	42*	36	7
1255	-	-	5
1256/1387	78+	32+	7+
1257/1403	72++	33++	9++
1387/1256	78+	32+	7+
1403/1257	72++	33++	9++
1446	53	32	8
1490	48*	36*	9
1578	54	36	9
1660	59*	31	9
1709	70*	47	10
1720	47*	29	6
1760	24*	36*	5
1833	62	26	6
3346	78	47	9

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
979	3	N1018/W1000	NW	2	99.8-99.7	
1021	3	N1024/W996	NW	2	99.8-99.7	
1145	3	N1022/W1002	NW	2	99.7-99.6	
1159	3	N1024/W998	SW	2	99.7-99.6	
1246	3	N1020/W996	NW	3a	99.6-99.5	
1247	3	N1020/W996	NE	3a	99.6-99.5	
1255	3	N1020/W1000	SW	3a	99.6-99.5	
1256/ 1387	3	N1020/W1002	NW	3a	99.6-99.5	
1257/ 1403	3	N1020/W1002	NE	3a	99.6-99.5	
1387/ 1256	3	N1018/W1002	NW	3b	99.5-99.4	
1403/ 1257	3	N1020/W1002	NW	3b	99.5-99.4	
1446	3	N1024/W998	NE	3a	99.5-99.4	
1490	3	N1028/W1000	NW	2	99.5-99.4	
1578	3	N1024/W996	SE	3a	99.4-99.3	
1660	3	N1018/W1002	NW	4	99.3-99.2	
1709	3	N1024/W998	NW	3b	99.3-99.2	
1720	3	N1024/W1002	NW	3b	99.3-99.2	
1760	3	N1028/W1002	NE	3a	99.3-99.2	
1833	3	N1026/W996	SE	3b	99.2-99.1	
3346	-	BHT19	-	3	99.4	S. wall profile

San Gabriel Biface Preforms (8 specimens) (Fig. 38d-i)

Description: Generally broad and subtriangular in outline, these specimens exhibit convex lateral edges, weak rounded shoulders and convex bases. Three of them retain cortex remnants on the base while a fourth retains cortex on the distal tip. All of the specimens in this group appear to be manufacturing failures or rejects. Each exhibits some characteristic -- knot, lipping, or fracture plane -- which appears to have prevented further reduction without danger of breakage (the four fragmentary specimens appear to have been broken in this manner rather than through use).

Discussion: The similarity to and covariation in distribution with San Gabriel bifaces strongly suggests that this group represents a series of preforms intended for further reduction.

Dimensions:

<u>Sp.#</u>	<u>Max. L.</u>	<u>Max. W.</u>	<u>Max. Thick.</u>
1009	89	47	19
1591	56*	58	16
1651	40*	49	9
1664	31*	39	8
1882	67	43	14
2644	44*	45	11
2685	95	64	14
2700	82	46	1

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
1009	3	N1022/W998	SE	2	99.8-99.7	
1591	3	N1024/W1000	SE	3a	99.4-99.3	
1651	3	N1016/W1000	SW	4	99.3-99.2	
1664	3	N1018/W1002	SE	4	99.3-99.2	
1882	3	N1020/W996	NW	4	99.1-99.0	
2644	1	N1000/W1012	NE	2	99.6-99.5	
2685	1	N998/W1012	SE	3	99.3-99.2	
2700	1	N1000/W1012	SW	3	99.2-99.1	

Miscellaneous Bifaces, Group 1 (2 specimens) (Fig. 39a-b)

Description: One complete and one fragmentary specimen which exhibit triangular outlines with essentially straight lateral edges and bases. The corners are squared. Both specimens exhibit internal fracture patterns and knots which hindered further reduction. The complete specimen is asymmetrical on the distal portion.

Figure 39. Artifact photographs; miscellaneous bifaces

a-b. Miscellaneous bifaces, Group 1

c-d. Miscellaneous bifaces, Group 2

e-g. Miscellaneous bifaces, Group 3

h-j. Miscellaneous bifaces, Group 4

FIGURE 39



Dimensions:

<u>Sp. #</u>	<u>Max. L.</u>	<u>Max. W.</u>	<u>Max. Thick.</u>
1896	39*	25	8
1964	93	36	16

Provenience:

<u>Sp. #</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
1896	3	N1018/W996	NE	5	99.0-98.9	
1964	3	N1020/W996	NW	6	98.6-98.5	

Miscellaneous Bifaces, Group 2 (2 specimens) (Fig. 39c-d)

Description: One complete and one fragmentary specimen which exhibit subtriangular outlines with gently convex lateral edges and rounded bases. The complete specimen is asymmetrical.

Dimensions:

<u>Sp. #</u>	<u>Max. L.</u>	<u>Max. W.</u>	<u>Max. Thick.</u>
2083	70	34	9
3088	44*	34	9

Provenience:

<u>Sp. #</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
2083	3	N1018/W998	SE	11	97.9-97.8	
3088	9	N987.5/W998	NW	16	97.2-97.1	

Miscellaneous Bifaces, Group 3 (3 specimens) (Fig. 39e-g)

Description: Crudely chipped elongated specimens which exhibit sinuous lateral edges. Internal fractures, lipping and unremoved platforms along the lateral edges suggest these pieces are discarded preforms. None of them show any evidence of use.

Dimensions:

<u>Sp. #</u>	<u>Max. L.</u>	<u>Max. W.</u>	<u>Max. Thick.</u>
1142	70	34	18
1702	81	37	17
2268	98	32	18

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
1142	3	N1022/W1000	NE	2	99.7-99.6	
1702	3	N1022/W1002	SE	3b	99.3-99.2	
2268	3	N1020/W998	SE	15+16	96.7-96.6	

Miscellaneous Bifaces, Group 4 (7 specimens) (Fig. 39h-j)

Description: These crudely chipped specimens vary widely in form; all appear to represent an early stage of biface reduction. Internal fractures, lipping, knots and unremoved platforms suggest technical difficulties which resulted in these pieces being discarded early in the reduction sequence. One specimen is reworked from a former biface which had been stream tumbled. Another specimen has been burned on one face; various pieces were restored to the burned segment. These restored fragments were distributed within the same unit and level as the primary piece as well as adjacent units; an additional eight chips appear to represent burned fragments of this specimen but could not be restored.

Dimensions:

<u>Sp.#</u>	<u>Max. L.</u>	<u>Max. W.</u>	<u>Max. Thick.</u>
1402	56	49	17
1405	83	63	20
1871	90	64	24
2016	52	27	11
2684	68	49	19
2686	69	57	22
3135	40	18	9

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
1402	3	N1020/W1000	SW	3a	99.5-99.4	
1405	3	N1020/W1002	NE	3a	99.5-99.4	Lot Nos. 1406 and 1531
1871	3	N1016/W996	NE	5	99.1-99.0	
2016	3	N1018/W998	SW	8	98.3-98.2	
2684	1	N998/W1012	NE	3	99.3-99.2	
2686	1	N998/W1012	SW	3	99.3-99.2	
3135	-	BHT15	-	-	-	Back dirt; no provenience

Biface Fragments, Distal (32 specimens)

Description: These specimens represent the distal portions of varied forms of bifacial implements. The fragmentary nature of the pieces precludes further morphological distributions. It appears that breakage resulted from both technical failure and use failure. The sizes of the pieces represented vary widely; one specimen exhibits thermal fracturing.

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
973	3	N1016/W996	SE	3a	99.8-99.7	
1120	3	N1020/W1000	NW	2	99.7-99.6	
1188	3	N1026/W1002	NE	2	99.7-99.6	
1227	3	N1016/W996	NE	3b	99.6-99.5	
1241	3	N1018/W1002	NW	3a	99.6-99.5	
1243	3	N1018/W1002	NE	3a	99.6-99.5	
1395	3	N1020/W996	NE	3a	99.5-99.4	
1402	3	N1020/W1000	SW	3a	99.5-99.4	
1403(2)	3	N1020/W1002	NW	3a	99.5-99.4	
1419	3	N1022/W998	NW	3a	99.5-99.4	
1421	3	N1022/W998	NE	3a	99.5-99.4	
1442	3	N1024/W996	SW	3a	99.5-99.4	
1544	3	N1020/W1002	NW	3b	99.4-99.3	
1560	3	N1022/W998	SE	3b	99.4-99.3	
1579	3	N1024/W996	SW	3a	99.4-99.3	
1592	3	N1024/W1000	SW	3a	99.4-99.3	
1600	3	N1024/W1002	SW	3a	99.4-99.3	
1692	3	N1022/W1000	NW	3b	99.3-99.2	
1713	3	N1024/W998	SW	3b	99.3-99.2	
1800	3	N1022/W998	NE	3b	99.2-99.1	
1878	3	N1018/W996	NE	4	99.1-99.0	
1956	3	N1016/W998	NW	7	98.6-98.5	
2468	3	N1016/W1000	NW	4	99.3-99.2	F-82 fill
2622	1	N998/W1012	NW	2	99.7-99.6	
2639	1	N998/W1012	NE	2	99.6-99.5	
2671	1	N998/W1012	SW	2	99.4-99.3	
2690	1	N1000/W1012	SE	3	99.3-99.2	
2762(2)	5	N1032/W938	SW	1d	99.3-99.2	
3088	9	N987.5/W998	NW	16	97.2-97.1	
3136	-	BHT16	-	-	-	Backdirt; no provenience

Biface Fragments, Medial (9 specimens)

Description: As with the distal fragments, these specimens appear to represent the remaining portions of tools either broken during manufacture or through use. The apparent form of the tools is varied, but the fragmentary nature of these specimens preclude further morphological assignment.

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
1309	3	N1024/W1002	NE	2	99.6-99.5	
1316	3	N1026/W996	SW	2	99.6-99.5	
1743	3	N1026/W1002	SW	3b	99.3-99.2	
2513/						
3098	9	N987.5/W998	NE	16	97.0-96.9	F-112 fill
2534	1	N1000/W1012	SW	1a-c	100.4-100.3	
2667	1	N998/W1012	NW	2	99.4-99.3	
2696	1	N1002/W1012	SW	3	99.3-99.2	
3098/						
2513	9	N987.5/W998	NE	16	97.1-97.0	
3102	9	N987.5/W1000	SE	16	97.1-97.0	
3142	-	BHT2	-	15+16	98.1-97.6	El. is estimated

Biface Fragments, Lateral (30 specimens)

Description: These items are fragments of lateral edges of bifacially worked implements. Some are probably manufacturing failure residue while others may have been broken through use. Three of the specimens have been burned.

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
855	3	N1016/W1002	NW	2	99.9-99.8	
981	3	N1018/W1002	NW	2	99.8-99.7	
1133	3	N1022/W996	SE	2	99.7-99.6	
1232	3	N1016/W1002	NE	3b	99.6-99.5	
1246	3	N1020/W996	NW	3a	99.6-99.5	
1255	3	N1020/W1000	SW	3a	99.6-99.5	
1277	3	N1022/W998	NW	3a	99.6-99.5	
1397	3	N1020/W998	NW	3a	99.5-99.4	
1414	3	N1022/W996	NW	3a	99.5-99.4	
1447	3	N1024/W998	SE	3a	99.5-99.4	
1457	3	N1024/W1002	SE	3a	99.5-99.4	
1550	3	N1020/W1002	SW	3b	99.4-99.3	
1559	3	N1022/W998	NE	3b	99.4-99.3	
1591	3	N1024/W1000	SE	3a	99.4-99.3	
1600	3	N1024/W1002	SW	3a	99.4-99.3	
1722	3	N1024/W1002	SE	3b	99.3-99.2	
1739	3	N1026/W1002	NW	3a	99.3-99.2	
1742	3	N1026/W1002	SE	3b	99.3-99.2	
1765	3	N1016/W996	SE	5	99.2-99.1	
1781	3	N1020/W996	NE	4	99.2-99.1	
1995	3	N1018/W996	NW	7	98.4-98.3	
2034	3	N1020/W996	SW	8	98.2-98.1	

Sp. #	XU	2x2 Unit	Cell	Stratum	El.(m)	Association/ Remarks
2097	3	N1018/W998	NW	12	97.8-97.7	
2332	3	N1018/W1002	NW	2	99.5-99.4	F-39 fill
2538	1	N998/W1012	NW	1a-c	100.3-100.2	
2587	1	N1000/W1012	NW	1d-g	100.0-99.9	
2626	1	N998/W1012	SW	2	99.7-99.6	
2689	1	N1000/W1012	NE	3	99.3-99.2	
2786	5	N1034/W936	SW	1d	99.2-99.1	
2846	5	N1034/W936	NE	1e	98.9-98.8	

Biface Fragments, Basal (10 specimens)

Description: This grouping represents basal fragments of bifacially worked implements. Each is too small in relation to the apparent original size of the specimens to allow detailed morphological segregation. Four of these specimens are thin while the other six are thick and generally crudely worked. The thin pieces may represent breakage through use while the thicker items probably represent manufacturing failures.

Provenience:

Sp. #	XU	2x2 Unit	Cell	Stratum	El.(m)	Association/ Remarks
985	3	N1018/W1002	SE	2	99.8-99.7	Thin
1534	3	N1020/W996	NW	3b	99.4-99.3	
1706	3	N1024/W996	NE	3b	99.3-99.2	
1808	3	N1022/W1002	SE	3b	99.2-99.1	Thin
2105	3	N1016/W996	SW	12	97.7-97.6	
2136	3	N1020/W996	NW	12	97.6-97.5	
2408	5	N1032/W936	NE	1f+g	98.5-98.4	Thin; F-59 fill
2497	-	BHR2	-	4	99.0-98.8	Thin; F-99 fill
2779	5	N1032/W938	NE	1d	99.2-99.1	
3100	9	N987.5/W998	SW	16	97.1-97.0	

Perforator (?) (1 specimen) (Fig. 40a)

Description: This lightly burned specimen appears to have been fashioned from a thin triangular biface. Although the one corner is lacking, the base appears to have been straight. The lateral edges are biconvex; they are indented sharply at about the midpoint and form a relatively narrow distal tip. Smaller flake scars on the distal portion may indicate this item was originally larger, then broken and subsequently reworked into its present form. Alternatively, this may indicate intentional shaping and use as a perforator.

Dimensions:

<u>Sp.#</u>	<u>Max. L.</u>	<u>Max. W.</u>	<u>Max. Thick.</u>
1514	57	26	8

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
1514	3	N1016/W996	NE	4	99.4-99.3	

Core Chopper (1 specimen) (Fig. 40b)

Description: Fashioned from an elongated and essentially rectangular stream-tumbled chert cobble, this specimen exhibits a rounded bifacially chipped edge on the distal end while the remainder of the cobble is unmodified. The worked end, or bit, is biconvex and is similar to that exhibited by the Erath bifaces described above and may have served a similar function as those tools.

Dimensions:

<u>Sp.#</u>	<u>Max. L.</u>	<u>Max. W.</u>	<u>Max. Thick.</u>	<u>Bit W.</u>	<u>Bit Thick.</u>
1209	145	61	39	50	18

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
1209	3	N1028/W1002	SW	2	99.7-99.6	

Crushers (19 specimens) (Fig. 40c-f)

Description: With one exception, these implements appear to be cores fashioned from small cobbles and large pebbles of chert; the one exception is made on a large flake. These items are bifacially chipped and, with four exceptions (including the large flake), exhibit varying degrees of unmodified cortex on one or more surfaces. All exhibit sinuous lateral edges. These sinuous edges exhibit battering and crushing which varies from light (Spec. No. 1864, for example) to extremely heavy (Spec. No. 1766, for example). The outline of these specimens varies from irregular to oval to circular and the crushing is not necessarily continuous along any given edge. The degree of crushing appears to be too intensive to have been intended for platform preparation; rather, it appears to have resulted from intentional use as hand-held hammers or mauls.

Figure 40. Artifact photographs; other bifaces and crushers

- a. Perforator
- b. Core chopper
- c-f. Crushers



FIGURE 40

Dimensions:

<u>Sp.#</u>	<u>Max. L.</u>	<u>Max. W.</u>	<u>Max. Thick.</u>
726	122	89	59
867	91	61	34
981	95	84	31
1039	44	37	41
1269	92	70	42
1290	69	49	26
1565	113	88	30
1574	80	58	17
1607	65	56	32
1721	94	71	36
1724	91	85	29
1734	76	65	37
1737	79	70	38
1766	90	98	40
1864	93	66	31
2434	75	72	41
2494	84	67	58
2660	76	72	55
2784/2806	92+	65+	33+
2806/2784	92+	65+	33+

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
726	3	N1026/W994	SW	1a-c	S.-100.2	
867	3	N1018/W1002	SW	2	99.9-99.8	
981	3	N1018/W1002	NW	2	99.8-99.7	
1039	3	N1024/W1002	SW	2	99.8-99.7	
1269	3	N1022/W996	SW	3a	99.6-99.5	
1290	3	N1022/W1002	NE	3a	99.6-99.5	
1565	3	N1022/W1000	NE	3b	99.4-99.3	
1574	3	N1022/W1002	SW	3b	99.4-99.3	
1607	3	N1026/W998	NW	3a	99.4-99.3	
1721	3	N1024/W1002	NE	3b	99.3-99.2	
1724	3	N1026/W996	NW	3a	99.3-99.2	
1734	3	N1026/W1000	NW	3a	99.3-99.2	
1737	3	N1026/W1000	SE	3b	99.3-99.2	
1766	3	N1016/W1000	NW	4	99.2-99.1	
1864	3	N1028/W1002	NE	3a	99.2-99.1	
2434	3	N1024/W1000	SE	3a	99.4-99.3	F-65
2494	-	BHR2	-	4	99.0-98.8	F-99 fill
2660	1	N1000/W1012	SE	2	99.5-99.4	
2784/						
2806	5	N1034/W936	NE	1d	99.2-99.1	
2806/						
2784	5	N1034/W936	SE	1d	99.1-99.0	

Crusher Fragments (27 specimens)

Description: These fragments appear to be small remnants or discarded segments of artifacts described above as crushers. In all but two instances, breakage appears to have resulted from use. Two of the fragments appear to have resulted from intentional resharpening of the parent tools.

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
646	3	N1016/W994	NW	1a	100.2-100.1	
933	3	N1026/W1000	NW	2	99.9-99.8	
986	3	N1018/W1002	SW	2	99.8-99.7	
1007	3	N1022/W998	NW	2	99.8-99.7	Resharpened
1240	3	N1018/W1000	SW	3a	99.6-99.5	
1243	3	N1018/W1002	NE	3a	99.6-99.5	
1262	3	N1022/W996	NW	3a	99.6-99.5	
1276	3	N1022/W998	SE	3a	99.6-99.5	
1397	3	N1020/W998	NW	3a	99.5-99.4	
1399	3	N1020/W1000	NW	3a	99.5-99.4	
1406	3	N1020/W1002	NE	3a	99.5-99.4	
1429	3	N1022/W1000	SE	3a	99.5-99.4	
1472	3	N1026/W1000	SE	3a	99.5-99.4	
1522	3	N1018/W1000	NW	3b	99.4-99.3	
1582	3	N1024/W998	NE	3a	99.4-99.3	
1587	3	N1024/W1000	NE	3a	99.4-99.3	
1616	3	N1026/W1000	SE	3a	99.4-99.3	
1666	3	N1020/W996	NW	3b	99.3-99.2	Resharpened
1686	3	N1022/W996	SW	3b	99.3-99.2	
1728	3	N1026/W996	SW	3b	99.3-99.2	
1835	3	N1026/W998	NW	3b	99.2-99.1	
1870	3	N1016/W996	NW	5	99.1-99.0	
1904	3	N1016/W996	NW	6	98.9-98.8	
2315	3	N1016/W1002	NE	3b	99.5-99.4	F-30 fill
2661	1	N1000/W1012	SW	2	99.5-99.4	
2694	1	N1002/W1012	NE	3	99.3-99.2	
2717	1	N1000/W1010	NW	3	99.1-99.0	

Unifacial Implements

Clear Fork Gouges (2 specimens) (Fig. 41a-b)

Description: This grouping is represented by one complete and one fragmentary specimen. The complete specimen is triangular in outline and has been fashioned from a large secondary cortex flake. The prepared striking platform is retained on the proximal end and the concave-convex ventral face exhibits minor retouching. The dorsal face

Figure 41. Artifact photographs; unifacial tools

a-b. Unfacial Clear Fork gouges

c-e. Large concave unifaces

FIGURE 41



is convex and exhibits retouch and intentional shaping along one lateral edge; primary attention appears to have been focused on shaping a steeply beveled bit on the distal end. The fragmentary specimen consists of the central portion of a steeply beveled bit; this item has been heavily burned and no observations regarding its original morphological features are possible with the exception that it appears to have been unifacial.

Dimensions:

<u>Sp.#</u>	<u>Max. L.</u>	<u>Max. W.</u>	<u>Max. Thick.</u>	<u>Bit Angle</u>	<u>Max. Bit. Width</u>
2567	88	60	18	60°	58
2571	-	-	12*	50°	-

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
2567	1	N998/W1012	SW	1d-g	100.1-100.0	
2571	1	N1000/W1012	SE	1d-g	100.1-100.0	

Large Concave Unifaces (6 specimens) (Fig. 41c-e)

Description: Typified by Specimen No. 1889, these tools are often referred to as "strangulated scrapers." Each of these elongated specimens is fashioned from a cortex flake; four are from initial cortex flakes while two are from secondary cortex flakes. Three of the specimens exhibit steeply beveled, unifacially chipped surfaces along both lateral edges while three are worked along one lateral edge only. The beveled lateral edges are gently concave and the unmodified lateral edges vary from irregular to gently convex. The gently convex specimen (No. 3138) exhibits an area of use polish directly opposite the concave bit.

Dimensions:

<u>Sp.#</u>	<u>Max. L.</u>	<u>Max. W.</u>	<u>Max. Thick.</u>	<u>Bit Angle</u>	<u>Max. Bit. Width</u>
1825	60*	44	18	60°	44*
1869/					
1901	92*	31+	9+	50°+	60+
1889	120*	52	23	70°	94*
1901/					
1869	92+	31+	9+	50°+	60+
2437	103	41	31	60°	82
2714	145	59	36	70°	120
3138	83	37	12	40°	61

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
1825	3	N1024/W1002	NW	3b	99.2-99.1	
1869/ 1901	3	N1016/W996	NW	5	99.1-99.0	
1889	3	N1016/W996	NE	5	99.0-98.9	
1901/ 1869	3	N1020/W996	SE	4	99.0-98.9	F-43, general
2437	3	N1024/W1000	SW	3a	99.3-99.2	F-65 fill
2714	1	N1000/W1012	SE	3	99.1-99.0	
3138	-	BHR1	-	-	-	Use polish, lateral edge

Small Concave Unifaces (11 specimens) (Fig. 42a-d)

Description: Each of these flakes or flake fragments exhibits one (6 specimens), two (4 specimens), or three (1 specimen) short shallow indentations along lateral edges. The shape and thickness varies considerably among this group; it appears the pieces represent tools of convenience wherein the morphological characteristics were unimportant. Three of the specimens exhibit areas of unifacial retouch in addition to the indentations (or bits).

Dimensions:

<u>Sp.#</u>	<u>Max. L.</u>	<u>Max. W.</u>	<u>Max. Thick.</u>	<u>Bit Angle</u>	<u>Max. Bit. Width</u>
981	64	25	11	60°	24
1277	29*	29*	9	60°	12
1838	79	56	26	50°	30
2065	22*	17	7	60°	8
2076	21*	32*	7	50°	14
2600	40*	40	18	80°	13
2678	14*	32*	10	70°	9
2692	40	32	11	60°	11
2807	35*	39	12	70°	8
2970	38*	24	6	70°	8
3058	39	28	14	70°	15

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
981	3	N1018/W1002	NW	2	99.8-99.7	
1277	3	N1022/W998	SE	3a	99.6-99.5	
1838	3	N1026/W998	SW	3b	99.2-99.1	
2065	3	N1018/W998	NE	9	98.0-97.9	
2076	3	N1016/W998	SE	10+11	97.9-97.8	
2600	1	N998/W1012	SE	1d-g	99.9-99.8	

Figure 42. Artifact photographs; unifacial tools

a-d. Small concave unifaces

e-j. Gravers

k-l. Scrapers, Group 1

m-n. Scrapers, Group 2

FIGURE 42



<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
2678	1	N1002/W1012	NW	2	99.4-99.3	
2692	1	N1002/W1012	NW	3	99.3-99.2	
2807	5	N1034/W936	SE	1d	99.1-99.0	
2970	5	N1032/W938	NW	2	98.2-98.1	
3058	9	N987.5/W998	NW	14	97.6-97.5	

Gravers (6 specimens) (Fig. 42e-j)

Description: These tools are fashioned from flakes of varying sizes and are characterized by the presence of short beaklike projections commonly referred to under the functional term "graver." On three of the specimens, the graver beak is formed by unifacial retouch on either side of the beak; each of these are on elongated flakes (one is a blade) and the beaks are located on lateral edges. One of these exhibits additional unifacial retouch on the lateral edge opposite the graver beak. The other three specimens are formed on irregularly shaped flakes and each takes advantage of a projecting corner. The lateral edges of the projecting corners have been unifacially chipped to form the graver beaks. None of these exhibit additional retouch.

Dimensions:

<u>Sp.#</u>	<u>Beak Length</u>	<u>Beak Width (Base)</u>	<u>Beak Thickness</u>
854	1	2	1
862	5	9	2
1111	4	5	1
1451	3	3	2
1713	1	3	2
2493	12	10	3

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
854	3	N1016/W996	SE	2	99.9-99.8	
862	3	N1018/W1000	NW	2	99.9-99.8	
1111	3	N1018/W1002	NE	2	99.7-99.6	
1451	3	N1024/W1000	NE	3a	99.5-99.4	
1713	3	N1024/W998	SW	3b	99.3-99.2	
2493	-	BHR2	-	4	99.0-98.8	F-99 fill

Scrapers, Group 1 (12 specimens) (Fig. 42k-l)

Description: Although all the specimens in this category are fragmentary, it appears they were fashioned from elongated flakes or possibly flake blades. These tools are characterized by the presence of unifacially chipped, steeply beveled scraping bits along one lateral

edge. They do not appear to have been modified other than the intentional shaping of the scraping bits. In some respects, these items are similar to, but smaller than, the Large Convex Unifaces described above. However, the present grouping exhibits relatively straight bits which vary from slightly concave to slightly convex.

Dimensions:

<u>Sp.#</u>	<u>Bit Length</u>	<u>Bit Thickness</u>	<u>Bit Angle</u>
973	16*	4	80°
1266	15*	7	80°
1395	24*	5	60°
1557	31	8	70°
1685	20*	4	65°
1728	6*	5	70°
1768	44*	4	60°
2437	30*	9	70°
2554	13*	5	70°
2784	9*	4	65°
3072	15*	6	80°
3098	46	6	60°

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
973	3	N1016/W996	SE	3a	99.8-99.7	
1266	3	N1022/W996	NE	3a	99.6-99.5	
1395	3	N1020/W996	NE	3a	99.5-99.4	
1557	3	N1022/W998	NW	3b	99.4-99.3	
1685	3	N1022/W996	SE	3b	99.3-99.2	
1728	3	N1026/W996	SW	3b	99.3-99.2	
1768	3	N1016/W1000	SW	5	99.2-99.1	
2437	3	N1024/W1000	SW	3a	99.4-99.3	F-65 fill
2554	1	N998/W1012	SW	1d-g	100.2-100.1	
2784	5	N1034/W936	NE	1d	99.2-99.1	
3072	9	N987.5/W998	NW	15	97.4-97.3	
3098	9	N987.5/W998	NE	16	97.1-97.0	

Scrapers, Group 2 (5 specimens) (Fig. 42m-n)

Description: These specimens are similar to those in Scraper Group 1; they are made from elongated flakes and the scraping bits are along lateral edges. The primary difference is in the steepness of the bevel of the bits; Group 2 exhibits gentler beveling than does Group 1.

Dimensions:

<u>Sp.#</u>	<u>Bit Length</u>	<u>Bit Thickness</u>	<u>Bit Angle</u>
1536	28*	3	40°
1770	81	5	50°
2110	35*	4	40°
2772	19*	4	50°
2879	47	4	35°

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
1536	3	N1020/W996	SE	3b	99.4-99.3	
1770	3	N1018/W996	SE	4	99.2-99.1	
2110	3	N1016/W998	SW	12	97.7-97.6	
2772	5	N1032/W936	NW	1d	99.2-99.1	
2879	5	N1032/W936	SW	1f+g	98.7-98.6	

Edge-damaged Flakes, Lateral (60 specimens) (Fig. 43a-d)

Description: Both complete and fragmentary specimens are represented in this category. The parent flakes vary from irregular to blade in form. The principal characteristic shared by these items is the presence of small flake scars along portions of one lateral edge. Flaking along the margins is not as extensive or as well defined as was noted in the two categories labeled as scrapers. It appears the present grouping represents tools of convenience.

Dimensions:

<u>Sp.#</u>	<u>Max Length</u>	<u>Max Width</u>	<u>Max Thickness</u>	<u>Bit Length</u>
649	25	13	3	11
653	39	24	10	31
733	33	21	5	12
859	22	17	4	11
863	43	21	7	26
880	49	19	4	18
883	37	29	3	23
890	33	25	5	27
903	16*	15*	2	15*
973	19*	16	2	10*
985	42	24	7	20
992	24*	20	3	17*
994	19	13	3	7
998	51	16	4	14
1005	34	26	4	18
1005	27	19	2	12
1058	24	15	3	20
1095	27	14	3	9

<u>Sp.#</u>	<u>Max Length</u>	<u>Max Width</u>	<u>Max Thickness</u>	<u>Bit Length</u>
1097	30	30	4	23
1130	17*	24	3	15*
1166	25	17	4	16
1180	35	28	5	11
1247	20	14	3	15
1262	39	19	5	19
1290	30	21	9	22
1306	36	14	3	16
1330	31	14	3	17
1342	63	32	5	25
1342	21	20	3	18
1403	46	37	5	10
1417	38	38	10	23
1442	21*	23	6	17
1512	28	15	3	11
1559	42	18	4	31
1559	32	20	5	11
1649	52*	43	9	46*
1686	19*	15	4	19*
1711	37	16	5	24
1993	20*	27	5	15*
2003	52	14	4	32
2019	10*	11*	2	10*
2023	18*	27	4	14*
2028	40	25	4	15
2047	37*	24	5	20
2076	36*	31	7	16
2097	62	33	8	25
2271	20*	24*	6	16*
2419	60	48	15	42
2534	56	75	10	22
2537	19	11	2	9
2538	23*	14	3	15
2554	25	23	10	19
2566	24	23	6	17
2625	40*	18	3	34*
2699	21	8	3	11
2750	42	30	3	19
3058	52	15	6	45
3060	38*	28	3	31*
3069	48	27	6	29
3098	24	21	5	16

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
649	3	N1016/W994	SE	1a-c	100.2-100.1	
653	3	N1016/W1002	NW	1a-c	100.2-100.1	
733	3	N1020/W996	NE	1d-g	100.1-100.0	

Figure 43. Artifact photographs; flakes and nonchipped stone

- a-d. Edge-damaged lateral flakes
- e-h. Edge-damaged distal flakes
- i-j. Serrated flakes
- k. Boatstone
- l. Stone gorget
- m. Smooth-edged flake
- n. Polished chert flake

FIGURE 43



Sp.#	XU	2x2 Unit	Cell	Stratum	El.(m)	Association/ Remarks
859	3	N1016/W1002	SW	2	99.9-99.8	
863	3	N1018/W1002	NW	2	99.9-99.8	
880	3	N1020/W1002	NE	2	99.9-99.8	
883	3	N1022/W996	NW	2	99.9-99.8	
890	3	N1022/W998	NE	2	99.9-99.8	
903	3	N1024/W996	NW	2	99.9-99.8	
973	3	N1016/W996	SE	3a	99.8-99.7	
985	3	N1018/W1002	SE	2	99.8-99.7	
992	3	N1020/W1000	NW	2	99.8-99.7	
994	3	N1020/W1000	NE	2	99.8-99.7	
998	3	N1020/W1002	NE	2	99.8-99.7	
1005(2)	3	N1022/W996	SE	2	99.8-99.7	
1058	3	N1026/W1002	SW	2	99.8-99.7	
1095	3	N1016/W996	NE	3a	99.7-99.6	
1097	3	N1016/W1002	NW	3a	99.7-99.6	
1130	3	N1020/W1002	SW	2	99.7-99.6	
1166	3	N1024/W1002	NW	2	99.7-99.6	
1180	3	N1026/W998	SW	2	99.7-99.6	
1247	3	N1020/W996	NE	3a	99.6-99.5	
1262	3	N1022/W996	NW	3a	99.6-99.5	
1290	3	N1022/W1002	NE	3a	99.6-99.5	
1306	3	N1024/W1000	SE	2	99.6-99.5	
1330	3	N1026/W1002	SE	2	99.6-99.5	
1342(2)	3	N1028/W998	SW	2	99.6-99.5	
1403	3	N1020/W1002	NW	3a	99.5-99.4	
1417	3	N1022/W996	SE	3a	99.5-99.4	
1442	3	N1024/W996	SW	3a	99.5-99.4	
1512	3	N1030/W1002	SE	2	99.5-99.4	
1559(2)	3	N1022/W998	NE	3b	99.4-99.3	
1649	3	N1016/W1000	NE	4	99.3-99.2	
1686	3	N1022/W996	SW	3b	99.3-99.2	
1711	3	N1024/W998	NE	3b	99.2-99.1	
1993	3	N1016/W998	SE	8	98.4-98.3	
2003	3	N1020/W996	SW	7	98.4-98.3	
2019	3	N1016/W996	NW	8	98.2-98.1	
2023	3	N1016/W998	NE	8	98.2-98.1	
2028	3	N1018/W996	SW	8	98.2-98.1	
2047	3	N1018/W998	SE	9	98.1-98.0	
2076	3	N1016/W998	SE	10+11	97.9-97.8	
2097	3	N1018/W998	NW	12	97.8-97.7	
2271	3	N1016/W996	NW	13	97.6-97.5	
2419	5	N1034/W936	SW	1d	98.9-98.8	F-61 fill
2534	1	N1000/W1012	SW	1a-c	100.4-100.3	
2537	1	N1003/W1012	SW	1a-c	100.4-100.3	
2538	1	N998/W1012	NW	1a-c	100.3-100.2	
2554	1	N998/W1012	SW	1d-g	100.2-100.1	
2566	1	N998/W1012	SE	1d-g	100.1-100.0	
2625	1	N998/W1012	SE	2	99.7-99.6	
2699	1	N1000/W1012	SE	3	99.2-99.1	
2750	5	N1034/W938	NW	1d	99.4-99.3	

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
3058	9	N987.5/W998	NW	14	97.6-97.5	
3060	9	N987.5/W998	NE	14	97.6-97.5	
3069	9	N987.5/W998	SW	14	97.5-97.4	
3098	9	N987.5/W998	NE	16	97.1-97.0	

Edge-damaged Flakes, Distal (77 specimens) (Fig. 44e-h)

Description: The pieces in this grouping are similar to the previous group; the primary difference is that the apparent utilized (or damaged) edge is on the end of the flake directly opposite the bulb of percussion.

Dimensions:

<u>Sp.#</u>	<u>Max Length</u>	<u>Max Width</u>	<u>Max Thickness</u>	<u>Bit Length</u>
658	17*	14	3	6
660	18	19	4	8
679	14	11	3	10
729	18	22	2	9
746	29	20	4	17
765	12*	21	3	12
782	14*	19	3	13
797	16*	17*	3	4
854	22	30	3	8
854	32	17	4	11
881	16	16	2	9
882	18*	18	2	9
887	26	27	3	12
891	21*	14	2	7
891	21	19	2	11
893	16*	20	1	11
921	15	15	3	12
953	10*	16	2	8
965	12*	22*	6	9*
976	32	31	5	11
977	12	25	3	10
977	21	9*	2	8*
977	15	14	2	12
981	22	34	4	31
983	24	24	6	11
983	14	20	4	11
986	29	19	4	7
990	22	11	3	8
992	11	15	1	15
994	18	13	2	13
995	16	13	2	7
995	17	16	4	9
995	30	27	4	9
995	29*	18*	5	14

<u>Sp.#</u>	<u>Max Length</u>	<u>Max Width</u>	<u>Max Thickness</u>	<u>Bit Length</u>
995	23	25	6	10
996	18	11	3	9
997	10*	15	2	11
1013	18	25	4	9
1029	9*	14	2	10
1037	20	22	4	12
1058	17	24	3	17
1095	14	14	2	8
1095	34	26	4	9
1096	30	15	6	14
1098	18	27	3	18
1098	19	14	3	11
1104	32	20	5	13
1115	23	19	2	7
1116	35	43	8	13
1119	25	17	3	15
1119	22	17	5	10
1129	16*	32*	9	21
1144	20	32	7	14
1147	42	14	5	8
1153	25	15	3	12
1155	38	27	4	6
1168	18*	22	5	15
1183	12*	19	2	6
1184	10*	13	1	6
1185	30	25	3	17
1249	30	18	3	14
1269	23*	24	3	13
1342	20	16	3	9
1510	61	35	11	12
1546	17*	18*	3	14
1551	48	29	6	13
1556	59	43	10	34
1559	22	25	6	7
1587	6*	21	4	14
1623	48	34	10	21
1686	29	25	5	15
2102	31	24	4	18
2554	10*	15*	3	15*
2591	16	20	4	12
2699	31	16	4	8
2762	16	13	3	8
2973	38	41	6	39

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
658	3	N1016/W1004	NE	1a-c	100.2-100.1	
660	3	N1016/W1004	SW	1a-c	100.2-100.1	

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
679	3	N1020/W1002	SW	1a-c	100.2-100.1	
729	3	N1018/W1002	NW	1d-g	100.1-100.0	
746	3	N1022/W998	SW	1d-g	100.1-100.0	
765	3	N1030/W996	NW	1d-g	100.1-100.0	
782	3	N1016/W1002	NW	1d-g	100.0-99.9	
797	3	N1022/W998	NE	1d-g	100.0-99.9	
854(2)	3	N1016/W996	SE	2	99.9-99.8	
881	3	N1020/W1002	SE	2	99.9-99.8	
882	3	N1020/W1002	SW	2	99.9-99.8	
887	3	N1022/W996	SW	2	99.9-99.8	
891(2)	3	N1022/W998	SE	2	99.9-99.8	
893	3	N1022/W1000	NW	2	99.9-99.8	
921	3	N1026/W996	NW	2	99.9-99.8	
953	3	N1028/W1000	SW	1d-g	99.9-99.8	
965	3	N1030/W1000	NE	1d-g	99.9-99.8	
976	3	N1016/W1002	SW	3a	99.8-99.7	
977(3)	3	N1018/W996	NE	2	99.8-99.7	
981	3	N1018/W1002	NW	2	99.8-99.7	
983(2)	3	N1018/W1002	NE	2	99.8-99.7	
986	3	N1018/W1002	SW	2	99.8-99.7	
990	3	N1020/W998	NW	2	99.8-99.7	
992	3	N1020/W1000	NW	2	99.8-99.7	
994	3	N1020/W1000	NE	2	99.8-99.7	
995(5)	3	N1020/W1000	SW	2	99.8-99.7	
996	3	N1020/W1002	NW	2	99.8-99.7	
997	3	N1020/W1002	NW	2	99.8-99.7	
1013	3	N1022/W1000	NE	2	99.8-99.7	
1029	3	N1024/W998	SE	2	99.8-99.7	
1037	3	N1024/W1002	NE	2	99.8-99.7	
1058	3	N1026/W1002	SW	2	99.8-99.7	
1095(2)	3	N1016/W996	NE	3a	99.7-99.6	
1096	3	N1016/W1002	NW	3a	99.7-99.6	
1098(2)	3	N1016/W1002	NE	3a	99.7-99.6	
1104	3	N1018/W996	SE	3a	99.6-99.5	
1115	3	N1020/W996	NE	2	99.7-99.6	
1116	3	N1020/W996	NE	2	99.7-99.6	
1117(2)	3	N1020/W998	NE	2	99.7-99.6	
1129	3	N1020/W1002	SW	2	99.7-99.6	
1144	3	N1022/W1000	SW	2	99.7-99.6	
1147	3	N1022/W1002	NE	2	99.7-99.6	
1153	3	N1024/W996	SE	2	99.7-99.6	
1155	3	N1024/W998	NW	2	99.7-99.6	
1168	3	N1024/W1002	SE	2	99.7-99.6	
1183	3	N1026/W1000	NE	2	99.7-99.6	
1184	3	N1026/W1000	SE	2	99.7-99.6	
1185	3	N1026/W1000	SW	2	99.7-99.6	
1249	3	N1020/W998	NW	3a	99.6-99.5	
1269	3	N1022/W996	SW	3a	99.6-99.5	
1342	3	N1028/W998	SW	2	99.6-99.5	
1510	3	N1030/W1002	NW	2	99.5-99.4	

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
1546	3	N1020/W1002	NE	3b	99.4-99.3	
1551	3	N1022/W996	NW	3b	99.4-99.3	
1556	3	N1022/W996	SW	3b	99.4-99.3	
1559	3	N1022/W998	NE	3b	99.4-99.3	
1587	3	N1024/W1000	NE	3a	99.4-99.3	
1623	3	N1026/W1002	SW	3b	99.4-99.3	
1686	3	N1022/W996	SW	3b	99.3-99.2	
2102	3	N1020/W996	SW	10+11	97.8-97.7	Polish(?)
2554	1	N998/W1012	SW	1d-g	100.2-100.1	
2591	1	N1000/W1012	SW	1d-g	100.0-99.9	
2699	1	N1000/W1012	SE	3	99.2-99.1	
2762	5	N1032/W938	SW	1d	99.3-99.2	
2973	5	N1034/W938	NE	2	98.2-98.1	

Serrated Flakes (2 specimens) (Fig. 43i-j)

Description: Each of these two thin irregularly shaped flakes exhibits small serrations along one lateral edge. Similar items have been reported from the Kyle Site (Jelks 1962:50 and Fig. 20H-I).

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
1075	3	N1028/W1002	NE	2	99.8-99.7	
1743	3	N1026/W1002	SW	3b	99.3-99.2	

Chipping Debris

Cores

Cobbles of chert which appear to have served as sources of flint are included within this broad category. No detailed analysis has been attempted with these artifacts. They are divided into gross groupings based upon the apparent degree of reduction. These categories include: tested cores, partially reduced cores, expended cores and core fragments. All of these items are of cherts which are readily available from contemporary gravel bars along the San Gabriel River or from the extensive Uvalde Gravel formation deposits which line both sides of the river valley wall.

Tested Cores (11 specimens)

Description: These eleven cobbles exhibit a few scars where initial cortex flakes have been removed. The prehistoric knappers apparently collected the cobbles, hauled them to the site for reduction, then after striking a few flakes from them decided that the cobbles were unsuitable for further reduction. Two specimens (Nos. 981 and 1722) are large stream-tumbled flakes rather than normal subrounded cobbles as are the remaining nine specimens.

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
920	3	N1024/W1002	SW	2	99.9-99.8	
929	3	N1026/W998	SE	2	99.9-99.8	
981	3	N1018/W1002	NW	2	99.8-99.7	Large tumbled flake
1722	3	N1024/W1002	SE	3b	99.3-99.2	Large tumbled flake
2025	3	N1016/W998	SW	9	98.2-98.1	
2075	3	N1016/W998	NE	10+11	97.9-97.8	
2606	1	N1000/W1012	SW	1d-g	99.9-99.8	
2661	1	N1000/W1012	SW	2	99.5-99.4	
2714	1	N1000/W1012	SE	3	99.1-99.0	
2971	5	N1034/W938	NW	2	98.2-98.1	
3093	9	N987.5/W998	SW	16	97.2-97.1	

Partially Reduced Cores (24 specimens)

Description: Similar to the previous group, these small cobbles exhibit flake scars which have been removed from either natural or prepared striking platforms. None have been reduced to the point where further flake removal could not be accomplished.

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
1099	3	N1016/W1002	SE	3a	99.7-99.6	
1118	3	N1020/W998	NW	2	99.7-99.6	
1133	3	N1022/W996	SE	2	99.7-99.6	
1158	3	N1024/W998	SE	2	99.7-99.6	
1164	3	N1024/W1000	SW	2	99.7-99.6	
1300	3	N1024/W998	NE	2	99.6-99.5	
1380	3	N1018/W996	SE	3b	99.5-99.4	
1467	3	N1026/W998	SE	3a	99.5-99.4	
1506	3	N1030/W1000	NW	2	99.5-99.4	
1696	3	N1022/W1000	SW	3b	99.3-99.2	
1872	3	N1016/W996	SE	5	99.1-99.0	
2021	3	N1016/W996	NW	8	98.2-98.1	
2067	3	N1018/W998	SW	9	98.0-97.9	
2093	3	N1016/W998	SW	12	97.8-97.7	
2096	3	N1018/W996	SW	12	97.8-97.7	
2133	3	N1018/W998	NE	12	97.6-97.5	
2359	3	N1016/W996	SE	3a	99.6-99.5	F-41 fill
2434	3	N1024/W1000	SE	3a	99.4-99.3	F-65 fill
2554	1	N998/W1012	SW	1d-g	100.2-100.1	
2809	5	N1034/W936	SW	1d	99.1-99.0	
2899	5	N1032/W936	NE	1f+g	98.6-98.5	
3086	9	N987.5/W1000	NE	16	97.3-97.2	

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
3087	9	N987.5/W1000	SE	16	97.3-97.2	
3146	-	-	-	-	-	Water screen Pit #1

Expended Cores (71 specimens)

Description: These specimens are the remnants of chert cobbles which have been reduced to the point that further flake removal is not practical. Some appear to have been discarded due to flaws and knots which precluded further flake removal while others are simply expended to such small dimensions that no more usable flakes can be removed.

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
669	3	N1018/W994	SW	1a-c	100.2-100.1	
724	3	N1016/W996	SE	1d-g	100.1-100.0	
727	3	N1016/W1002	NW	1d-g	100.1-100.0	
994	3	N1020/W1000	NE	2	99.8-99.7	
1015	3	N1022/W1000	SW	2	99.8-99.7	
1096	3	N1016/W1002	NW	3a	99.7-99.6	
1122	3	N1020/W1000	NE	2	99.7-99.6	
1125	3	N1020/W1002	NW	2	99.7-99.6	
1142	3	N1022/W1000	NE	2	99.7-99.6	
1147	3	N1022/W1002	NE	2	99.7-99.6	
1159	3	N1024/W998	SW	2	99.7-99.6	
1164	3	N1024/W1000	SW	2	99.7-99.6	
1165	3	N1024/W1002	NW	2	99.7-99.6	
1199	3	N1028/W998	SE	2	99.7-99.6	
1256	3	N1020/W1002	NW	3a	99.6-99.5	
1276	3	N1022/W998	SE	3a	99.6-99.5	
1289	3	N1022/W1002	NW	3a	99.6-99.5	
1310	3	N1024/W1002	SE	2	99.6-99.5	
1374	3	N1016/W1002	NW	3b	99.5-99.4	
1406	3	N1020/W1002	NE	3a	99.5-99.4	
1421	3	N1022/W998	NE	3a	99.5-99.4	
1423	3	N1022/W998	SW	3a	99.5-99.4	
1436(2)	3	N1022/W1002	SE	3a	99.5-99.4	
1472	3	N1026/W1000	SE	3a	99.5-99.4	
1479	3	N1028/W996	NW	2	99.5-99.4	
1544	3	N1020/W1002	NW	3b	99.4-99.3	
1565	3	N1022/W1000	NE	3b	99.4-99.3	
1582	3	N1024/W998	NE	3a	99.4-99.3	
1597	3	N1024/W1002	NE	3a	99.4-99.3	
1604	3	N1026/W996	NE	3a	99.4-99.3	
1615	3	N1026/W1000	SE	3a	99.4-99.3	
1690	3	N1022/W998	SE	3b	99.3-99.2	

Sp.#	XU	2x2 Unit	Cell	Stratum	El.(m)	Association/ Remarks
1712	3	N1024/W998	SE	3b	99.3-99.2	
1717	3	N1024/W1000	SE	3b	99.3-99.2	
1727	3	N1026/W996	SE	3b	99.3-99.2	
1736	3	N1026/W1000	NE	3b	99.3-99.2	
1753	3	N1028/W1000	NW	3a	99.3-99.2	
1871	3	N1016/W996	NE	5	99.1-99.0	
1872	3	N1016/W996	SE	5	99.1-99.0	
1924	3	N1016/W996	SW	6	98.8-98.7	
1927	3	N1016/W998	SE	6	98.8-98.7	
2024	3	N1016/W998	SE	8	98.2-98.1	
2069(2)	3	N1020/W996	SW	9	98.0-97.9	
2071(3)	3	N1016/W996	NW	10+11	97.9-97.8	
2109	3	N1016/W998	SE	12	97.7-97.6	
2122	3	N1016/W996	NW	13	97.6-97.5	
2153	3	N1018/W998	NW	13	97.5-97.4	
2230	3	N1018/W996	SW	14	96.9-96.8	
2262	3	N1018/W996	SW	15+16	96.7-96.6	
2278	3	N1018/W998	NW	15+16	96.6-96.5	
2292	3	N1018/W998	NE	15+16	96.5-96.4	
2361	3	N1020/W996	SE	3b	99.1-99.0	F-43 fill
2434	3	N1024/W1000	SE	3a	99.4-99.3	F-65 fill
2516	9	N987.5/W1000	NE	16	97.2-97.1	F-114 fill
2563	1	N998/W1012	NW	1d-g	100.1-100.0	
2565	1	N998/W1012	NE	1d-g	100.1-100.0	
2567	1	N998/W1012	SW	1d-g	100.1-100.0	
2594	1	N1002/W1012	SW	1d-g	100.0-99.9	
2708	1	N1000/W1010	NE	3	99.1-99.0	
2709	1	N1000/W1010	SE	3	99.1-99.0	
2763	5	N1034/W936	NW	1d	99.3-99.2	
2786	5	N1034/W936	SW	1d	99.2-99.1	
2793	5	N1032/W936	NW	1d	99.1-99.0	
2876	5	N1032/W936	NE	1f+g	98.7-98.6	
3092	9	N987.5/W998	SW	14	97.2-97.1	
3140	BHR2	-	-	-	-	General provenience
3347	7	N1049/W972	SE	3(?)	94.5-94.4	

Core Fragments (108 specimens)

Description: Each of these fragmentary specimens appears to represent the remnants of cores which were accidentally split during the reduction process. Technically, these pieces could be considered as waste flakes; however, in the interest of lithic reduction strategies, it seems more appropriate to classify them simply as core fragments.

Provenience:

<u>Sp. #</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
656	3	N1016/W1004	NW	1a-c	100.2-100.1	
658	3	N1016/W1004	NE	1a-c	100.2-100.1	
669	3	N1018/W994	SW	1a-c	100.2-100.1	
722	3	N1020/W994	SW	1a-c	100.2-100.1	
797	3	N1022/W998	NE	1d-g	100.0-99.9	
895	3	N1022/W1000	NE	2	99.9-99.8	
897	3	N1022/W1000	SW	2	99.9-99.8	
930	3	N1026/W998	SW	2	99.9-99.8	
952	3	N1028/W1000	SE	1d-g	99.9-99.8	
972	3	N1016/W996	NE	2	99.8-99.7	
974(2)	3	N1016/W1002	NW	2	99.8-99.7	
982	3	N1018/W1002	NW	2	99.8-99.7	
998	3	N1020/W1002	NE	2	99.8-99.7	
1006	3	N1022/W998	NW	2	99.8-99.7	
1009	3	N1022/W998	SE	2	99.8-99.7	
1035	3	N1024/W1002	NW	2	99.8-99.7	
1064	3	N1028/W998	NW	2	99.8-99.7	
1095	3	N1016/W996	NE	3a	99.7-99.6	
1102	3	N1018/W996	NE	2	99.7-99.6	
1111	3	N1018/W1002	NE	2	99.7-99.6	
1112(3)	3	N1018/W1002	SE	2	99.7-99.6	
1120	3	N1020/W1000	NW	2	99.7-99.6	
1128	3	N1020/W1000	SE	2	99.7-99.6	
1131	3	N1022/W996	NW	2	99.7-99.6	
1133	3	N1022/W996	SE	2	99.7-99.6	
1138	3	N1022/W998	NE	2	99.7-99.6	
1153	3	N1024/W996	NW	2	99.7-99.6	
1167/ 1169/ 1292	3	N1024/W1002	NW	2	99.7-99.6	
1169/ 1167/ 1292	3	N1024/W1002	SW	2	99.7-99.6	
1186(2)	3	N1026/W1002	NW	2	99.7-99.6	
1234	3	N1016/W1002	SW	3b	99.6-99.5	
1251(2)	3	N1020/W1000	NW	3a	99.6-99.5	
1262	3	N1022/W996	NW	3a	99.6-99.5	
1266	3	N1022/W996	NE	3a	99.6-99.5	
1272	3	N1022/W998	NW	3a	99.6-99.5	
1273	3	N1022/W998	NW	3a	99.6-99.5	
1274	3	N1022/W998	NE	3a	99.6-99.5	
1278	3	N1022/W998	SW	3a	99.6-99.5	
1284	3	N1022/W1000	SE	3a	99.6-99.5	
1291	3	N1022/W1002	SE	3a	99.6-99.5	
1292/ 1167/ 1169	3	N1022/W1002	SW	3a	99.6-99.5	
1332	3	N1028/W996	NW	2	99.6-99.5	

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
1342	3	N1028/W998	SW	2	99.6-99.5	
1348	3	N1028/W1002	NW	2	99.6-99.5	
1352	3	N1028/W1002	SW	2	99.6-99.5	
1370	3	N1030/W1002	SE	2	99.6-99.5	
1395	3	N1020/W996	NE	3a	99.5-99.4	
1402	3	N1020/W1000	SW	3a	99.5-99.4	
1403	3	N1020/W1002	NW	3a	99.5-99.4	
1446	3	N1024/W998	NE	3a	99.5-99.4	
1452	3	N1024/W1000	SE	3a	99.5-99.4	
1458	3	N1024/W1002	SW	3a	99.5-99.4	
1464	3	N1026/W998	NW	3a	99.5-99.4	
1468	3	N1026/W998	SW	3a	99.5-99.4	
1535	3	N1020/W996	NE	3b	99.4-99.3	
1558	3	N1022/W998	NW	3b	99.4-99.3	
1566	3	N1022/W1000	NE	3b	99.4-99.3	
1578	3	N1024/W996	SE	3a	99.4-99.3	
1597(2)	3	N1024/W1002	NE	3a	99.4-99.3	
1606	3	N1026/W996	SW	3a	99.4-99.3	
1618	3	N1026/W1000	SW	3a	99.4-99.3	
1696	3	N1022/W1000	SW	3b	99.3-99.2	
1702	3	N1022/W1002	SE	3b	99.3-99.2	
1706	3	N1024/W996	NE	3b	99.3-99.2	
1721	3	N1024/W1002	NE	3b	99.3-99.2	
1746	3	N1028/W996	SE	3a	99.3-99.2	
1802	3	N1022/W1000	NW	3b	99.2-99.1	
1809	3	N1022/W1002	SW	3b	99.2-99.1	
1812	3	N1024/W996	NE	3b	99.2-99.1	
1817	3	N1024/W998	NE	3b	99.2-99.1	
1833	3	N1026/W998	SE	3b	99.2-99.1	
1842	3	N1026/W1000	SW	3b	99.2-99.1	
1847	3	N1026/W1002	SE	3b	99.2-99.1	
1851	3	N1028/W996	NE	3a	99.2-99.1	
1853	3	N1028/W996	SW	3a	99.2-99.1	
1892	3	N1016/W998	NW	5	99.0-98.9	
1908	3	N1016/W996	SW	6	98.9-98.8	
1929	3	N1018/W996	SE	6	98.8-98.7	
1932	3	N1020/W996	SE	6	98.8-98.7	
1949	3	N1020/W996	NE	6	98.7-98.6	
1989	3	N1016/W996	SW	8	98.4-98.3	
1991	3	N1016/W998	NW	8	98.4-98.3	
1997	3	N1018/W996	SW	8	98.4-98.3	
2055	3	N1016/W998	NW	10+11	98.0-97.9	
2059	3	N1016/W998	SE	10+11	98.0-97.9	
2077	3	N1016/W998	SW	10+11	97.9-97.8	
2090	3	N1016/W998	NW	12	97.8-97.7	
2127	3	N1016/W998	SE	13	97.6-97.5	
2133	3	N1018/W998	NE	12	97.6-97.5	
2256	3	N1016/W996	NW	15+16	96.7-96.6	
2486	BHT25	-	-	16	-	BHR1; F-96; medium rock hearth

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
2536	1	N1002/W1012	NW	1a-c	100.4-100.3	
2565	1	N998/W1012	NW	1d-g	100.1-100.0	
2571	1	N1000/W1012	SE	1d-g	100.1-100.0	
2585	1	N998/W1012	SW	1d-g	100.0-99.9	
2711	1	N1000/W1012	NW	3	99.1-99.0	
2720	1	N1002/W1010	SW	3	99.1-99.0	
2728	5	N1032/W936	NW	1c	99.5-99.4	
2753	5	N1032/W936	NW	1d	99.3-99.2	
2874	5	N1032/W936	NW	1f+g	98.7-98.6	
2915	5	N1034/W938	SW	1f+g	98.6-98.5	
3086(3)	8	N987.5/W1000	NE	16	97.3-97.2	
3142	BHT26	-	-	16(?)	-	BHR2; deep test

Waste Flakes

Flint Flakes (43,830 specimens)

Description: This category includes the flakes and chips which represent waste debitage resulting from core reduction and tool manufacture. Included are only those pieces recovered from $\frac{1}{4}$ -inch mesh screening; several thousand additional flakes and chips were recovered on the fine screening and from the features but are not considered in the present report. These materials warrant detailed studies in the future. Provenience for the waste flakes is given by XU and stratum only; fine screen and feature residues are not included.

Provenience:

<u>XU</u>	<u>Stratum</u>	<u>No. of Specimens</u>
1	1a-c	150
	1d-g	1,021
	2	2,252
	3	855
3	1a-c	557
	1d-g	669
	2	5,895
	3a	11,582
	3b	7,054
	4	1,042
	5	797
	6	408
	7	451
	8	994
	9	337
	10 + 11	595
	12	1,660
	13	524

<u>XU</u>	<u>Stratum</u>	<u>No. of Specimens</u>
	14	208
	15 + 16	1,376
	17	13
	18	4
	19	6
	20	2
5	1a-c	11
	1d	807
	1e	157
	1f+g	499
	2a	67
7	3(?)	28
8	1a+b	23
	1c	61
9	13	58
	14	328
	15 + 16	3,339

NONCHIPPED STONE

Pecked and Smoothed Stone

Boatstone (1 specimen; Fig. 43k)

Description: This rectangular limestone specimen is complete except for one corner. It is aberrant for the Central Texas region in that it is thin, the dorsal concavity is shallow and the parent material is limestone rather than quartzite or an exotic material such as porphyry. The lateral edges are gently convex and the ends are slightly convex (almost straight). The dorsal surface is shallowly concave both latitudinally and longitudinally. The ventral surface is gently convex along the longitudinal axis; it is slightly convex (almost straight) across the latitudinal axis. This piece has been shaped to rough form by pecking; distinct peck marks are visible over most of the ventral surface and along the edges of the dorsal surface. Intensive smoothing is exhibited over most of the dorsal surface and along the lateral edges although this process has not completely obliterated all traces of the pecking. The ventral surface exhibits less intensive smoothing.

Dimensions:

<u>Sp.#</u>	<u>Max. L.</u>	<u>Max. W.</u>	<u>Max. Thick.</u>	<u>Concav. Depth</u>	<u>End. Thick.</u>
1587	83	37	17	3	10

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
1587	3	N1024/W1000	NE	3a	99.4-99.3	

Gorget (1 specimen; Fig. 43l))

Description: This diamond- (or lozenge-) shaped object is made from a thin flat pebble of Packsaddle schist; these pebbles are common to the gravels of the nearby Colorado River and originate from Precambrian formations associated with the Llano uplift in Central Texas. This specimen is gently biconvex in both latitudinal and longitudinal cross section. One end is sharply rounded; the other end was probably similar, but a small chip has been removed and obscures the original form. The four lateral edges are gently convex and have been thinned on each face. Deep U-shaped notches have been cut into both lateral corners near the midpoint of the piece. Two suspension holes have been drilled along the central longitudinal axis and are slightly off center. Both suspension holes are biconcave and both are canted on a slight diagonal (oriented in the same direction). Remnants of peck marks are visible on one face indicating that the piece was shaped to rough form by pecking, then was smoothed to the desired finish. On the face exhibiting the pecking remnants, there are two sets of striae partially encircling each of the suspension holes. These are situated on the oblique (or low) side of the hole orientations and are interpreted as being unremoved indentations incurred during the drilling process. This suggests that a chipped stone drill with an expanded haft (or base) was used to produce the holes; further, the same tool was probably used for both holes (at least during the final stages of preparation) since the striae are identical and equidistant from the holes.

Dimensions:

<u>Sp.#</u>	<u>ML</u>	<u>MW</u>	<u>MT</u>	<u>Notch Depth</u>	<u>Hole Dia. (Ext.)</u>	<u>Hole Dia. (Int.)</u>
2497	92	55	9	9	8	4

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
2497	-	BHR2	-	4	99.0-98.8	F-99 fill

Smoothed Stone

Smoothed-edge Flake (1 specimen; Fig. 43m)

Description: This small narrow elongated chert flake fragment exhibits intensive smoothing and polishing on the edge opposite the bulb of percussion (the striking platform and bulb are now lacking).

Dimensions:

<u>Sp.#</u>	<u>Max. L.</u>	<u>Max. W.</u>	<u>Max. Thick.</u>	<u>W. of Wear</u>
925	27	10	3	10

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
925	3	N1026/W996	SW	2	99.9-99.8	

Polished Stone

Polished Chert Flakes (3 specimens; Fig. 43n)

Description: Two small flakes of tan chert each retain patches of cortex and appear to have been removed from the same parent cobble (or pebble). The remaining cortex on each piece exhibits intensive polishing which suggests the parent cobble was used as a burnisher. Both flakes exhibit prepared platforms which suggest they were probably removed during biface reduction. The third specimen (No. 1370) is of light gray chert and is a larger flake than the previous two; the cortex surface is flat and intensively polished.

Dimensions:

<u>Sp.#</u>	<u>Max. L.</u>	<u>Max. W.</u>	<u>Max. Thick.</u>
1370	56	54	17
2642	10	11	2
2714	30	29	4

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
1370	3	N1030/W1002	SE	2	99.6-99.5	
2642	1	N1000/W1012	NW	2	99.6-99.5	
2714	1	N1000/W1012	SE	3	99.1-99.0	

Ground Stone

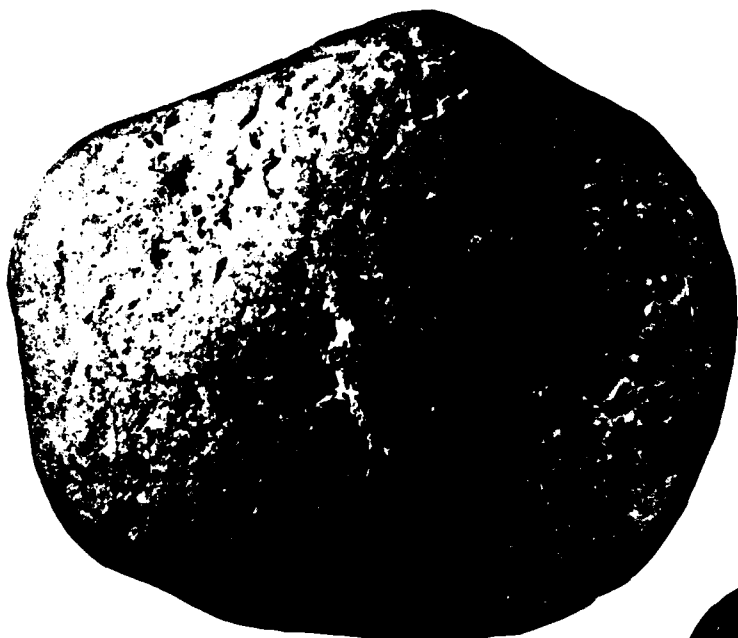
Handstones (10 specimens; Fig. 44a-c)

Description: A variety of parent stones are represented in this small group of hand-held grinding stones. The three largest complete specimens are made of coarse-grained chert cobbles; these vary from round to oval in outline and are relatively thick. The two larger specimens are pecked and smoothed on one face only while the smallest is pecked on both faces; however, the smaller one is smoothed on one face

Figure 44. Artifact photographs; ground stone

a-c. Handstones

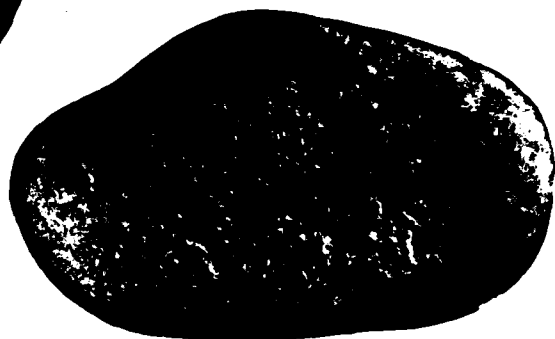
d-f. Grinding slabs



a



b



c



d



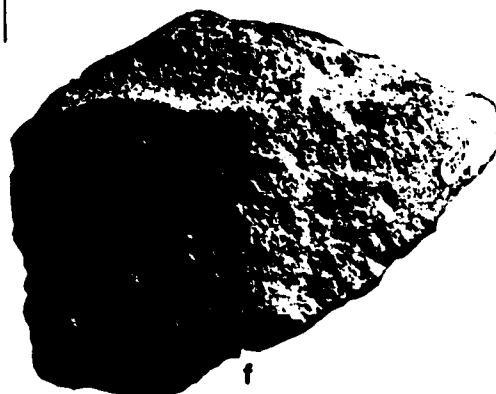
d



f



e



f

FIGURE 44

only. The other complete specimen is composed of granite and is broken into two pieces. The larger segment has been burned but the smaller shows no evidence of burning. This specimen is oval, pecked around the lateral edges and is smoothed on both faces. One large handstone fragment consists of a burned tabular sandstone pebble; it may be a small palette rather than a handstone. It is rectangular in outline and is smoothed on one face only. Three small fragments are composed of a light porous limey sandstone; although they are fragmentary, they appear to have been similar in shape to the granite specimen. One of the remaining two specimens is a small fragment of a quartzite cobble which is pecked, shaped and burned. The final specimen is a small fragment of a highly fossiliferous limestone which is smoothed on one surface.

Dimensions:

<u>Sp.#</u>	<u>Max. L.</u>	<u>Max. W.</u>	<u>Max. Thick.</u>	<u>Material</u>
869	-	-	-	Limey sandstone
1190	-	-	-	Limey sandstone
1674	99	97	22	Sandstone
1757	99	61	44	Chert
1768	-	-	-	Quartzite
1832	-	-	-	Limey sandstone
1832	150	119	49	Chert
1872	-	-	-	Fossiliferous sandstone
1942	116	101	63	Chert
2083/ 2124	88	73	46	Granite

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x3 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
869	3	N1020/W996	NE	2	99.9-99.8	F-83 fill
1190	3	N1026/W1002	SW	2	99.7-99.6	
1674	3	N1020/W1002	NW	3b	99.3-99.2	
1757	3	N1028/W1000	SW	3a	99.3-99.2	
1768	3	N1016/W1000	SW	4	99.2-99.1	
1832(2)	3	N1026/W996	NE	3b	99.2-99.1	
1872	3	N1016/W996	SE	5	99.1-99.0	
1942	3	N1016/W998	NE	7	98.7-98.6	
2083/ 2124	3	N1018/W998	SE	10+11	97.9-97.8	
2124/ 2083	3	N1016/W996	SW	13	97.6-97.5	

Grinding Slabs (13 specimens; Fig. 44d-f)

Description: All thirteen of these apparent grinding slab fragments are remnants of probable shallow basin-shaped artifacts. Nine are of sandstone while four are of light porous limey sandstone. Two

fragments of the same specimen which were found in differing contexts are counted as a single specimen. These grinding slab pieces are too small and fragmentary for meaningful measures.

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
1309	3	N1024/W1002	NE	2	99.6-99.5	
1316	3	N1026/W996	SW	2	99.6-99.5	
1414/ 1446	3	N1022/W996	NW	3a	99.5-99.4	
1426	3	N1022/W1000	NW	3a	99.5-99.4	Limey sandstone
1446/ 1414	3	N1024/W998	NE	3a	99.5-99.4	
1452	3	N1024/W1000	NE	3a	99.5-99.4	Limey sandstone
1622	3	N1026/W1002	SE	3a	99.4-99.3	Limey sandstone
1725	3	N1026/W996	NW	3a	99.3-99.2	
1770	3	N1018/W996	SE	4	99.2-99.1	
1985	3	N1020/W996	SW	7	98.5-98.4	
2046	3	N1018/W998	NE	8	98.1-98.0	
2120	3	N1020/W996	SW	12	97.7-97.6	
2389	1	N998/W1012	NE	1d-g	100.0-99.9	F-54
2774	5	N1032/W936	NE	1d	99.2-99.1	Limey sandstone

Battered and Striated Stone

Hammerstones (9 specimens; Fig. 45a-c)

Description: These small cobbles and pebbles exhibit battering on one or more surfaces which indicates use as hammerstones. Specimens 995 and 1686 are heavily battered indicating intensive use while the remainder are less intensively battered. Two of the specimens are small and probably represent platform edge preparation tools. One of these small pebbles is a fine-grained quartzite while the remainder are coarse-grained cherts.

Dimensions:

<u>Sp.#</u>	<u>Max. L.</u>	<u>Max. W.</u>	<u>Max. Thick.</u>	<u>Material</u>
995	123	101	52	Chert
1376	51	43	20	Chert
1686	75	52	53	Chert
1859	109	55	55	Chert
2079	48	38	29	Quartzite
2111	69	64	40	Chert
2651	76	61	45	Chert
2705	85	82	37	Chert
2790	87	45	29	Chert

Figure 45. Artifact photographs; battered and striated stone

a-c. Hammerstones

d-g. Striated hammerstones

h-i. Striated stones

FIGURE 45



Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
995	3	N1020/W1000	SW	2	99.8-99.7	
1376	3	N1016/W1002	NE	3b	99.5-99.4	
1686	3	N1022/W996	SW	3b	99.3-99.2	
1859	3	N1028/W1000	NW	3a	99.2-99.1	
2079	3	N1018/W996	NW	10+11	97.9-97.8	
2111	3	N1018/W996	NW	12	97.7-97.6	
2651	1	N998/W1012	NW	2	99.5-99.4	
2705	1	N1002/W1012	SW	3	99.2-99.1	
2790	5	N1034/W938	SE	1d	99.2-99.1	

Hammerstones Fragments (16 specimens)

Description: This group of artifacts is composed of small fragments of battered chert cobbles (or pebbles). They appear to be the discarded remnants of hammerstones which fractured during use as lithic reduction tools. All the specimens in this group are too fragmentary for meaningful measurements, and all are of coarse-grained cherts.

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
741	3	N1022/W996	SW	1d-g	100.1-100.0	
1230	3	N1016/W1002	NW	3b	99.6-99.5	
1234	3	N1016/W1002	SW	3b	99.6-99.5	
1284	3	N1022/W1000	SE	3a	99.6-99.5	
1377	3	N1016/W1002	SW	3b	99.5-99.4	
1416	3	N1022/W996	NE	3a	99.5-99.4	
1563	3	N1022/W1000	NW	3b	99.4-99.3	
1587	3	N1024/W1000	NE	3a	99.4-99.3	
1885	3	N1020/W998	NW	4	99.1-99.0	
1978	3	N1018/W996	NW	7	98.5-98.4	
2097	3	N1018/W998	NW	12	97.8-97.7	
2498	BHR2	-	-	4	99.0-98.8	F-99; hearth fill
2715	1	N1000/W1012	SW	3	99.1-99.0	
2766	5	N1034/W936	SW	1d	99.3-99.2	
2780	5	N1032/W938	SE	1d	99.2-99.1	
3102	9	N987.5/W1000	SE	16	97.1-97.0	

Striated Hammerstone Fragments (4 specimens; Fig. 45d-g)

Description: These four items are the same as the previous group with the exception that each has small striations originating from the battering marks. Two specimens, Nos. 2018 and 2952, were used by right-handed persons, while Nos. 1108 and 3093 were used by left-handed persons. Two are of coarse-grained chert (Nos. 2018 and 3093) and two

are of limestone (Nos. 1108 and 2952). They are too fragmentary for measurement. The striations average about 10 mm in length.

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
1108	3	N1018/W1002	NW	2	99.7-99.6	
2018	3	N1020/W996	SW	8	98.3-98.2	
2952	5	N1034/W938	SW	1f+g	98.4-98.3	
3093	9	N987.5/W998	SW	16	97.2-97.1	

Striated Stones (2 specimens; Fig. 45h-i)

Description: The first of these specimens (No. 2724) is a coarse-grained chert which exhibits linear striations on one face; the opposite face is broken and about 25% of the pebble is lacking. The striations appear to have been made by abrasion on sharp surfaces. The second specimen (No. 2706) is a portion of a flat coarse-grained chert pebble. One face is flat and exhibits several distinct linear striations. The opposite face exhibits a wide shallow groove which extends the length of the pebble. This face is intensively pecked with numerous striations oriented longitudinally with the wide shallow groove; the groove was probably formed as a result of intensive use. The lateral edges exhibit moderate battering which probably resulted from secondary use as a light hammerstone. Both of these artifacts appear to have functioned as striking platform edge preparers used during the lithic reduction process. Both specimens are fragmentary; no measurements were taken.

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
2706	1	N1000/W1010	NW	1	99.1-99.0	
2724	1	N1002/W1012	SE	3	99.1-99.0	

Miscellaneous Stone

Burnished Stone (1 specimen)

Description: This small fragment of burned coarse-grained limestone appears to be burnished on its exterior surface. The piece is too fragmentary to determine either its form or its function.

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
2674	1	N1000/W1012	NE	2	99.4-99.3	

Ocher (1 specimen)

Description: This is a small rectangular tabular piece of fine-grained hematite. One face is smooth although no striations are visible. It is probable that this flat pebble served as a source of red pigment, but this cannot be demonstrated conclusively.

Dimensions:

<u>Sp.#</u>	<u>Max. L.</u>	<u>Max. W.</u>	<u>Max. Thick.</u>
2817	27	25	9

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
2817	5	N1032/W936	SE	1d	99.0-98.9	

Quartz Crystal Fragment (1 specimen)

Description: This small chip from a quartz crystal appears to represent chipping debris. Occasional finds of chipped quartz (not quartzite) are known for the Central Texas region although none have been noted previously in the Granger Lake District.

Dimensions:

<u>Sp.#</u>	<u>Max. L.</u>	<u>Max. W.</u>	<u>Max. Thick.</u>
3087	16	8	5

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
3087	9	N987.5/W1000	SE	16	97.3-97.2	

Shells and Bones

FRESHWATER SHELLS

Pendants (8 specimens; Fig. 46a-e)

Description: These small thin items appear to be ornaments made from locally available freshwater mussel shells although species identifications are not possible. Four of the specimens are trapezoidal in outline and each has two suspension holes drilled through the narrow end. Although the holes are essentially straight, it appears that in each case they were drilled from the interior face of the shells. A fifth specimen is similar to these, but it is rectangular rather than

trapezoidal in outline. This piece is fragmentary and exhibits one complete and one partial suspension hole; a third hole may have been present at one time. The remaining three specimens are too fragmentary to allow description of their original morphological characteristics. All of the ornaments in this group appear to have been shaped through the groove-and-snap method and then the lateral edges were smoothed.

Discussion: Two specimens previously reported from this site (Prewitt 1974:113 and Fig. 23u-v) are slightly larger and more distinctly rectangular in outline than the present group. A similar ornament has been reported in an apparent Driftwood/Austin/Toyah Phase context at the Evoe Terrace Site on the Lampasas River (Sorrow, Shafer and Ross 1967:118 and Fig. 71h). Four of five similar specimens from the Oblate Shelter on the Guadalupe River appear to be associated with a Twin Sisters/Austin/Toyah Phase context (Johnson, Suhm and Tunnell 1962:113, Fig. 43e-f, and Tables 3, 4 and 8).

Dimensions:

<u>Sp.#</u>	<u>Max. L.</u>	<u>Max. W.</u>	<u>Min. W.</u>	<u>Max. Thick.</u>	<u>Hole Dia.</u>
1034	13	12	10	1	2
1038	11*	13	11*	1	2
1054	13	12	11	1	2
1190	9*	12*	11*	1	2
1316	11*	11*	11*	1	2
1467	8*	11*	10*	1	1
2548	12*	8*	6	1	2
3039	12*	14	11*	1	1

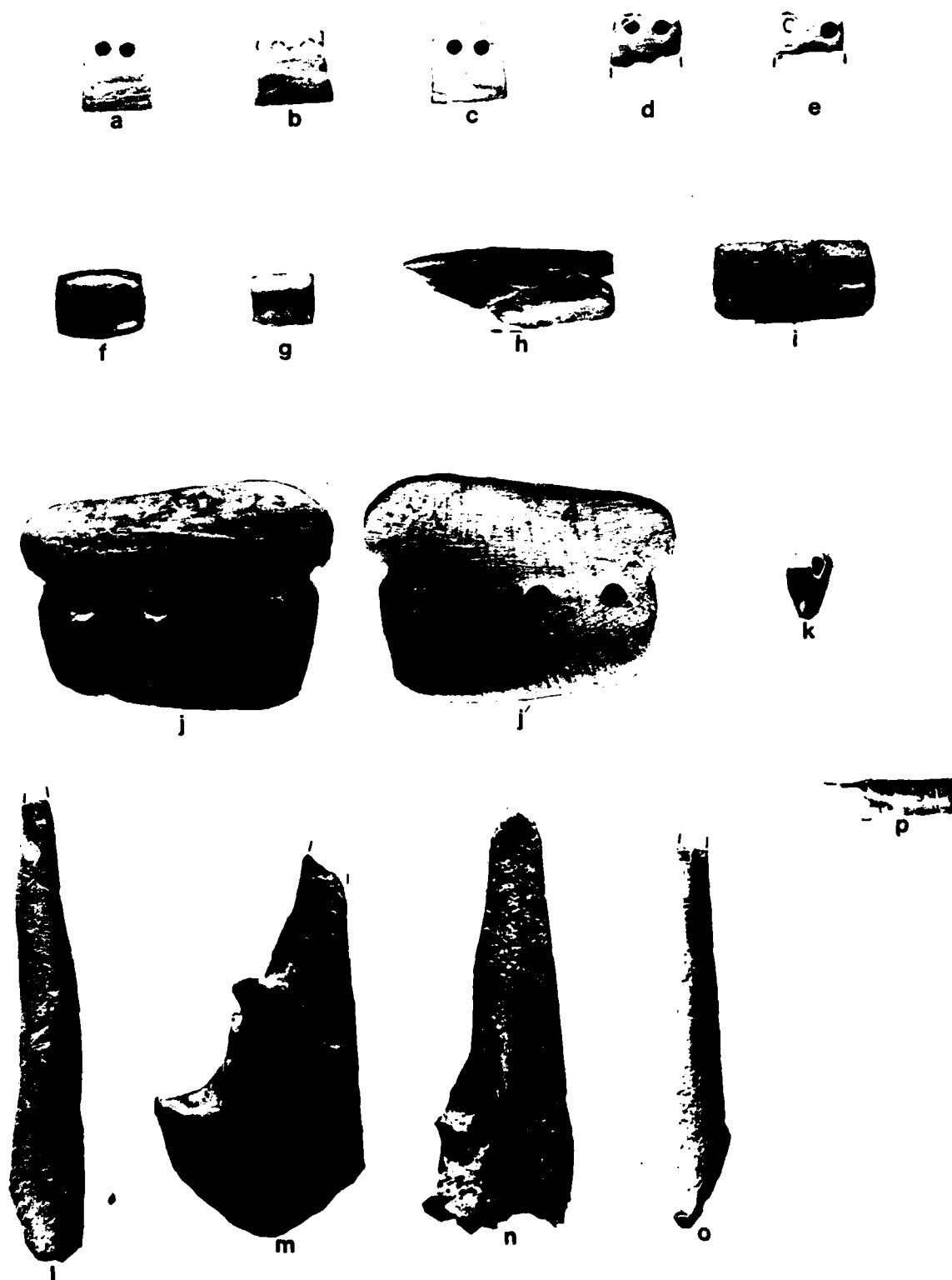
Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
1034	3	N1024/W1000	SW	2	99.8-99.7	Complete, trapezoidal
1038	3	N1024/W1002	SE	2	99.8-99.7	Fragment, trapezoidal
1054	3	N1026/W1002	NW	2	99.8-99.7	Complete, trapezoidal
1190	3	N1026/W1002	SW	2	99.7-99.6	Fragment, trapezoidal
1316	3	N1026/W996	SW	2	99.6-99.5	Fragment
1467	3	N1026/W998	SE	3a	99.5-99.4	Fragment
2548	1	N1002/W1012	NW	1a-c	100.3-100.2	Fragment, rectangular
3139	-	BHR1	-	2	99.8 (est)	Fragment

Figure 46. Artifact photographs; shell and bone artifacts

- a-e. Freshwater shell pendants
- f-i. Conch columella beads
- j. Shell gorget
- k. Perforated marginella shell
- l. Antler flaker
- m-n. Ulna flakers
- o. Bone awl
- p. Bone bead

FIGURE 46



MARINE SHELLS

Beads (4 specimens; Fig. 46f-i)

All four of these specimens are made from the columella section of whelk (or conch) shells. Two complete specimens are short barrel-shaped beads which have been highly polished on the exterior surface. A third fragmentary specimen (broken during excavation) is a longer tubular bead. In each of these, suspension holes are oriented longitudinally through the center and are biconcave; the perforations constrict slightly near the center of the beads and indicate they were drilled from either end. The grain on each of these three specimens spirals to the right; it is probable the columellae were obtained from shells of the pear whelk (Busycon spiratum) commonly found on the Texas coast. The fourth specimen is also tubular. In addition to a longitudinally drilled suspension hole, two canted and offset perforations (one on either side) have been drilled from one exterior face and which intersect the main perforation. The grain on this specimen spirals to the left and indicates it was probably made from the columella of a perverse whelk (B. perversum) or possibly a lightning whelk (B. contrarium).

Dimensions:

<u>Sp.#</u>	<u>Max. L.</u>	<u>Max. Dia.</u>	<u>Lip Thick.</u>	<u>Hole Dia. (lip)</u>
2567	14	12	3	5
2577	10	9	2	4
2588	35*	14*	3*	6*
3145	25	14	5	4

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
2567	1	N998/W1012	SW	1d-g	100.1-100.0	Complete, barrel, burned
2577	1	N998/W1012	NW	1d-g	100.0-99.9	Complete, barrel
2588	1	N1000/W1012	NW	1d-g	100.0-99.9	Fragment, tubular, burned
3145	-	BHR2	-	12	98.4-98.25	Complete, tubular, burned; F-140 fill

Gorget (1 specimen; Fig. 46j)

Description: This small gorget is made from the whorl section of a whelk (or conch) shell; the piece has been too heavily modified to allow species identification. Trapezoidal (almost rectangular) in outline, the lateral edges are gently convex and have been smoothed to an even

roundness. This thin specimen has been smoothed and exhibits three irregularly spaced suspension holes along the latitudinal axis. Each of the holes is biconvex and has been drilled from both faces. The gorget was probably substantially larger in its original form; remnants of an additional suspension hole are visible at either end. Both of these holes are slightly offset upward from the three existing suspension holes. A small crack has developed on one end and extends from a former suspension hole to the nearest of the existing holes. Numerous smoothing striae are visible on both faces of the gorget.

Dimensions:

<u>Sp.#</u>	<u>Max. L.</u>	<u>Max. Dia.</u>	<u>Max. Thick.</u>	<u>Hole Dia.</u>
2494	52	38	3	3

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
2494	-	BHR2	-	4	99.0-98.8	F-99 fill

Perforated Shell (1 specimen; Fig. 46k)

Description: This common Atlantic marginella (*Prunum apicimum*) shell exhibits a small perforation on the shoulder of the body whorl. No other modifications are apparent, and it remains undetermined whether this item was used as an ornament.

Dimensions:

<u>Sp.#</u>	<u>Max. L.</u>	<u>Max. Dia.</u>	<u>Hole Dia.</u>
2506	13	9	3

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
2506	3	N1018/W998	SW	10+11	97.9-97.8	

BONE TOOLS

Antler Flaker (?) (1 specimen; Fig. 46l)

Description: This segment of a deer antler tine may be the remains of either a flaker or an awl. The distal and proximal ends exhibit teeth marks from rodent gnawing; a single additional set of teeth marks are visible on the mid-portion of the tine. Slight polish on the distal end indicates the tine was used as a tool; however, the tip has been removed through rodent gnawing and precludes accurate judgment of its function.

Dimensions:

<u>Sp.#</u>	<u>Max. L.</u>	<u>Dia. Base</u>	<u>Dia. Tip</u>
3	78*	14	6*

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
3	-	BHT #?	-	-	-	Provenience lost by NTSU lab

Ulna Flakers (2 specimens; Fig. 46m-n)

Description: Fashioned from the distal end of deer ulnae, these two spatulate objects may represent either flakers or blunt awls. Both specimens are fragmentary and both have been gnawed upon by rodents. On Specimen No. 1891 the head of the ulna has been trimmed and the shank has been fractured; this latter feature may have occurred accidentally during use of the tool. The head of Specimen No. 2762 was shattered during excavation, but the blunted shank is intact. The articular process appears to have been trimmed from this specimen. Even though they are poorly preserved, both specimens retain evidence of use polish, particularly on the shank portions.

Dimensions:

<u>Sp.#</u>	<u>ML</u>	<u>MW</u>	<u>MT</u>	<u>Shaft L.</u>	<u>Shaft W.</u>	<u>Shaft Thick.</u>
1891	65*	35	11	19*	18*	5*
2762	71*	27*	12*	42	15	4

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
1891	3	N1016/W996	SW	6	99.0-98.9	
2762	5	N1032/W938	SW	1d	99.3-99.2	

Awl (1 specimen; Fig. 46o)

Description: This fragment of a long slender awl appears to have been made from a deer ulna. Both ends of the bone were probably trimmed and the shank used as a tool. The proximal end of the remaining segment certainly appears to have been cut and shaped. The distal end is lacking. Although the bone is poorly preserved, use polish and striations are visible over much of this artifact.

Dimensions:

<u>Sp.#</u>	<u>Max. L.</u>	<u>Max. W.</u>
1142	65*	10

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
1142	3	N1022/W1000	NE	2	99.7-99.6	

BONE ORNAMENT

Bead (1 specimen; Fig. 46p)

Description: This short segment of an unidentified hollow bone appears to represent a manufacturing failure. Both ends exhibit deep grooves encircling the bone in typical fashion for the groove-and-snap manufacturing process. One end snapped cleanly and the sharp edges are smoothed; however, the opposite end snapped erratically and the prehistoric artisan probably tossed this piece aside. A large segment of the bead apparently did not separate from the adjacent piece, and a small segment of the adjacent piece did not separate from this specimen.

Dimensions:

<u>Sp.#</u>	<u>Max. L.</u>	<u>Max Dia.</u>	<u>Hole Dia.</u>	<u>Max. Intended Length</u>
1000	20	6	3	17

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
1000	3	N1020/W1002	SW	2	99.8-99.7	

RECONSTRUCTION OF CULTURAL HISTORY

A massive quantity of information has been condensed and summarized in the preceding sections. In this section, the descriptive information will be recombined in an effort to provide a reconstruction of the cultural history of the Loeve-Fox Site. Each definable phase of aboriginal site use will be described; these descriptions will be presented in reverse geological order from the youngest occupation (Toyah Phase) to the oldest (Round Rock Phase).

The format of the presentation will consist of a listing of the numbers and percentages of features within each recognized phase followed by a similar listing of artifact categories and the numbers of

specimens within those categories. This is followed by a tabulation of comparisons and interpretations of artifact relationships as shown by ratios of percentages. Floor plans showing the spatial relationships of features, artifacts and lithic debris follow those tabulations. Finally, a brief narrative discussion which contains observations and general interpretations concludes the presentation for each phase of occupation.

In the feature and artifact listings, an asterisk (*) indicates feature or artifact types which are unique to or diagnostic of the particular phase in which they are listed. No artifact or distributional data are presented for XU2, XU4 and XU6 since excavations during the current season of work were not carried out in those units.

Toyah Phase (Stratum 1a-1c) (Tables 6, 7 and 8; Fig. 47)

The Toyah Phase occupation is represented by thinly scattered debris and relatively few features in relation to the immediately preceding occupations. This phase is characterized by the presence of Perdiz, Cliffton and Young arrow points, bison bones, and large flat stone hearths; one ceramic sherd also appears to be associated with the Toyah Phase occupation. The patterning of the features and occupational debris is difficult to interpret due to the dispersed nature of the materials and the small sample of features.

No diagnostic materials and no features assignable to this phase were found in XU1 although sparse waste debris was recovered from Stratum 1a-c. The single ceramic sherd described in the previous report and a freshwater shell pendant were recovered from XU1. A single burned clay lens (F-133) was partially exposed in XU2 during the previous investigations; an as yet undescribed bone bead was found near the feature and both appear to be associated with the Toyah Phase. In XU3, a single large flat stone hearth surrounded by thinly scattered bison bone fragments is attributed to this phase. The assignment of the probable pit (F-25) in XU4 to this phase is based on stratigraphy alone since no artifacts were associated. A Perdiz arrow point and a few bison bones were found in XU5, but no feature associations were noted. In XU8, an articulated bison skeleton was found to be associated with Perdiz, Cliffton and Young arrow points and sparse lithic debris. Mandible fragments of two Canis sp. individuals were also found in this unit. The reason for the presence of the bison skeleton is unclear; the bones are well articulated, carnivore disturbance is slight, yet no butchering marks are visible but the cranium (and horn cores) are missing. Further, one arrow point was found with the skeleton and others were found nearby. Clearly, human intervention is present, but there is no conclusive evidence regarding the extent or specific nature of this intervention. The remaining feature associated with the Toyah Phase is a large flat hearth exposed in the walls of a jackhoe trench; this feature and its associations have not been explored further.

Overall, the tone of the Toyah Phase occupation at this site is one of small hunting groups who probably camped at the site for relatively brief periods of time and whose activities were heavily oriented towards hunting. Specifically, the presence of scattered bison bones and a

TABLE 6
FEATURE INVENTORY, TOYAH PHASE

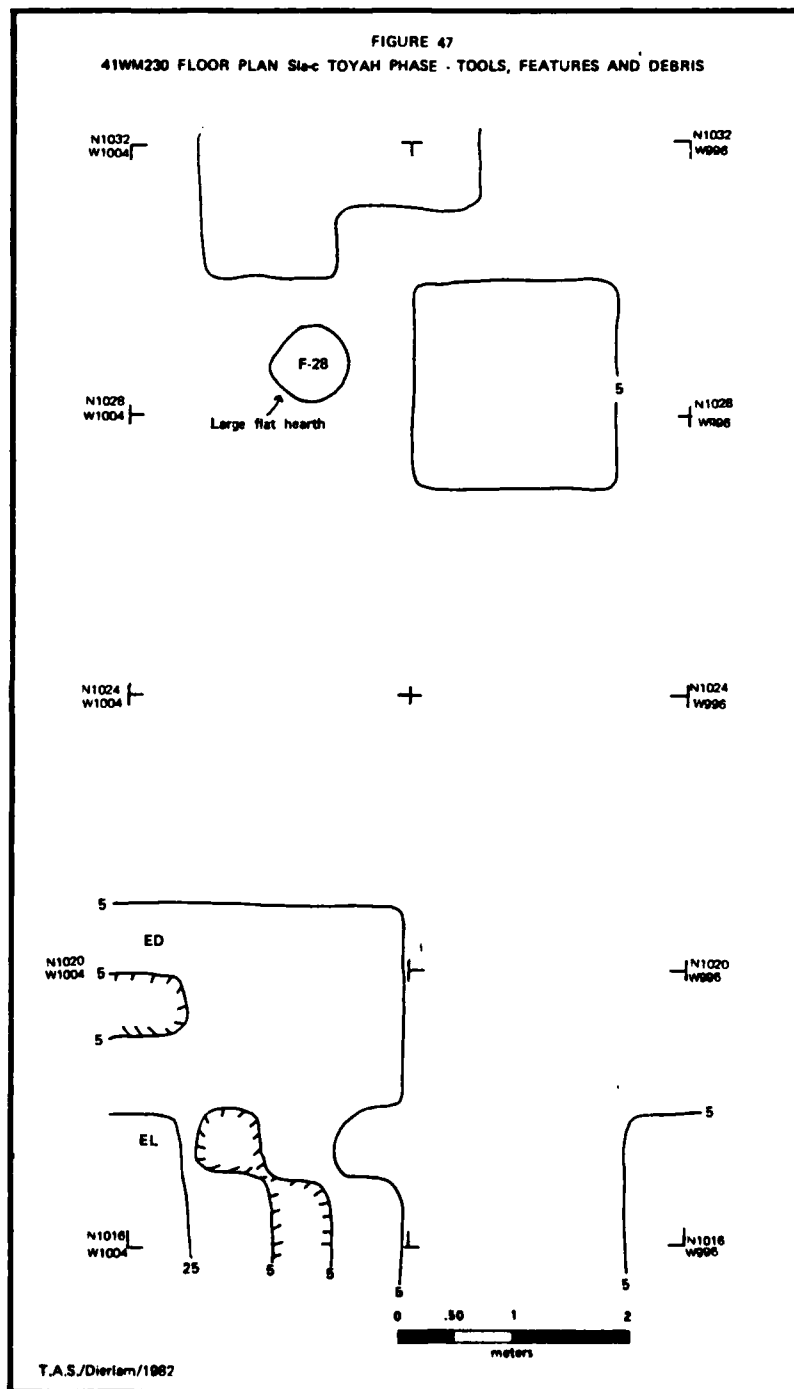
Type	Number	Percentage
*Large flat hearth	2	25.0%
Burned clay/charcoal lens	1	12.5%
*Pit (?)	1	12.5%
*Bison skeleton	1	12.5%
Burned tree root	1	12.5%
Snail shell concentration	1	12.5%
	<u>7</u>	<u>100.0%</u>

TABLE 7
ARTIFACT INVENTORY, TOYAH PHASE

Type	Number
*Young	2
*Cliffton	2
*Perdiz	4
Miscellaneous arrow point fragments	3
Biface fragments, lateral	1
Crushers and fragments	2
Edge-damaged flakes, lateral	5
Edge-damaged flakes, distal	3
Expendable core	1
Core fragments	6
Flint flakes	802
Freshwater shell pendant	1
	<u>832</u>

TABLE 8
COMPARISONS AND INTERPRETATIONS OF ARTIFACT
GROUPINGS, TOYAH PHASE

Comparison	Interpretation
(1) Flakes and cores: 97.2% (N = 809) All other artifacts: 2.8% (N = 23)	High ratio of chipping debris to other artifacts; considerable knapping required to produce desired tools.
(2) Flakes: 99.1% (N = 802) Cores: 0.9% (N = 7)	Disproportionate ratio of cores to flakes; either many flakes produced from each core or initial reduction accomplished off-site and most cores left at chipping station.
(3) Cores: 100% (N = 7) Hammerstones: 0% (N = 0)	Hard-hammer reduction not carried out on-site or not an important part of lithic technology.
(4) Hammerstones: 0% (N = 0) Bone flaking tools: 0% (N = 0)	Soft hammers made of wood, or poor bone preservation.
(5) Projectile points: 50% (N = 11) All other tools: 50% (N = 11)	Importance of projectile points equal to all other tools; hunting an important part of economy.
(6) Bifacial tools: 27.3% (N = 3) Unifacial tools: 72.7% (N = 8)	Tools of convenience used frequently.
(7) Cutting tools: 81.8% (N = 9) Crushing tools: 18.2% (N = 2) Grinding tools: 0% (N = 0)	Cutting tools used more frequently than crushing tools; grinding not important.
(8) All other tools: 95.65% (N = 22) All ornaments: 4.35% (N = 1)	Low ratio of ornaments to tools; possibly poor preservation of ornaments.



bison skeleton lend credence to this interpretation, particularly when the ratio of projectile points to all other tools and the ratio of cutting tools to crushing and grinding tools are considered. The general lack of ceramics, the presence of few ornaments, and the nature of the cooking/heating features further augments this interpretation.

Austin Phase (Stratum 1d-g) (Tables 9, 10, 11; Figs. 48 and 49)

The Austin Phase occupation is amply represented at the site in terms of both features and artifacts. This phase is characterized by the presence of Scallorn and Granbury arrow points, marine shell ornaments, a cemetery, and a variety of cooking/heating features dominated by burned clay/charcoal pits. A series of six radiocarbon dates indicate this phase extended from about 1,250 radiocarbon years B.P. to about 870 years B.P., or a span of roughly 400 years. As with the succeeding Toyah Phase, it is difficult to detect specific patterning in the distribution of the features and debris other than in relation to the cemetery (F-1).

The portions of the cemetery examined are within XU1 and there certainly seems to be a lack of general camping features and debris in the immediate environs of the cemetery. That feature is internally segregated into two distinct major components which consist of a central core of noncremated interments contained within an area of approximately 3 meters in diameter which is surrounded by a band of cremated interments that is approximately 3 meters wide. This dichotomy of placement and treatment of the dead suggests that the circumstances of death may have been a significant factor which contributed to this differential treatment. The interpretation favored here is that those individuals who died some distance away from the main camp may have been cremated as a measure both to facilitate transportation of the remains of the deceased to the place designated for burial and to avoid the unpleasant conditions associated with decomposition of a corpse. Further, the circumstances of death may have set those individuals apart from those who may have died in or near the main camp, and this is reflected in the segregation of the cremated remains from the noncremated remains. The idea that all persons within the group should be buried in the community cemetery was probably a strong impetus for maintaining the integrity of the cemetery boundaries, yet the fact that these individuals died under "different" circumstances and their remains treated differently may have resulted in the interment of the remains in a place adjacent to but separated from the place where persons who died under "normal" circumstances were buried.

There is a further implication that the cemetery was marked since it appears to have been used for the entire span of nearly 400 years during which Austin Phase peoples occupied the site. It is conceivable that a fence encircled the noncremated segment of the cemetery or that these individuals were buried within some sort of shelter and a fence possibly encircled the area designated for the burial of cremated interments. This suggestion of a visible and continuously maintained boundary marker is reinforced by the change in noncremated interment style as described in the previous report. Individual graves were not marked,

TABLE 9
FEATURE INVENTORY, AUSTIN PHASE

Type	Number	Percentage
Large basin hearth	2	11.1%
Medium basin hearth	1	5.5%
Small basin hearth	1	5.5%
Burned clay/charcoal pits	8	44.4%
Burned clay/charcoal lenses	2	11.1%
*Cemetery	1	5.5%
*Charcoal-filled pit	1	5.5%
Burned tree root	1	5.5%
Snail shell concentration	1	5.5%
	<u>18</u>	<u>100.0%</u>

TABLE 10
ARTIFACT INVENTORY, AUSTIN PHASE

Type	Number
*Granbury	2
*Scallorn	7
Miscellaneous arrow point fragments	3
Mahomet	4
Miscellaneous dart point fragment	1
Hare biface	1
Biface fragments, distal	2
Biface fragment, medial	1
Biface fragments, basal	2
*Unifacial <u>Clear Fork</u> gouges	2
Small concave unifaces	2
Scrapers, Group 1	2
Scrapers, Group 2	2
Edge-damaged flakes, lateral	5
Edge-damaged flakes, distal	10
Tested core	1
Partially reduced cores	3
Expended cores	10
Core fragments	8
Flint flakes	3,153
Grinding slabs	2
Hammerstones and fragments	4
Striated hammerstone fragment	1
*Ocher	1
Marine shell beads	3
Ulna flaker	1
	<u>3,237</u>

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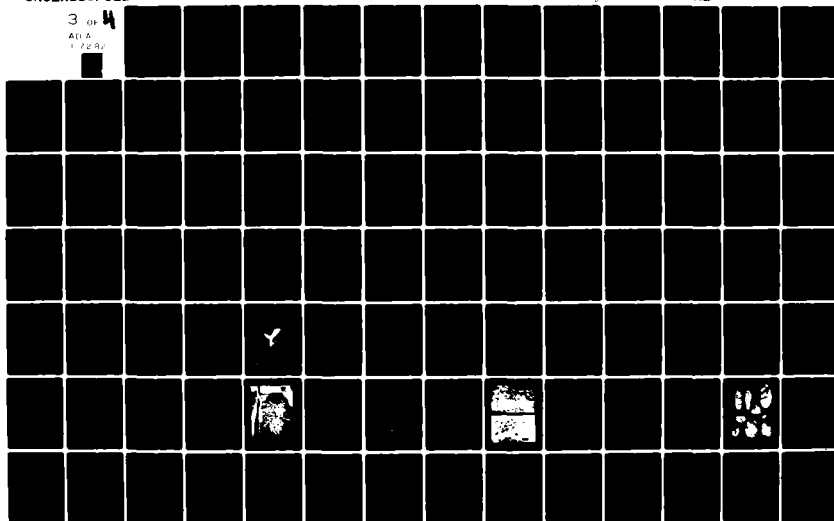
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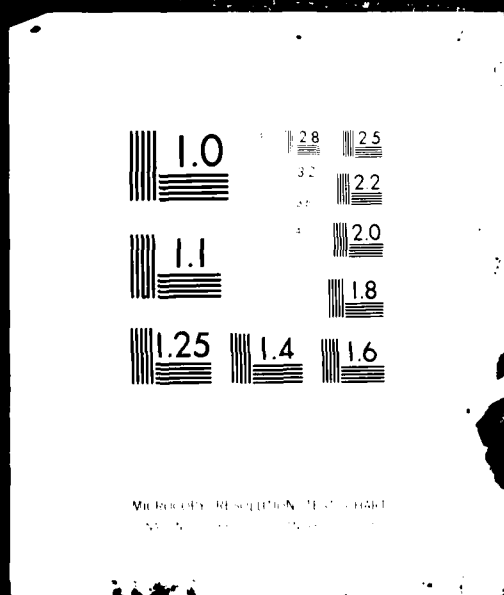


TABLE 11
COMPARISONS AND INTERPRETATIONS OF ARTIFACT
GROUPINGS, AUSTIN PHASE

Comparison	Interpretation
(1) Flakes and cores: 98.1% (N = 3,175) All other artifacts: 1.9% (N = 62)	High ratio of chipping debris to other artifacts; considerable knapping required to produce desired tools.
(2) Flakes: 99.3% (N = 3,153) Cores: 0.7% (N = 22)	Disproportionate ratio of cores to flakes; either many flakes produced from each core, or initial reduction accomplished off-site and most cores left at chipping station.
(3) Cores: 81.5% (N = 22) Hammerstones: 18.5% (N = 5)	Hard-hammer reduction of cores an important part of lithic technology.
(4) Hammerstones: 83.3% (N = 5) Bone flaking tools: 16.7% (N = 1)	Bone tools important in lithic reduction process.
(5) Projectile points: 29.3% (N = 17) All other tools: 70.7% (N = 41)	Projectile points not as important as full range of tools; hunting important but not primary economic pursuit.
(6) Bifacial tools: 30.3% (N = 10) Unifacial tools: 69.7% (N = 23)	Tools of convenience preferred over formal tools although formal tools an important part of assemblage.
(7) Cutting tools: 75% (N = 24) Crushing tools: 3.7% (N = 1) Grinding tools: 7.4% (N = 2)	Cutting tools used more frequently; grinding more important than crushing.
(8) Cutting tools: 75% (N = 24) Scraping tools: 25% (N = 8)	Scraping activities important, but cutting tools used more frequently.

Table 11, continued

Comparison	Interpretation
(9) All tools: 95.1% (N = 58) All ornaments: 4.9% (N = 3)	Poor preservation of ornaments or unimportant in comparison to economic pursuits.
(10) Bone ornaments: 0% (N = 0) Freshwater shell ornaments: 0% (N = 0) Marine shell ornaments: 100% (N = 3) Stone ornaments: 0% (N = 0)	Marine shell ornaments preferred; implies high value and trade network to obtain exotic items.

but the mode of interment was altered in such a way that continued burials were possible while the integrity of the boundary was not breached. No direct evidence of the postulated fences or shelter was found which would support this assumption; however, the character and placement of the human remains certainly seem to support this interpretation.

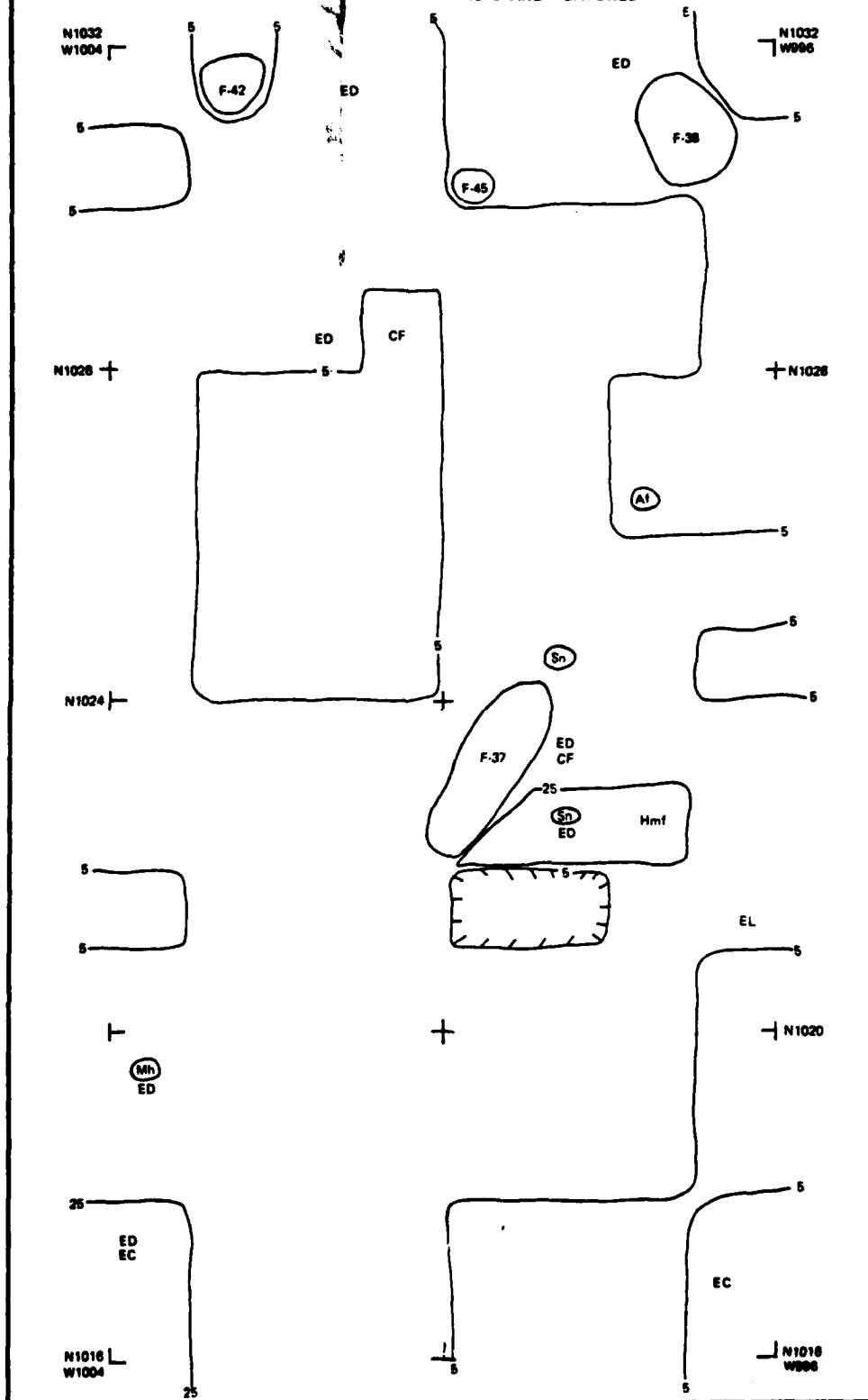
The apparent inclusion of grave goods with several interments negates the statement to the contrary made in the previous report. While the direct association of a conch shell pendant and a freshwater mussel shell is fairly clear, the association of three conch columella beads and two antler tine segments are more tenuous. Even though direct associations of the latter five items cannot be documented, the implication is that these artifacts were intentionally placed with the remains of the deceased. It is quite possible that these items were placed on top of the graves rather than being placed in the grave with the body (or ashes in the case of the cremations).

This generalized association of grave goods, particularly the exotic marine shell ornaments, also modified to some extent the statements regarding possible differential status which were made in the previous report. While it may be true that the presence of grave goods does identify individuals who may have been set apart during life, the variety and number of objects suggests more of a tendency toward a generalized practice rather than a restrictive practice. Greater numbers of individuals may have been afforded recognition for various capabilities and there was probably less of a status differential than was implied in the previous interpretation.

The assumptions regarding group identity and human aggression which were stated in the previous report remain unchanged. There is little question that those persons who were buried in the cemetery lived during the time span encompassed by the current definition of the Austin Phase. There is no indication of intervention from or contact with peoples of the preceding or succeeding phases. This supports the interpretation that the human aggression aspect of the cemetery data represents internecine warfare among the contemporaneous groups which are recognized

FIGURE 48

XU3 Sld-2, AUSTIN PHASE FLOOR PLAN
DISTRIBUTION OF ARTIFACTS AND FEATURES



archeologically as composing the Austin Phase. It is quite possible that extended family units or bands maintained sharply delineated exploitive ranges and the aggressive acts resulted from real or imagined transgressions of established territorial rights. This further implies two additional aspects: (1) the exploitive strategy practiced by these peoples was such that the overall capacity of the resource base was becoming rather strained, and (2) the population density was at such a level that competition for limited resources erupted into acts of violence.

The cemetery population which has been exhumed includes 27 noncremated individuals and 10 cremations which probably represent at least 13 individuals. If it is accepted that only 25 percent of the cremations were documented, then the total number of individuals cremated is approximately 52. The total approximate cemetery population, then, is 79. If it is further assumed that one group occupied the site continuously for the 400-year span indicated by the radiocarbon dates, then there was an average of one death every five years. However, the density of general camping features and debris over the remainder of the site does not appear to be sufficient to represent continuous occupation for that length of time. Rather, it appears that the site was occupied on an intermittent basis and in all likelihood did not exceed roughly 100 years of actual occupancy. This, however, yields an average of approximately one death every 1.25 years which seems somewhat high in terms of what might be expected in a hunting and gathering group.

The logical alternative to explain the death rate may be that certain sites were designated as cemeteries by each band or extended family group, and individuals who died away from that site were transported to the appropriate site for burial. This interpretation is supported by the differential treatment of individuals as discussed above and in turn provides an explanation of why there was any differential treatment at all.

This interpretation has significant ramifications in terms of identifying the size of areas which may have been exploited by specific groups during the Austin Phase. If each group buried its dead only at one location, then those sites should be surrounded by other sites of the same time period but which lack burials. The current data on cemetery site distributions (see Prewitt 1974:51-67) suggests that this may indeed be the case, although it is tenuous at best to place a great deal of emphasis on this interpretation until it can be examined in detail. Any future investigations in Austin Phase sites should certainly be conducted with this in mind, and evidence to refute or to support this hypothesis should be actively sought.

The previous investigations in XU2 yielded a medium basin hearth and three burned clay/charcoal pits which are assignable to the Austin Phase although no diagnostic artifacts were noted. In XU3, this phase is represented by three burned clay/charcoal pits and one burned clay/charcoal lens. The distributions of the features and debris in each of these units do not reveal any distinct patterning which might be helpful in interpreting the structure of the camp at that time, although there

is a hint of a general clustering of these features both in XU2 and XU3. However, in XU5 there is a definite clustering of three features and associated debris which includes three Scallorn and two Granbury arrow points, a grinding slab fragment, hammerstones, crushers, several scraping and cutting tools, and an ulna flaker. The features include a large basin hearth, a small basin hearth and a burned clay/charcoal pit (Fig. 49). It is unfortunate that the small size of XU5 precludes adequate examination of the extent of the feature and artifact distributions.

Two of the features are of additional significance; both the large basin hearth (F-61) and the burned clay/charcoal pit (F-20) were found to exhibit digging stick impressions which were preserved in intensively burned rings around the perimeter of each feature. In F-61 there are two distinct levels which exhibit the marks; an upper series near the top of the hearth and a lower series which alternates with the spacing of the upper series. No impressions are preserved in the floor of the hearth. It appears that the pit for this hearth was dug in distinct increments with a sharp instrument with a bit approximately 2 to 3 centimeters wide. No bone tools of this nature have been found, and none of the stone tools exhibit the type of wear which would be expected from this type of use; this leads to the assumption that the instrument was made of wood and probably consisted of what is commonly referred to as a digging stick. The significance of these features not only lies with the ability to determine the manner in which the pits were constructed, but in the documentation of the fact that such tools were indeed part of the range of items used during this phase in Central Texas. There has always been an implicit assumption that they were used, but the documentation of these impressions provides the direct evidence for their use in the absence of the preservation of the tools themselves.

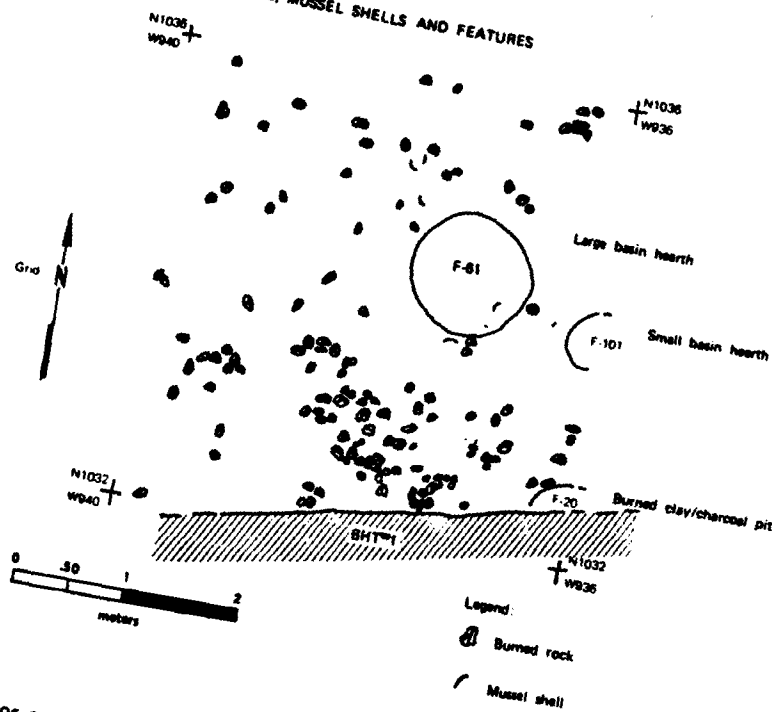
The remainder of the features assignable to the Austin Phase were exposed in backhoe trenches, and the significance of their distributions remains undetermined in the absence of additional detailed investigations.

In contrast to the Toyah Phase occupations previously described, the general tenor of the Austin Phase materials suggests the presence of hunting and gathering peoples with an emphasis on the gathering although the quantity of projectile points suggests that hunting was an important pursuit. The quantities and variety of both the features and the artifacts indicate fairly intensive use of the site during the Austin Phase. However, as was indicated in the discussion of the cemetery, the intensity of occupation is not such that there is any reason to believe that the usage was continuous for the full extent of the 400 years this phase spanned at this site. Rather, it appears that the occupation was intermittent and the actual time the Austin Phase peoples lived on the site is probably restricted, and may possibly have been as much as 100 years as was suggested on the basis of the cemetery data.

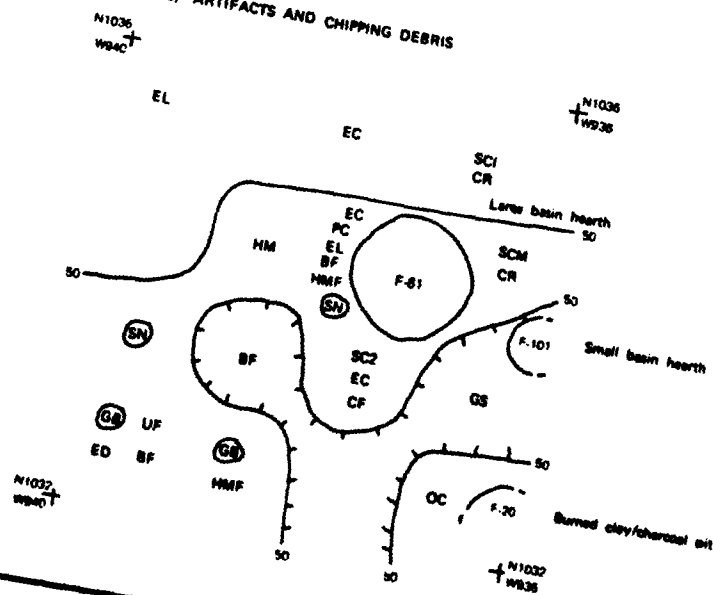
The range of activities which were carried out at the site includes the use of grinding stones which were not present in the succeeding

FIGURE 49
XUS SLD FLOOR PLAN
AUSTIN PHASE

DISTRIBUTION OF BURNED ROCKS, MUSSEL SHELLS AND FEATURES



DISTRIBUTION OF FEATURES, ARTIFACTS AND CHIPPING DEBRIS



T.A.S./Dorlan/1982

Toyah Phase. Substantial lithic reduction was carried out on-site during this phase, but there is a disproportionate ratio of flakes to cores which suggests that initial reduction was done off-site in many instances. The ratio of cutting to scraping tools seems to indicate a balance of activities which is quite compatible with the ratio of all tools to projectile points; both hunting tools and scraping tools form about 25 percent of the groupings and support the implications of an emphasis upon gathering, although hunting was a significant part of the subsistence pursuits.

A final facet of the Austin Phase occupations which should be noted is the presence of marine shell artifacts. A total of six items has been recovered in direct or indirect association with the cemetery; these include three columella beads, one triangular whorl pendant, one decorated whorl pendant fragment, and one whorl shoulder groove-and-snap manufacturing debris fragment. All of these pieces are made of conch shell (Busycon sp.). The quantity of marine artifacts suggests contact in some manner with a supply from the coast. Whether this contact was in the form of direct procurement through far-ranging travel by the individual groups of people or whether these represent goods which were obtained through the mechanism of a widespread trade network is conjectural at this point. The latter interpretation is favored here. There is no question that Austin Phase peoples extended their range of exploitation to the central Gulf Coast of Texas, but it cannot be demonstrated whether the sites on the coast represent use by the same specific groups or whether they represent different groups who used the same types of tools and practiced the same archeologically recognized pattern of adaptation and were, in a general sense, related in terms of an extraregional cultural unit.

Driftwood Phase (Stratum 2) (Tables 12, 13 and 14; Figs. 50 and 51)

There is practically an equal quantity of features present in the Driftwood Phase as in the succeeding Austin Phase; however, the quantity of artifacts and debris is about 2.6 times as great as the later occupation. The Driftwood Phase is characterized by the presence of Mahomet dart points, Hare bifaces, freshwater shell ornaments, and a limited range of features dominated by burned clay/charcoal pits and small basin hearths. As with the succeeding Austin and Toyah phases, the patterns of feature and artifact distributions are difficult to interpret; however, there does seem to be at least the bare inklings of patterning to the distributions.

A fairly substantial quantity of artifacts and debris attributed to this phase was recovered from XU1. Due to the placement of the cemetery in the following Austin Phase, the Driftwood Phase materials in this unit are disrupted to the extent that it is felt to be unwise to hazard guesses regarding the possible significance of the distributions of the materials. That camping activities occurred in XU1 is demonstrated by the quantity of tools and debris and the disrupted hearths which were noted. Although only three Mahomet dart points were recovered from Stratum 2 in XU1, additional specimens were removed from mixed contexts during the excavations of the cemetery; although these latter items were

included in the tabulations for the Austin Phase, this is felt to be somewhat misleading in that there is no question that the activities relating to the cemetery resulted in the disruption of the Driftwood deposits and portions of the artifacts therein were removed from primary context.

Substantial quantities of materials attributable to the Driftwood Phase were also found in XU2 during the previous investigations. In addition to various artifacts, two small basin hearths and a burned clay/charcoal pit are associated with this phase in the XU2 deposits. At the present time, no comments regarding the probable patterning of artifacts and features related to this phase will be offered for this unit.

In XU3, however, there appear to be some indications of patterning in the Driftwood Phase materials. One small basin hearth (F-44) and one burned clay/charcoal pit (F-122) appear to be paired, and there is a distinct peak in the density of flakes and tools adjacent to these features. This is the only set of paired features for this phase in XU3, and it seems significant that five Mahomet dart points are distributed very closely around these two features. It appears that a considerable amount of activity was concentrated around the small basin hearth in particular. Three of the remaining four burned clay/charcoal pits in this unit possibly have slight concentrations of chipping debris associated with them; F-50 and F-138 each have a noticeable increase in flake density just to the west while F-48 has a slight increase to the northwest and there is a noticeable paucity of debris near F-72. There is another concentration of chipping debris in the N1026 to N1028 area centered on the W1004 gridline; no features were noted near this concentration, but it seems likely that a feature (or features) exists just outside the western side of the excavation unit. It seems significant that four of five freshwater shell pendants were recovered in the area extending from this concentration southeastward toward F-48. When combined with a generally low density of tools in this area, the ornaments suggest that this was possibly the location of a domiciliary

TABLE 12
FEATURE INVENTORY, DRIFTWOOD PHASE

Type	Number	Percentage
Medium basin hearths	2	11.8%
Small basin hearths	4	23.5%
Disrupted hearths	2	11.8%
Burned clay/charcoal pits	6	35.3%
Burned clay/charcoal lens	1	5.9%
Burned tree roots	2	11.8%
	<u>17</u>	<u>100.0%</u>

TABLE 13
ARTIFACT INVENTORY, DRIFTWOOD PHASE

Type	Number
*Mahomet	12
Miscellaneous dart point fragments	9
Erath biface	1
*Hare bifaces	5
San Gabriel bifaces	5
San Gabriel biface preforms	2
Miscellaneous biface, Group 3	1
Biface fragments, distal	5
Biface fragments, medial	3
Biface fragment, basal	1
*Core chopper	1
Crusher and fragments	8
Small concave uniface	3
Graver	3
Edge-damaged flakes, lateral	22
Edge-damaged flakes, distal	46
Serrated flake	1
Tested core	5
Partially reduced core	6
Expended core	12
Core fragments	30
Flint flakes	8,214
*Smoothed-edge flake	1
Polished chert flakes	2
Handstones	2
Grinding slabs	2
Hammerstones	2
Striated hammerstone	1
*Burnished stone	1
Freshwater shell pendants	6
Bone awl	1
Bone bead	1
	<u>8,419</u>

TABLE 14
COMPARISONS AND INTERPRETATIONS OF ARTIFACT
GROUPINGS, DRIFTWOOD PHASE

Comparison	Interpretation
(1) Flakes and cores: 98.2% (N = 8,267) All other artifacts: 1.8% (N = 152)	High ratio of chipping debris to other artifacts; considerable knapping required to produce desired tools.
(2) Flakes: 99.4% (N = 8,214) Cores: 0.6% (N = 53)	Disproportionate ratio of cores to flakes; either many flakes produced from each core or initial reduction accomplished off-site and most cores left at chipping station.
(3) Cores: 94.6% (N = 53) Hammerstones: 5.4% (N = 3)	Hard-hammer reduction of cores not important to lithic technology, or few hammerstones discarded on-site but most discarded at chipping station.
(4) Hammerstones: 100% (N = 3) Bone flaking tools: 0% (N = 0)	Bone tools not important in production of lithic tools; soft hammers probably made of wood.
(5) Projectile points: 14.5% (N = 21) All other tools: 85.5% (N = 124)	Projectile points not as important as full range of tools; hunting important but not primary economic pursuit.
(6) Bifacial tools: 25.9% (N = 28) Unifacial tools: 74.1% (N = 80)	Tools of convenience preferred over formal tools although formal tools an important part of assemblage.
(7) Cutting tools: 71.4% (N = 30) Crushing tools: 19.1% (N = 8) Grinding tools: 9.5% (N = 4)	Cutting tools used more frequently; crushing more important than grinding.

Table 14, continued

Comparison	Interpretation
(8) Cutting tools: 29.7% (N = 30) Scraping tools: 70.3% (N = 7.)	Cutting activities important, but scraping tools more important and used more frequently.
(9) All tools: 95.4% (N = 145) All ornaments: 4.6% (N = 7)	Low ratio of ornaments to tools; possibly poor preservation of ornaments or ornaments unimportant in comparison to economic pursuits.

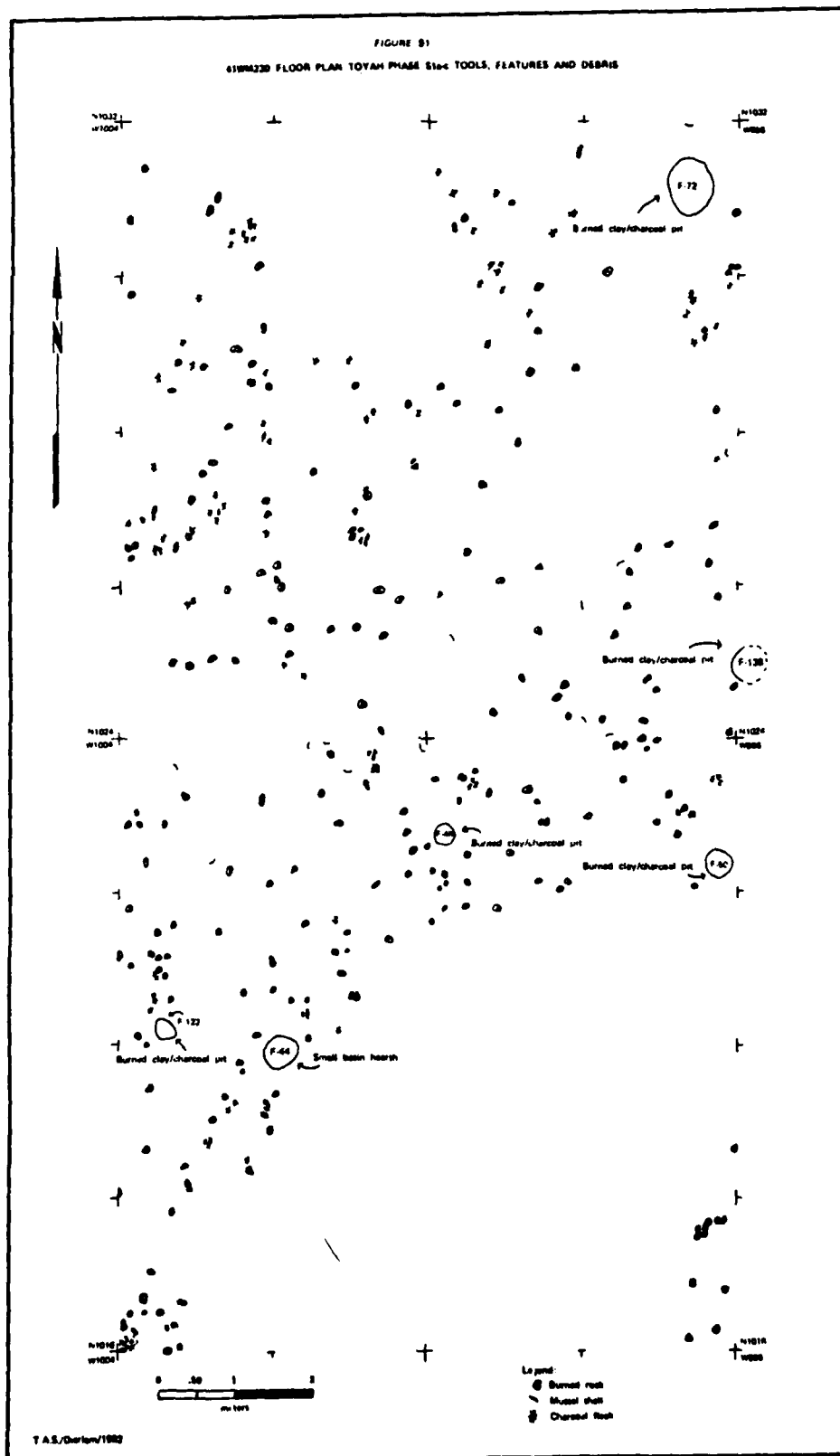
structure. Although no physical structural evidence to support this interpretation exists, it is intriguing that several burned mud dauber nests were recovered from this same area. There is a noticeable decrease in the density of features, artifacts and debris to the north in XU3; while some of this may be attributed to sampling error, it appears more likely that this reflects the edge of the main camping area adjacent to the gully which transects that portion of the site.

The excavations in XU5 barely reached the Driftwood Phase deposits, and no feature or artifact patterning can be detected in that unit. Deposits relating to this phase were not penetrated in the other units at the site, although it is suggested that they do indeed exist.

As with the succeeding Austin Phase, the materials documented in the Driftwood Phase exhibit a general tendency toward a hunting and gathering culture with an emphasis on the gathering. The importance of hunting is demonstrated in the quantity of projectile points which are included in the materials, but the overall range of artifacts indicates that this was not the primary economic pursuit. There is a similar ratio of bifaces to unifaces as was noted in the Austin Phase and indicates that tools of convenience were preferred over, or used more frequently than, formal tools. While cutting tools represent a significant element as in the Austin Phase, it may be significant to note that crushing activities apparently were greater than the grinding activities. This apparent difference in probable food processing techniques may indicate a significant variation in the overall emphasis of the gathering aspect of the adaptation during this phase of occupation.

While it is difficult to hazard population estimates and relative intensity of occupation, it seems likely that during the Driftwood Phase the site was occupied by small groups (possibly extended family units or small bands) on an intermittent basis during the entire 200-year span this phase is thought to have been in existence. It does not seem likely that the occupation was continuous during this time span, and in the

[illegible]



absence of quantifiable cemetery data such as is present in the succeeding Austin Phase, it is felt best not to indulge in guessing games regarding the precise size of the group population.

One other aspect, though, merits attention for the Driftwood Phase occupation; there is a distinct lack of marine shell ornaments and other exotic items. This is in direct contrast to the Austin Phase which follows this occupation and the Twin Sisters Phase which immediately precedes it. While a preference for ornamentation is scant evidence to go on, this lack of exotic items is felt to be significant and may contribute to an eventual explanation of the presence of Mahomet type projectile points in portions of east Central Texas. The absence of marine shells or other imported materials indicates the lack of an established trade network through which these items could be procured. Alternatively, the peoples who manufactured and used Mahomet points did not extend their range of occupation to include the coastal environment. The known distribution of Mahomet points supports the concept that these peoples were restricted from coastal areas. In reality, a combination of both these reasons may explain this facet of the Driftwood occupations. If it is assumed that definable artifact assemblages, in this case dominated by Mahomet dart points, represent real groupings of people in the sense that they represent a series of related bands or other groups who are genetically and/or linguistically related and who practice a reasonably comparable subsistence/exploitation pattern, then it can be expected that these assemblages reflect the area over which these peoples ranged during specific time periods.

In this case, the Mahomet points and associated artifacts such as Hare bifaces are apparently restricted to east Central Texas and do not extend to the Texas Gulf Coast or into western Central Texas. The group, as an inclusive unit, then did not include the coastal environment within the normal range of their activities. If it is further assumed that this group represents an intrusive population (Mahomet dart points do not appear to be morphologically derived from the preceding Ensor points associated with the Twin Sisters Phase), then there may have been territorial restrictions which precluded their access to marine resources, and there may have been no friendly (e.g., trade) intercourse between these peoples and the groups who occupied and controlled the coastal regions. While it may be argued that these are speculative assumptions, there is a lack of trade goods during a brief period (roughly 200 years) which is bracketed by occupations which do exhibit evidence of widespread trade networks or direct contact with coastal resources. However, even if these reasonings are somewhat speculative, the explanations of why there is an absence of certain types of items during a restricted time period are at least plausible and can be subjected to detailed scrutiny during future investigations and comparative examinations of existing data.

Twin Sisters Phase (Strata 3 and 4) (Tables 15, 16 and 17)

The Twin Sisters Phase by far represents the most intensive usage yet encountered at this site; nearly half the features, artifacts and

debris are assignable to occupations during this phase. Nine radiocarbon assays indicate that this phase is restricted to about a 350-year time span which lasted from 1,800 to 1,450 radiocarbon years Before Present. This is somewhat longer than the 200-year span indicated for the Driftwood Phase, but is still shorter than the 400 years encompassed by the Austin Phase (the full extent of the Austin Phase is 600 years, but only 400 years have been documented at this site). The Twin Sisters Phase occupations are characterized by the presence of Ensor dart points, Erath and San Gabriel bifaces, chert crushers, exotic artifacts which include a boatstone, a stone gorget, and a marine shell gorget, arcuate hearth features, and a variety of other features which are dominated by small basin hearths and burned clay/charcoal pits. Materials assignable to this phase are contained within two superimposed strata, S3 and S4; at least three, and possibly four, episodes of site use are identifiable within these strata. The oldest occupation is in S4, the next is in S3b, and the final two occupations are in S3a.

Portions of the excavations in XU1 have penetrated into the upper part of the Twin Sisters Phase occupations as is evidenced by the artifacts recovered in that unit. However, no features were encountered and the small size of the area examined in that unit precludes any meaningful consideration of the patterning. It is important to note that a medium basin hearth assigned to this phase was encountered in BHT19 just to the south of XU1; this indicates strong potential for the existence of similar concentrations of features and debris as was noted in XU2 and XU3.

Several features were noted in the previous excavations in XU2; these include two large basin hearths, a medium basin hearth, an arcuate hearth, two disrupted hearths, a burned clay/charcoal pit, and a mussel

TABLE 15
FEATURE INVENTORY, TWIN SISTERS PHASE

Type	Number	Percentage
Large basin hearths	7	11.7%
Medium basin hearths	8	13.3%
Small basin hearths	18	30.0%
*Arcuate hearths	7	11.7%
Disrupted hearths	3	5.0%
Burned clay/charcoal pits	11	18.3%
Burned clay/charcoal lens	1	1.7%
*Mussel shell concentration	1	1.7%
Burned tree root	1	1.7%
Snail shell concentrations	3	5.0%
	60	100.0%

TABLE 16
ARTIFACT INVENTORY, TWIN SISTERS PHASE

Type	Number
Miscellaneous arrow point fragment	1
*Ensor	12
Mahomet	2
Miscellaneous dart point	1
Miscellaneous dart point fragments	17
*Bifacial Clear Fork gouge	1
*Erath bifaces	2
Hare Bifaces	3
*San Gabriel bifaces	13
*San Gabriel biface preforms	6
Miscellaneous biface, Group 3	1
Miscellaneous bifaces, Group 4	4
Biface fragments, distal	22
Biface fragments, medial	2
Biface fragments, lateral	17
Biface fragments, basal	4
*Perforator	1
*Crushers and fragments	33
*Large concave unifaces	4
Small concave unifaces	3
Gravers	3
Scrapers, Group 1	7
Scrapers, Group 2	2
Edge-damaged flakes, lateral	15
Edge-damaged flakes, distal	17
Serrated flake	1
Tested cores	2
Partially reduced cores	6
Expended cores	28
Core fragments	44
Flint flakes	20,561
*Boatstone	1
*Stone gorget	1
Polished chert flake	1
Handstones	5
Grinding slabs	6
Hammerstones and fragments	14
*Striated stones	2
Freshwater shell pendant	1
*Marine shell gorget	1
	<u>20,867</u>

TABLE 17
COMPARISONS AND INTERPRETATIONS OF ARTIFACT
GROUPINGS, TWIN SISTERS PHASE

Comparison	Interpretation
(1) Flakes and cores: 98.9% (N = 20,641) All other artifacts: 1.1% (N = 226)	Extremely high ratio of chipping debris to other artifacts; considerable knapping required to produce desired tool.
(2) Flakes: 99.6% (N = 20,561) Cores: 0.4% (N = 80)	Disproportionate ratio of cores to flakes; either many flakes produced from each core or initial reduction accomplished off-site and most cores left at chipping station.
(3) Cores: 85.1% (N = 80) Hammerstones: 14.9% (N = 14)	Hard-hammer reduction an important part of lithic technology.
(4) Hammerstones: 100% (N = 14) Bone flaking tools: 0% (N = 0)	Hard-hammer reduction an important part of lithic technology.
(5) Projectile points: 14.8% (N = 33) All other tools: 85.2% (N = 190)	Projectile points not as important as full range of tools; hunting important, but not primary economic pursuit.
(6) Bifacial tools: 59.4% (N = 76) Unifacial tools: 40.6% (N = 52)	Formal tools preferred and used more frequently than tools of convenience.
(7) Cutting tools: 62.7% (N = 74) Crushing tools: 28% (N = 33) Grinding tools: 9.3% (N = 11)	Cutting tools used more frequently; crushing more important than grinding.
(8) Cutting tools: 60.2% (N = 74) Scraping tools: 39.8% (N = 49)	Cutting activities more frequent than scraping activities.

Table 17, continued

Comparison	Interpretation
(9) All tools: 98.4% (N = 190) All ornaments: 1.6% (N = 3)	Low ratio of ornaments to tools; possibly poor preservation of ornaments, or ornaments unimportant in comparison to economic pursuits.
(10) Bone ornaments: 0% (N = 0) Freshwater shell ornaments: 33.3% (N = 1) Marine shell ornaments: 33.3% (N = 1) Stone ornaments: 33.3% (N = 1)	Bone ornaments poorly preserved or not important; other ornaments equal in importance; marine shell implies existence of trade network.

shell concentration. The hints of patterning of these features and the associated artifacts seem to support the observations made in XU3; however, the extent of the excavations in XU2 are too limited at this point to allow meaningful interpretations and comparisons.

In contrast, the quantity of features and debris encountered in XU3 provides some of the most tantalizing and provocative suggestions of patterning yet encountered within the central reaches of the San Gabriel River valley. As noted above, at least three, and possibly four, distinct episodes of use are isolatable for the Twin Sisters Phase in XU3. These episodes will be presented in reverse geological order (youngest to oldest) in the following discussion.

Stratum 3a is a complex maze of features with associated tools and chipping debris (Figs. 52, 53 and 54). The focal points in terms of features are a medium basin hearth (F-2) and the unexcavated F-29 which is probably a medium or large basin hearth. There are relatively few tools and debris in the immediate vicinity of these two features although the previous excavations by Clarence Loeve have obscured these distribution patterns. These two features, however, are surrounded by a series of three small basin hearths, two burned clay/charcoal pits and four arcuate hearths which are contained in a band approximately 5 to 6 meters in width. A substantial quantity of artifacts and debris coincides with the distribution of these apparent specialized cooking features. Starting at about 2 to 3 meters beyond this arrangement of cooking features, there is an alignment of four small basin hearths and a disrupted hearth which are associated with a lessening in the quantity of artifacts and debris. To the north beyond this alignment, there is a sharp decrease in the quantities of debris except in a narrow corridor which leads to an isolated burned clay/charcoal pit.

N1032
W1004+



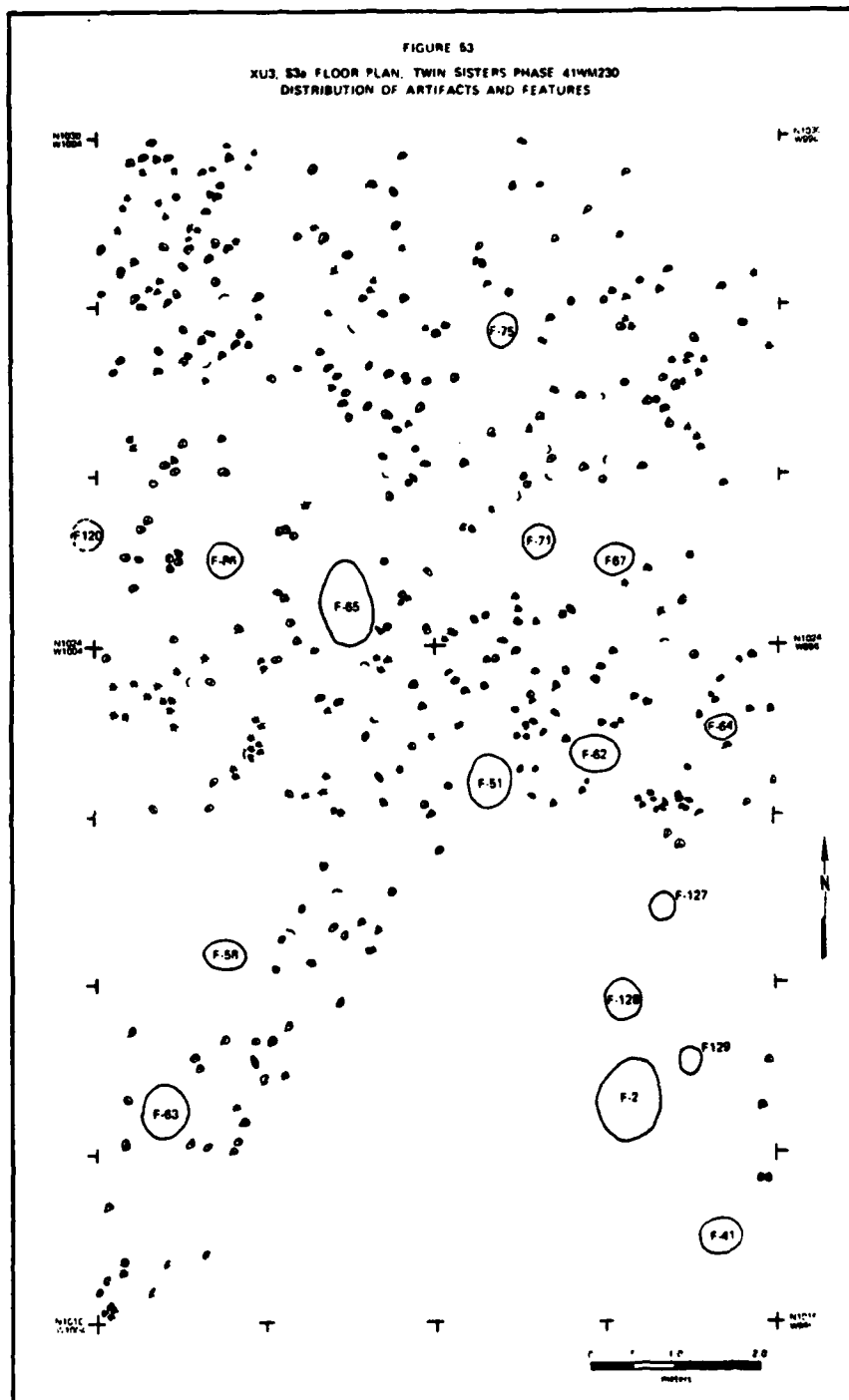
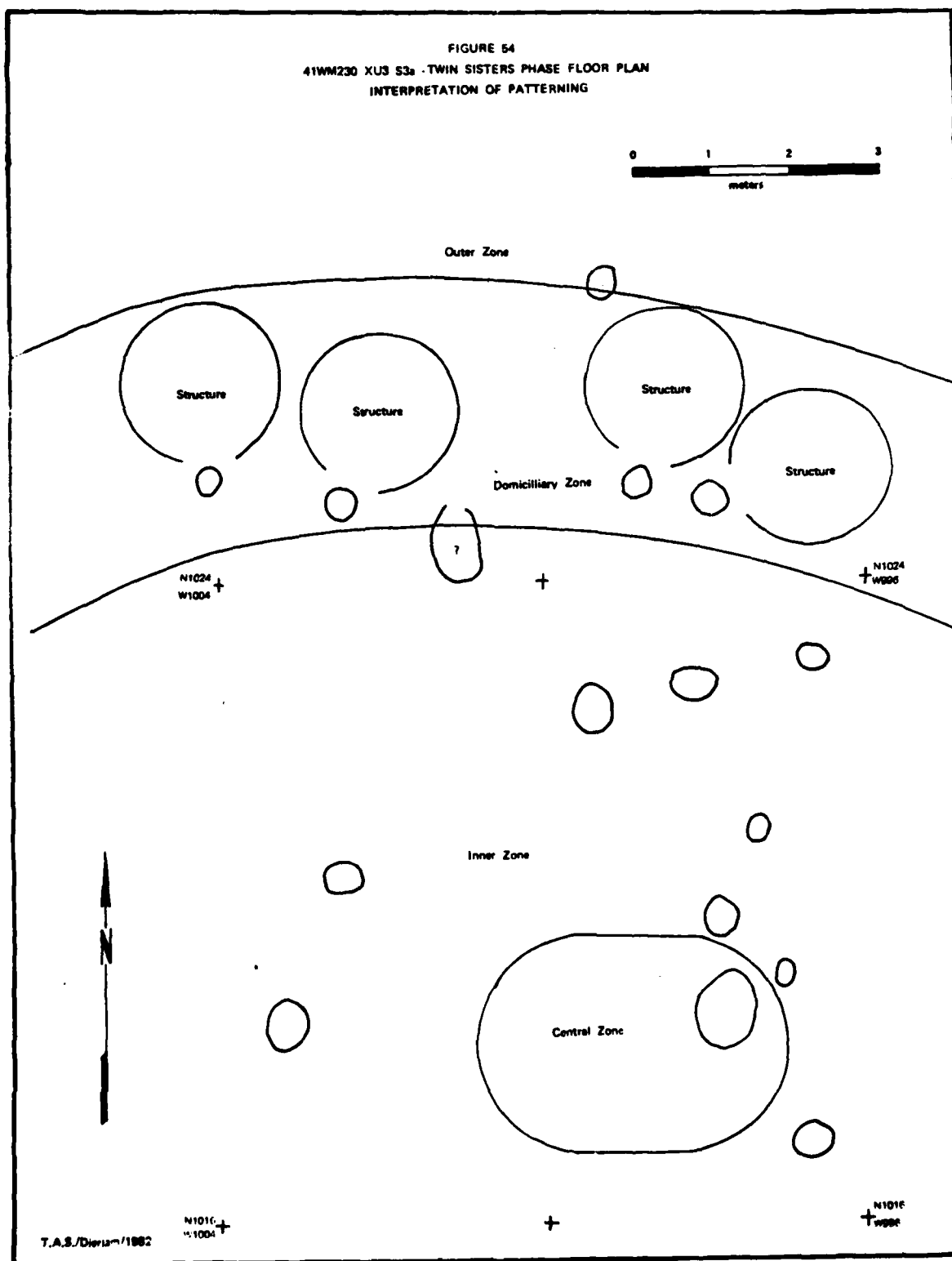


FIGURE 54
41WM230 XUS S3a TWIN SISTERS PHASE FLOOR PLAN
INTERPRETATION OF PATTERNING



The disrupted hearth (F-65), two partially disrupted arcuate hearths (F-62 and F-63), the presence of two major central hearths (F-2 and F-29), and the general density of the features suggests that it is quite likely that two episodes of occupation are included on the floor plan as shown in Figure 53.

The distribution of the features and artifacts is interpreted as consisting of a central hearth which is surrounded by a series of specialized cooking features restricted to an area about 6 meters wide and which in turn is surrounded by a series of small hearths that probably were associated with domiciliary structures even though no physical evidence of such structures remain. For lack of a better term, the small basin hearths which form the outer perimeter are viewed as "warming hearths" which could have been placed either within, or, more likely, just outside the entrance to a structure. Four "zones," then, are recognized within this patterning.

The "central" zone consists of a medium to large stone-lined fire hearth which serves as a focal point and which is used to produce live coals for use in the other cooking/heating features. The surrounding "inner" zone is an area of intensive and varied activities; that cooking is one of the primary tasks accomplished in the "inner" zone is shown by the variety (3) and numbers (9) of specialized cooking features contained within the zone. The quantities of lithic debris present suggest that tool manufacturing was also an important activity in this area of high traffic. Various artifacts suggest that crushing, grinding, cutting and scraping activities were also concentrated in this "inner" zone which probably served as the location of a majority of the daily maintenance, processing, cooking and eating activities which are normally associated with primitive camps. The third zone is referred to as the "domiciliary" zone and consists of the area where shelters were constructed; ostensibly these were constructed of brush, but there is some physical evidence to indicate the type of construction which may have been used. The existence of these structures is indicated by the presence of "warming hearths" and a sharp decrease in the quantities of discarded tools and debris. The fourth zone is referred to as the "outer" zone and consists of the area beyond the "domiciliary" zone. That more limited activities were carried out in the "outer" zone is shown by the presence of only one burned clay/charcoal pit (F-75) and scattered tools and debris.

There is an interesting aspect to one microcosm of this pattern which may illustrate the probable accuracy of the interpretations offered here. A "warming hearth" (F-71) is located in the edge of a relatively dense lithic concentration (200 flakes per 1 square meter); however, the lithics partially surround a distinct area in which the lithics are lacking. This latter area probably represents the location of a structure with which F-71 was associated; F-75, then, is located just beyond the structure in the edge of the "outer" zone.

If this pattern recognition is anywhere near accurate, then the obvious interpretation is that these materials represent the debris left by a small extended family group. Each of the "warming hearths" and

presumed associated structures represents a nuclear family unit who are in turn arranged about a central locus which served as the focal point of the activities of an extended family group.

In Stratum 3b of XU3 the patterning of features and debris is almost identical to that which was just described (Figs. 55, 56 and 57). A large basin hearth (F-30) represents the "central" zone while four specialized cooking features (F-63, an arcuate hearth, and F-69, F-73 and F-121, which are all burned clay/charcoal pits) occupy the "inner" zone. Two small basin hearths (F-68 and F-119) occupy the "domiciliary" zone while there are no features in the "outer" zone. Indeed, this substratum appears to represent a single occupation by one extended family unit.

It is indeed unfortunate that excavations in the underlying Stratum 4 were so restricted that the full extent of the patterning was not obtained (Figs. 58, 59 and 60). However, the portions exposed contain a large basin hearth (F-31) in the "central" zone and four specialized cooking features which include two small basin hearths (F-46 and F-136) in the "inner" zone. "Warming hearths" are probably located just outside the limits of the excavations and should reflect the patterning noted in Stratum 3.

Twin Sisters Phase deposits were not penetrated in XU5, but limited excavations in XU7 revealed a cluster of features assignable to this phase. An insufficient area was exposed for any determination of patterning, but it appears that some cooking/heating activities were carried out adjacent to a small creek channel. The significance of these features and their location has not been determined.

The remaining area where materials relating to the Twin Sisters Phase have been examined in detail is in BHR2 (Fig. 61). While controlled hand excavations are lacking, all features noted during the machine-removal of fill in this ramp were recorded; there is a definite possibility of sampling error in terms of whether all features were noted. However, constant monitoring of the machine excavations assures reasonable detection of the features. Three features assignable to Stratum 3 were documented in this ramp; these include one each large, medium and small basin hearths. Six features assignable to Stratum 4 were encountered and consist of two each of the same three sizes of basin hearths. No burned clay/charcoal pits and no small "warming hearths" were noted. Further, a series of intentionally placed artifacts were recovered from one of the large basin hearths (F-99) and include two Ensor dart points, the conch shell gorget, the stone gorget, an Erath biface, a crusher, a graver, a hammerstone fragment, and a substantial quantity of waste flakes. All of these items are unburned and appear to have been placed within the hearth following its last use. In addition, another Erath biface may have been associated with the F-100 medium basin hearth.

The implications are that these features represent activities other than those noted in XU2 and XU3 in the sense that these features are not indicators of the location for the same types of camping activities. Rather, the placement of tools and curated items within one the hearths

FIGURE 56

XU3, S3b, FLOOR PLAN, TWIN SISTERS PHASE

Distribution of burned rock, mussel shells and charcoal

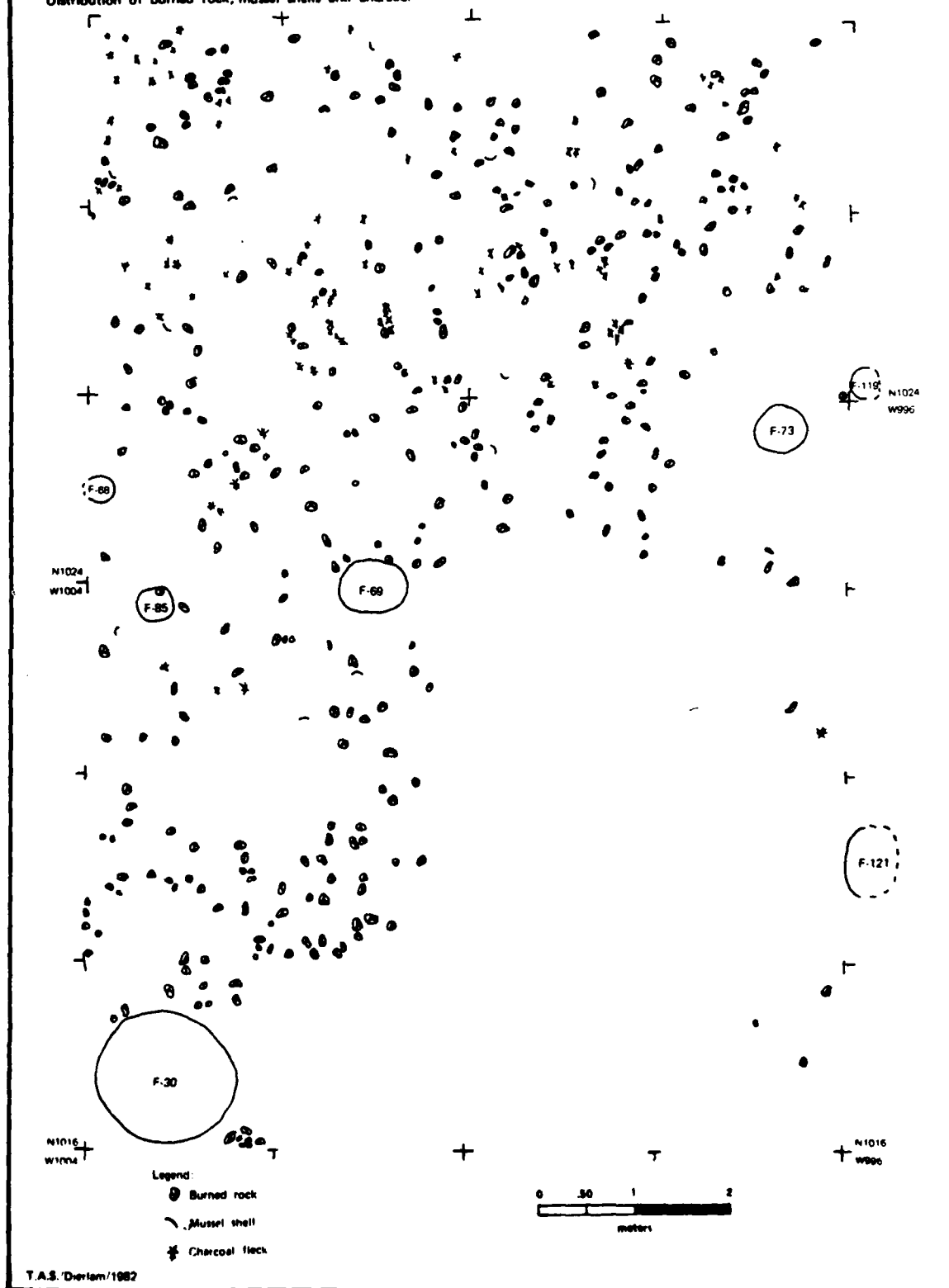


FIGURE 57

XU3, S3b FLOOR PLAN, TWIN SISTERS PHASE
41WM230

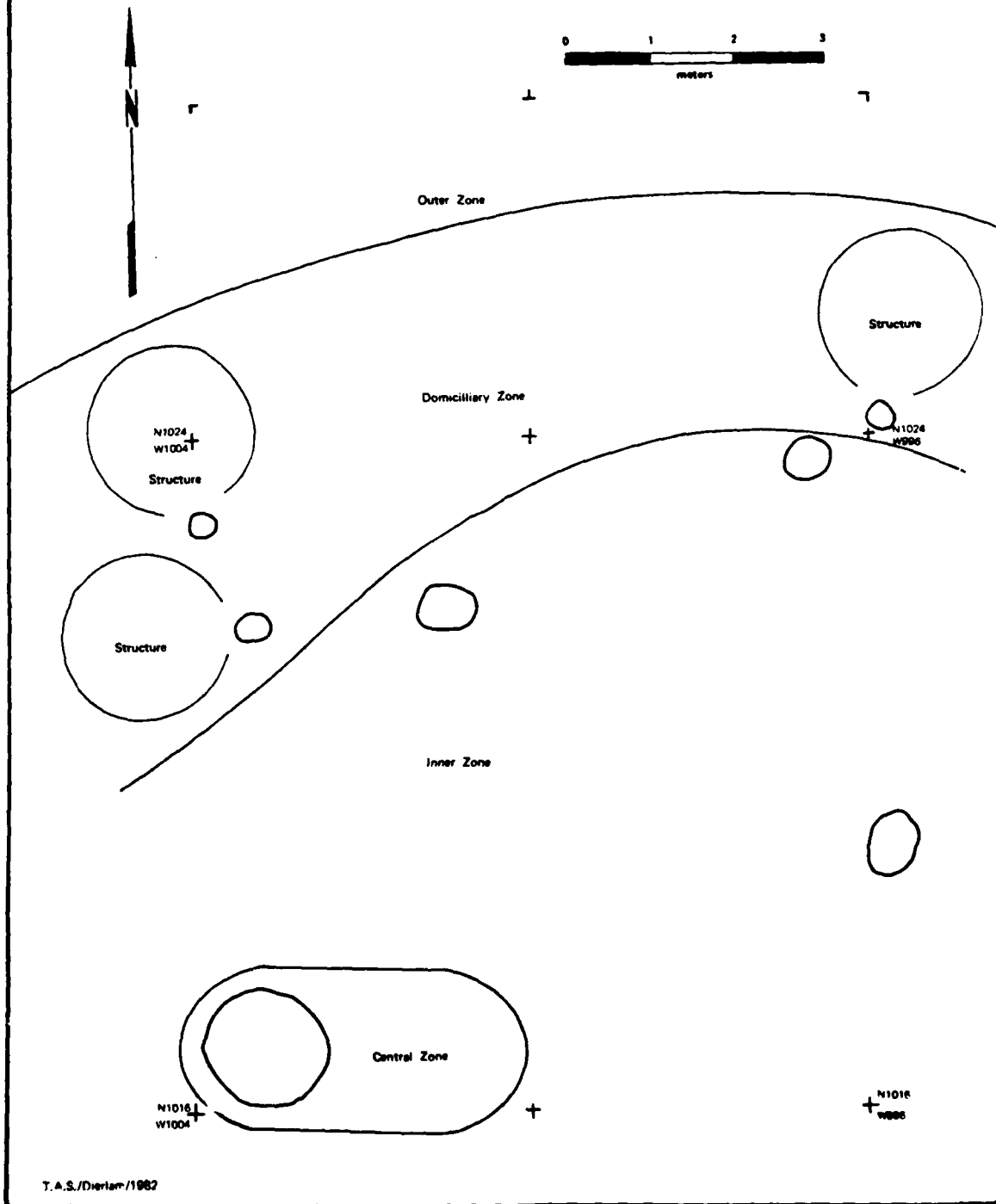


FIGURE 58
XU3, S4 FLOOR PLAN,
TWIN SISTERS PHASE

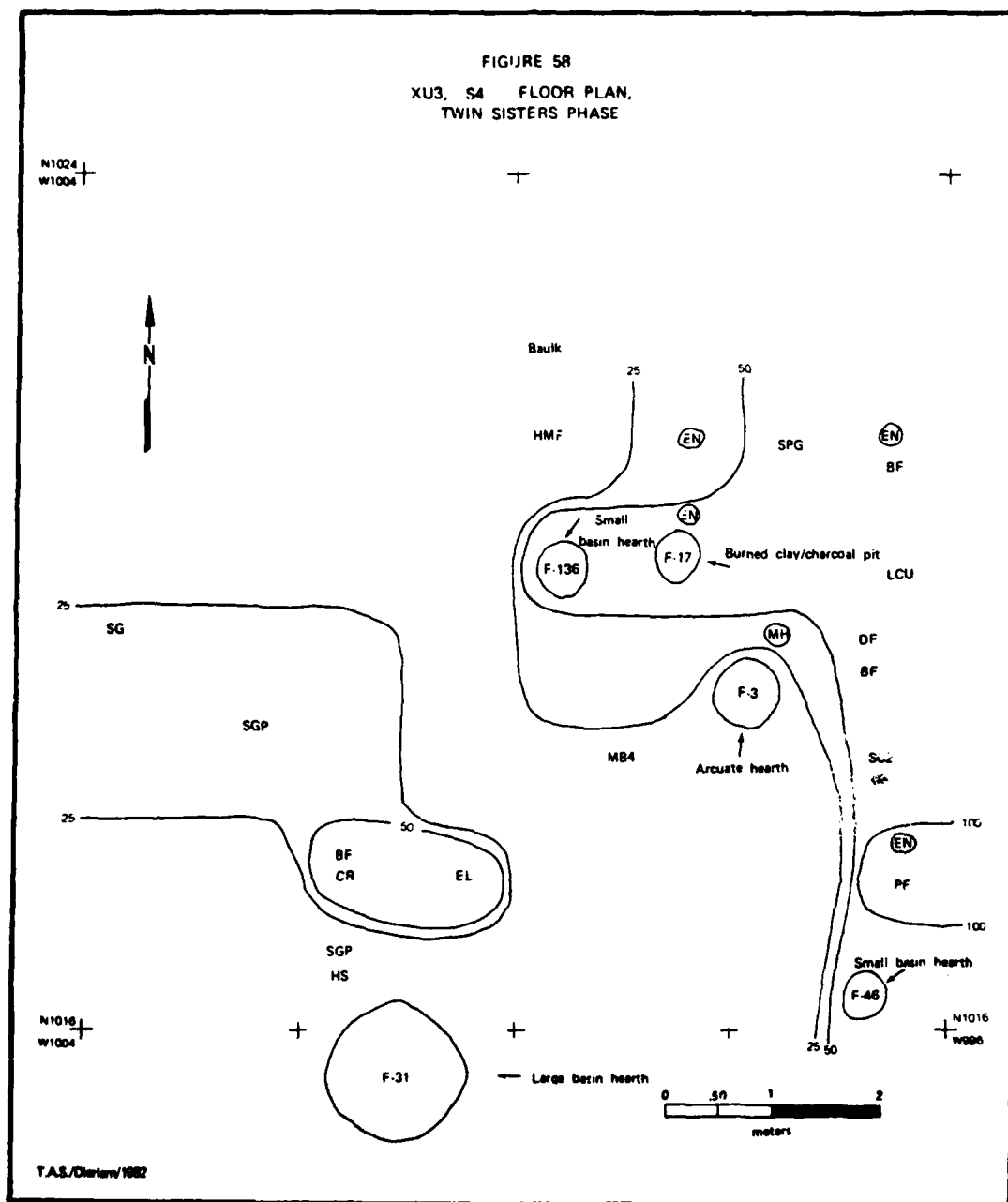


FIGURE 59
XU3, S4 FLOOR PLAN, TWIN SISTERS PHASE
DISTRIBUTION OF ARTIFACTS AND FEATURES

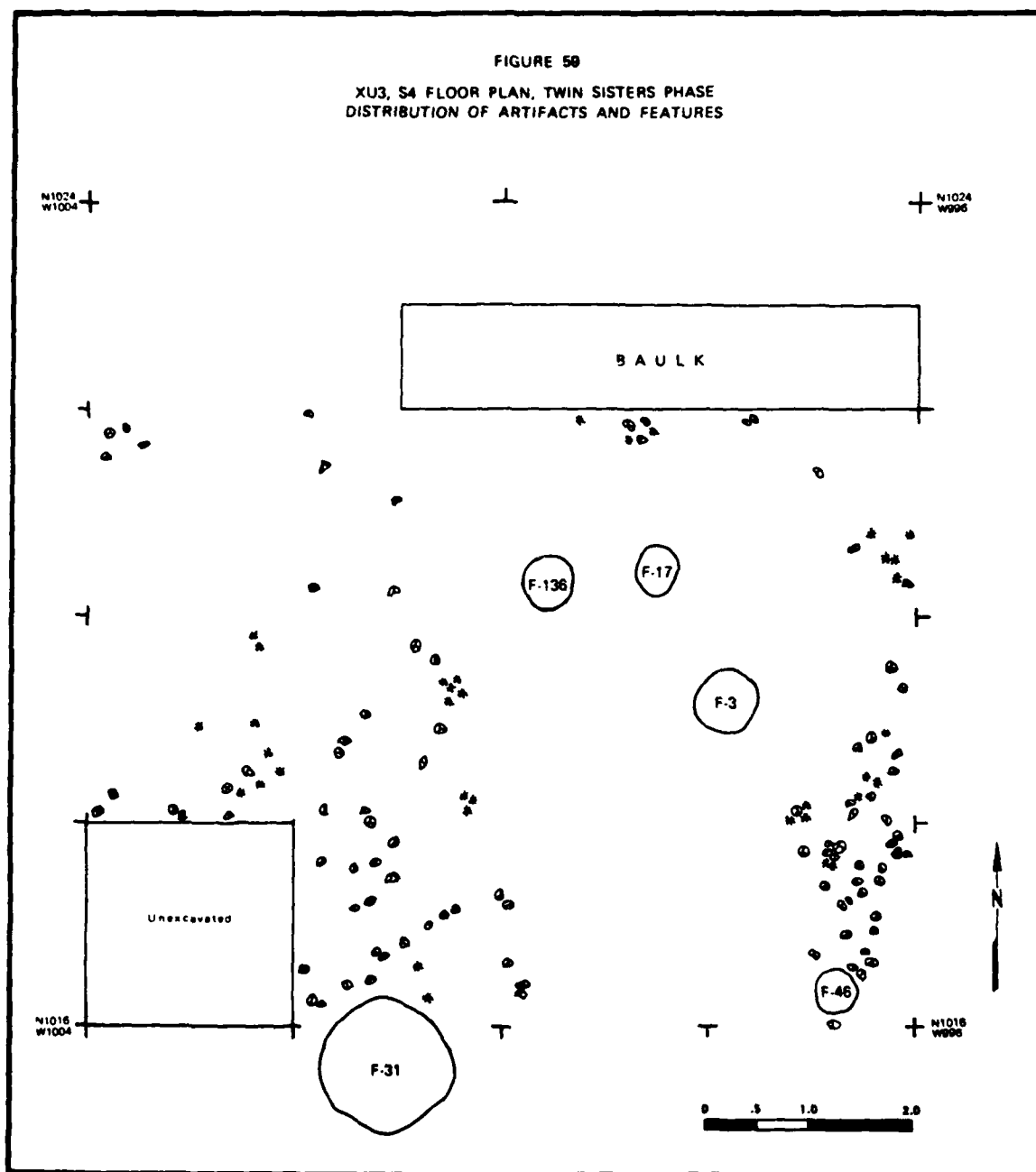


FIGURE 60

XU3 S-4 FLOOR PLAN INTERPRETATIONS
TWIN SISTERS PHASE

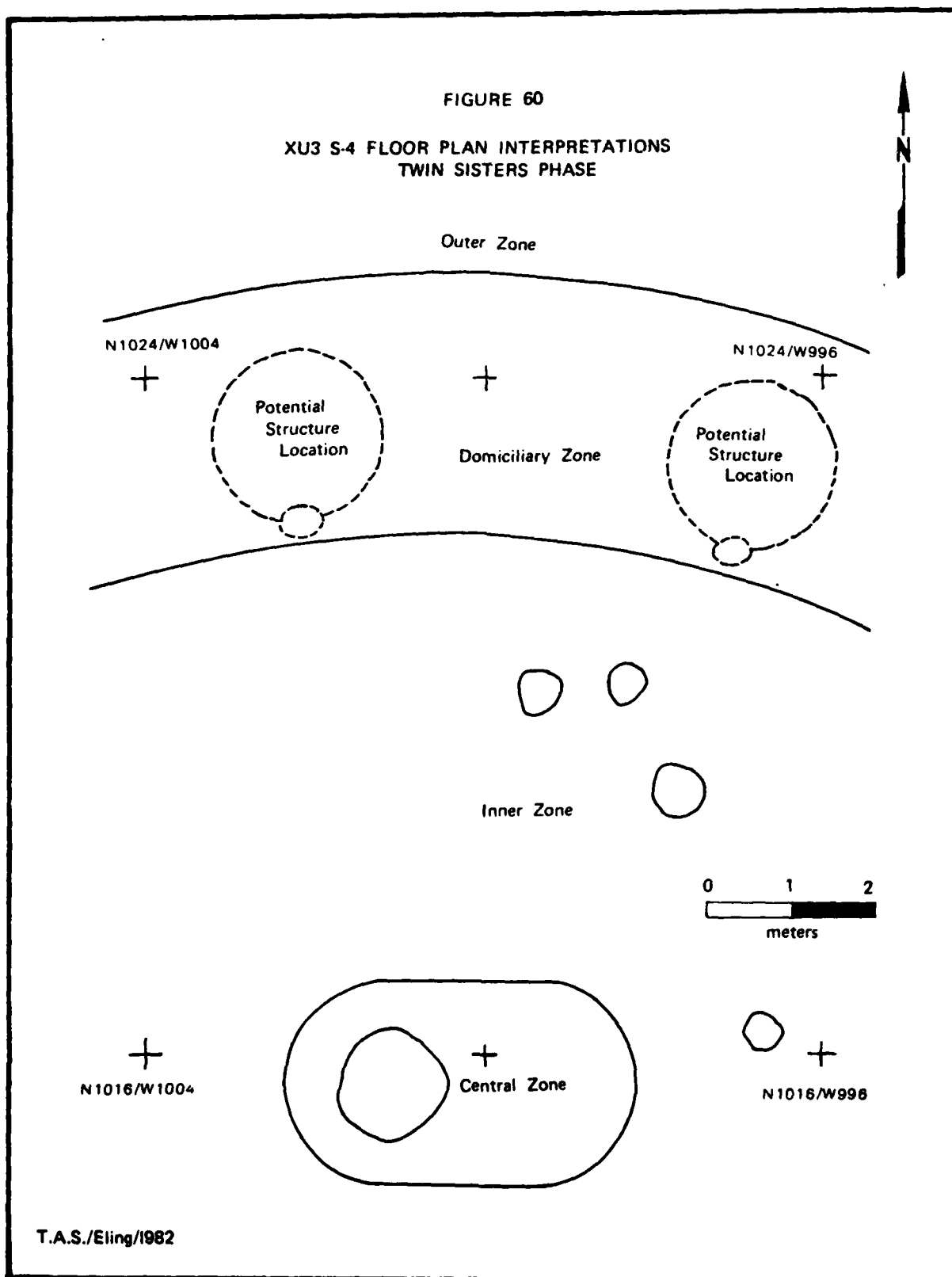
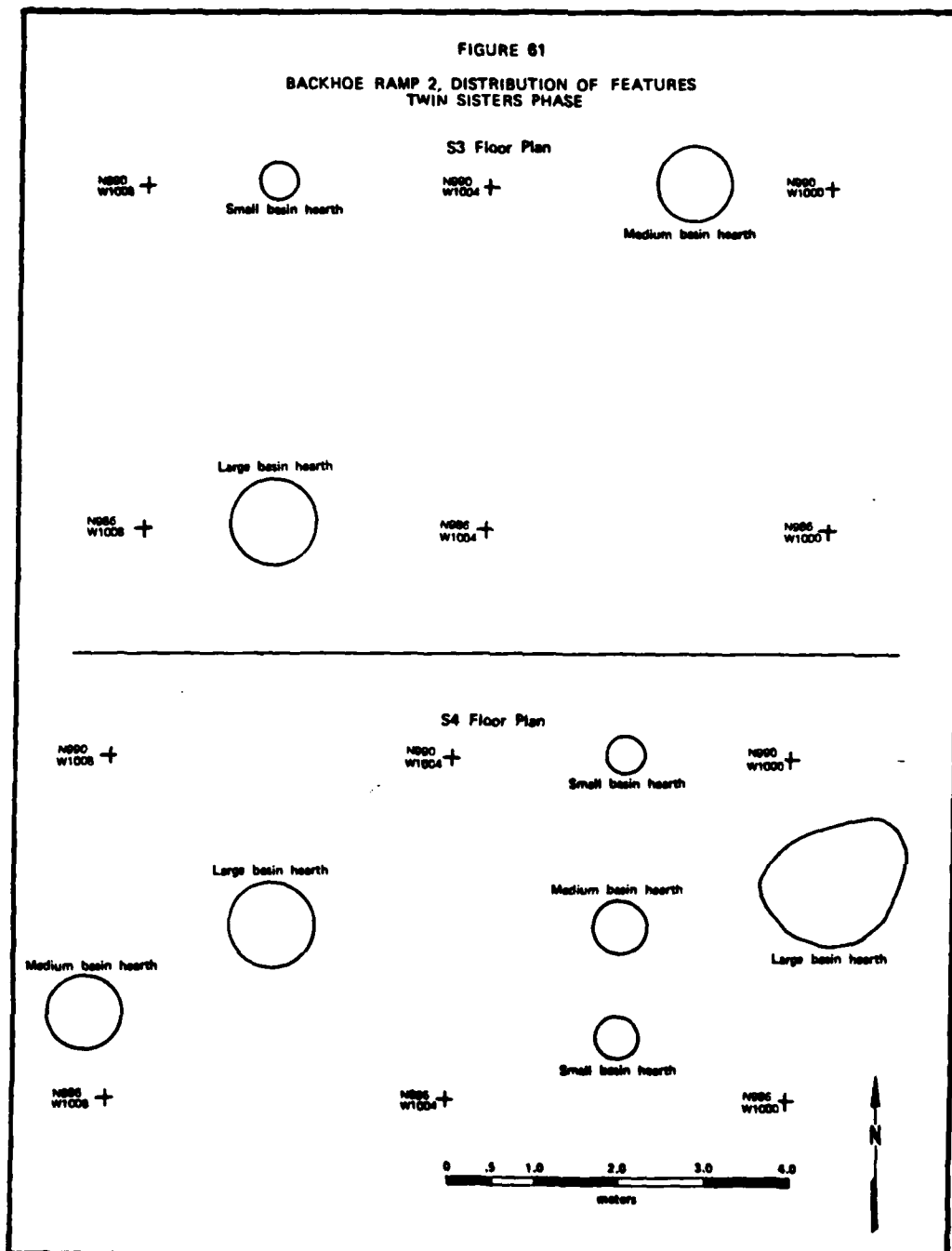


FIGURE 61
BACKHOE RAMP 2, DISTRIBUTION OF FEATURES
TWIN SISTERS PHASE



suggests something on the order of a special use area where activities relating to the entire camp were carried out. In the absence of controlled hand excavations, it is difficult to assess the specific functions of these features; however, it appears they represent an area which is central to the entire camp during the Twin Sisters Phase occupations. There is a distinct separation of the location of these features in relation to the proposed groupings indicated for XU2 and XU3, and for those presumed to exist near XU1. The overall relationship of the features is shown in Figure 62.

The interpretation favored here is that the feature cluster in BHR2 represents a larger-scale version of the zonation proposed for those in XU3. That is, this area is the "central precinct" for the entire camp during this phase, and an "inner precinct" is presumed to surround it; in turn, this is surrounded by a "domiciliary precinct" which consists of those feature relationships discussed in detail in XU3. What emerges then is a "pattern within a pattern" in which the arrangement noted in XU3 reflects an extended family unit which is part of a larger group which itself is arranged in the same spatial order but on a larger scale.

The general pattern of the camp arrangement is a common one which occurs in primitive societies on a worldwide basis (for example, see Fraser 1968). Similar patterns are documented for various Plains Indian groups such as the Cheyenne (Lowie 1963:93, Fig. 29) and the Omaha (Fletcher and La Flesche 1972:141, Fig. 20). While specific forms vary, the general order consists of a circular or semicircular arrangement of family or kin units about a common (or open) area in which activities important to the entire group were conducted.

If this general pattern recognition is accepted, there are additional implications regarding the frequency of occupation of the site during this phase. In XU3, it is postulated that three separate episodes of use are present in Stratum 3 and a single episode in Stratum 4; however, if one set of features in BHR2 (one each large, medium and small basin hearths) represents an episode of use, then only one episode is recognized in Stratum 3 and two are recognized in Stratum 4. This indicates that there are additional sets of features located outside the limits of the present excavations which correspond to the episodes in Stratum 3 and, conversely, that there is at least one other episode which corresponds with the additional set of features in Stratum 4 located in BHR2.

Using these two units as a base, there are at least five episodes of use at the site during the Twin Sisters Phase. It has been previously noted that this phase extends over a 350-year time span, so it appears that the site was occupied an average of once each 70 years. On the basis of the present evidence, it is not possible to determine the duration of each separate occupation. Substantial additional work at this and other sites in the vicinity would be required to begin searching for evidence of seasonality or long-term occupations at specific localities.

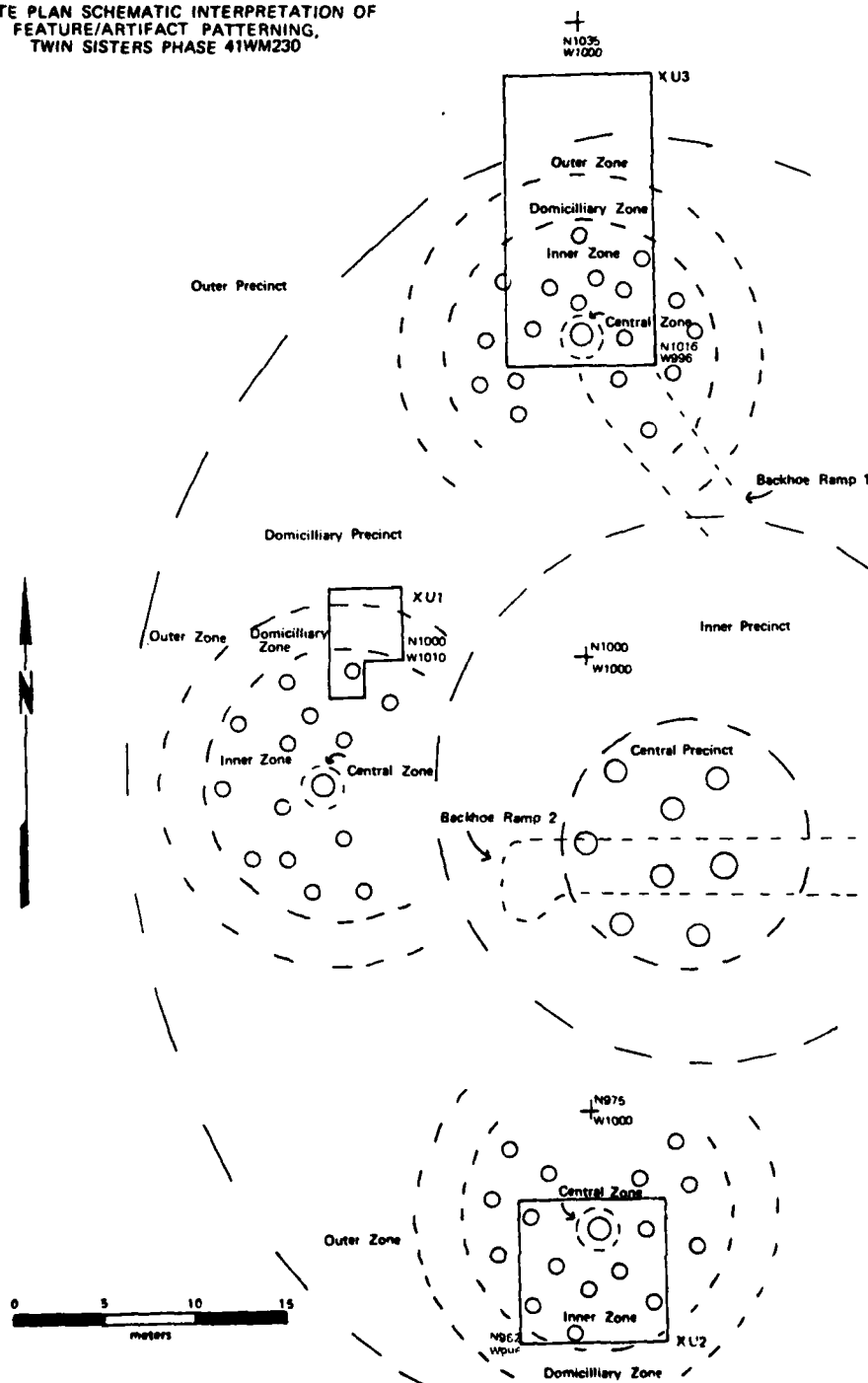
As with the succeeding Driftwood Phase and the Austin Phase, the overall tenor of the Twin Sisters Phase occupations is one of hunting and gathering peoples with an emphasis on the gathering. There is no question that hunting was an important pursuit; however, the ranges of other tools present suggest that the gathering and processing of other subsistence items were of considerable importance. There are several tendencies, though, which set this phase apart from the other hunting and gathering occupations represented at the site. The first difference is the quantity of crushers associated with the Twin Sisters Phase; the precise functions of these tools have not been determined, but in relation to grinding tools they are three times more popular and represent a significant activity. Another significant difference is the ratio of bifacial tools to unifacial tools; this ratio is reversed in the Twin Sisters Phase with bifaces representing nearly 60 percent of the two groupings of tools. This indicates that, overall, there is more of an emphasis on cutting activities rather than scraping, and may tend to support the diversity of gathering activities over hunting.

A third difference which is felt to be quite significant is the variety of apparently formal morphological tool types which are present in the Twin Sisters Phase. In addition to Ensor dart points, these morphological groups include bifacial Clear Fork gouges, Erath bifaces, San Gabriel bifaces, crushers, and large concave unifaces. Such an array of formal morphological tool types is not exhibited during any of the other Archaic or Nearchaic phases in the Granger Lake District. While specific reasons for this proliferation of tool types are difficult to determine, it is suspected that this trend represents a high degree of specialization in the exploitive system used by these peoples. Indeed, it may be that this phase represents a peak in the efficient exploitation of the local environment not only in terms of the variety of resources used but in the manner in which they were gathered and processed. There is also another interesting correlation in that this apparent formalization of tool types occurs at a time when there appears to be a definite structuring of the camp as discussed above. This could possibly reflect structural concepts adhered to by the social group as a whole and further supports the general idea that these people were highly formalized in their behavior patterns.

Exotic items included in the Twin Sisters Phase assemblage include a boatstone, a stone gorget and a conch shell gorget. While boatstones are not unusual in Central Texas sites, they do occur infrequently and the documentation of this specimen suggests they were in use at least during this particular phase. The stone gorget is likewise not unusual although these objects also occur infrequently. The source of the raw material is apparently to the west of the Granger Lake District in the Llano Uplift region of Central Texas. However, the type of stone from which the gorget is made, Packsaddle schist, is common in the gravels of the Colorado River and would not necessarily have to be procured from the outcrop source. It is clear, though, that either these peoples ranged outside the limits of the San Gabriel River drainage or they participated in a trade network to obtain the stone either in raw or finished form.

FIGURE 62

SITE PLAN SCHEMATIC INTERPRETATION OF
FEATURE/ARTIFACT PATTERNING,
TWIN SISTERS PHASE 41WM230



T.A.S./Dierker/1982

Similarly, the conch shell gorget represents an item which could only be obtained through trade or by the inclusion of coastal environments within the normal exploitation range. The latter suggestion seems unlikely since marine shell objects are rather scarce in the Twin Sisters Phase. It is probable that, in contrast to the following Driftwood Phase, there was an extensive trading system which operated as a mechanism for the widespread exchange of goods.

Uvalde Phase (Strata 5 and 6) (Tables 18 through 23)

The Uvalde Phase is relatively thinly distributed in the small area sampled and differs markedly from the dense quantities of features and debris noted in the succeeding Twin Sisters Phase. There is nothing particularly outstanding about this phase other than its noticeable paucity at this site. No diagnostic artifacts were recovered during the current excavations; the assignment to the Uvalde Phase is based on the occurrence of a single Montell dart point which was found during the previous work in XU3.

TABLE 18
FEATURE INVENTORY, UVALDE PHASE, STRATUM 5

Type	Number	Percentage
Arcuate hearth	1	50%
Burned tree root	1	50%
	<u>2</u>	<u>100%</u>

TABLE 19
ARTIFACT INVENTORY, UVALDE PHASE, STRATUM 5

Type	Number
Miscellaneous biface, Group 1	1
Miscellaneous biface, Group 4	1
Biface fragment, lateral	1
Crusher fragment	1
Large concave uniface	1
Scraper, Group 1	1
Partially reduced core	1
Expended cores	2
Core fragment	1
Flint flakes	797
Handstone	1
	<u>808</u>

TABLE 20
COMPARISONS AND INTERPRETATIONS OF ARTIFACT
GROUPINGS, UVALDE PHASE, STRATUM 5

Comparison	Interpretation
(1) Flakes and cores: 99.1% (N = 801) All other artifacts: 0.9% (N = 7)	High ratio of chipping debris to other artifacts; considerable knapping required to produce desired tools.
(2) Flakes: 99.5% (N = 797) Cores: 0.5% (N = 4)	Disproportionate ratio of cores to flakes; either many flakes produced from each core, or initial reduction accomplished off-site and most cores left at chipping station.
(3) Cores: 100% (N = 4) Hammerstones: 0% (N = 0)	Hard-hammer reduction not an important part of lithic technology.
(4) Projectile points: 0% (N = 0) All other tools: 100% (N = 7)	Hunting not an important economic pursuit.
(5) Bifacial tools: 60% (N = 3) Unifacial tools: 40% (N = 2)	Formal tools preferred and used more frequently than tools of convenience.
(6) Cutting tools: 60% (N = 3) Crushing tools: 20% (N = 1) Grinding tools: 20% (N = 1)	Cutting tools used more frequently; crushing and grinding of equal importance.
(7) Cutting tools: 60% (N = 3) Scraping tools: 40% (N = 2)	Cutting activities more frequent than scraping.

TABLE 21
FEATURE INVENTORY, UVALDE PHASE, STRATUM 6

Type	Number	Percentage
Burned tree root	1	100%

TABLE 22
ARTIFACT INVENTORY, UVALDE PHASE, STRATUM 6

Type	Number
Miscellaneous biface, Group 1	1
Crusher fragment	1
Expended cores	2
Core fragments	4
Flint flakes	408
Ulna flaker	1
	<u>417</u>

TABLE 23
COMPARISONS AND INTERPRETATIONS OF ARTIFACT
GROUPINGS, UVALDE PHASE, STRATUM 6

Comparison	Interpretation
(1) Flakes and cores: 99.3% (N = 414) All other artifacts: 0.7% (N = 3)	High ratio of chipping debris to other artifacts; considerable knapping required to produce desired tools.
(2) Flakes: 98.5% (N = 408) Cores: 1.5% (N = 6)	Low ratio of cores to flakes; initial reduction and subsequent knapping carried out on-site rather than at separate chipping station.
(3) Cores: 100% (N = 6) Hammerstones: 0% (N = 0)	Hard-hammer reduction not an important part of lithic technology.
(4) Hammerstones: 0% (N = 0) Bone flaking tools: 100% (N = 1)	Bone tools important part of lithic reduction process.
(5) Projectile points: 0% (N = 0) All other tools: 100% (N = 3)	Hunting not an important economic pursuit.
(6) Cutting tools: 50% (N = 1) Crushing tools: 50% (N = 1) Grinding tools: 0% (N = 0)	Cutting and crushing activities more important than grinding.

The previous excavations in XU2 did not yield features or artifacts diagnostic of this phase, and none of the remaining excavation units (other than XU3) extended to a sufficient depth to penetrate these deposits. Three features are assigned to this phase in XU3; two of these are burned tree roots. The third feature is an arcuate hearth (F-18) which may be associated with the following Twin Sisters Phase rather than the Uvalde Phase in view of the lack of other features in this phase.

Although based on negative data, it seems significant that there is such a contrast between the intensity of use during this phase and the intensity in the following phase. There could be numerous reasons for a lack of occupation during the Uvalde Phase; however, it is most likely attributable to variations in the regional exploitation pattern. The time span partially coincides with a bison presence period as proposed by Dillehay (1974:182) and the thinly scattered materials may simply reflect the differing exploitive system. The general lack of projectile points indicates that hunting was not an important pursuit, but this is contradictory in the sense that if bison were present in the region, then surely they would have been relied upon as a multiple-use resource. It is probable that there is a fair amount of sampling error involved in the current limited investigations at this site and that further excavations in these strata may help to clarify some of the questions concerning the Uvalde Phase.

Uvalde Phase (Strata 7 and 8) (Tables 24 through 29)

As was the case with the succeeding occupational phase, the Uvalde Phase is made conspicuous through the paucity of materials associated with it. The temporal assignment is made on the basis of a single Castroville dart point. With the exceptions of four snail shell concentrations, features are lacking. Other than the one typed dart point, there is nothing in particular which characterizes this occupation. A deep test in XU2 made during the previous work at the site apparently penetrated these deposits, but the excavations in XU3 represent the only significant work associated with this phase. The small size of the excavations and the thinly distributed nature of the debris preclude examination of potential patterning. It is probable that this phase is similar to that discussed above for the Uvalde Phase Strata 5 and 6 and most of the same assumptions probably apply to this occupation. The

TABLE 24
FEATURE INVENTORY, UVALDE PHASE, STRATUM 7

Type	Number	Percentage
Snail shell concentration	1	100%

TABLE 25
ARTIFACT INVENTORY, UVALDE PHASE, STRATUM 7

Type	Number
*Castroville	1
Miscellaneous dart point fragment	1
Miscellaneous biface fragment, distal	1
Miscellaneous biface fragment, lateral	1
Edge-damaged flake, lateral	1
Flint flakes	451
Handstone	1
Grinding slab	1
Hammerstone fragment	1
	<u>459</u>

TABLE 26
COMPARISONS AND INTERPRETATIONS OF ARTIFACT
GROUPINGS, UVALDE PHASE, STRATUM 7

Comparison	Interpretation
(1) Flakes and cores: 98.3% (N = 451) All other artifacts: 1.7% (N = 8)	High ratio of chipping debris to other artifacts; considerable knapping required to produce desired tools
(2) Flakes: 100% (N = 451) Cores: 0% (N = 0)	Disproportionate ratio of cores to flakes; initial lithic reduction accomplished off-site and cores left at chipping station.
(3) Cores: 0% (N = 0) Hammerstones: 100% (N = 1)	Hard-hammer reduction an important part of lithic technology.
(4) Projectile points: 25% (N = 2) All other tools: 75% (N = 6)	Projectile points not as important as full range of tools; however, hunting an important economic pursuit.

Table 26, continued

Comparison	Interpretation
(5) Cutting tools: 50% (N = 2) Crushing tools: 0% (N = 0) Grinding tools: 50% (N = 2)	Cutting and grinding activities equally important, but crushing not used.
(6) Cutting tools: 66.7% (N = 2) Scraping tools: 33.3% (N = 1)	Cutting activities more frequently engaged in than scraping.

TABLE 27
FEATURE INVENTORY, UVALDE PHASE, STRATUM 8

Type	Number	Percentage
Snail shell concentrations	3	100%

TABLE 28
ARTIFACT INVENTORY, UVALDE PHASE, STRATUM 8

Type	Number
Miscellaneous biface, Group 4	1
Biface fragment, lateral	1
Edge-damaged flakes, lateral	4
Partially reduced core	1
Expend core	1
Core fragments	3
Flint flakes	994
Grinding slab	1
Striated hammerstone fragment	1
	<u>1007</u>

TABLE 29
COMPARISONS AND INTERPRETATIONS OF ARTIFACT
GROUPINGS, UVALDE PHASE, STRATUM 8

Comparison	Interpretation
(1) Flakes and cores: 99.2% (N = 999) All other artifacts: 0.8% (N = 8)	High ratio of chipping debris to other artifacts; considerable knapping required to produce desired tools.
(2) Flakes: 99.5% (N = 994) Cores: 0.5% (N = 5)	Disproportionate ratio of cores to flakes; either many flakes produced from each core, or initial reduction accomplished off-site and cores left at chipping station.
(3) Cores: 83.3% (N = 5) Hammerstones: 16.7% (N = 1)	Hard-hammer reduction an important part of lithic technology.
(4) Projectile points: 0% (N = 0) All other tools: 100% (N = 8)	Hunting not an important economic pursuit.
(5) Cutting tools: 66.7% (N = 2) Crushing tools: 0% (N = 0) Grinding tools: 33.3% (N = 1)	Cutting tools more frequently used, but grinding an important activity; crushing not used.
(6) Cutting tools: 33.3% (N = 2) Scraping tools: 66.7% (N = 4)	Scraping activities more frequently engaged in than cutting.

most significant aspect appears to be the general lack of use of the site during the Uvalde Phase Strata 9, 10, 11 and 12 as contrasted with the San Marcos Phase which precedes it and the Twin Sisters Phase which follows it. There certainly is a change in the type of occupation represented during the full extent of this phase, but the limited excavations simply have not provided sufficient information to pursue the question of why this change occurred.

San Marcos Phase (Strata 9 through 12) (Tables 30 through 32)

In terms of overall quantities of debris, there is not much difference between the San Marcos Phase occupations and the previously described succeeding phase, the Uvalde. However, there are significant differences in the relative concentrations of debris and the types of features which are present. The San Marcos Phase is characterized by a variety of features dominated by medium basin hearths and mussel shell concentrations, and by the presence of Marshall and Williams dart points. Additional significant aspects include an isolated cremation and two marine shell artifacts.

Controlled excavations which penetrate the San Marcos Phase deposits are limited to XU3 where four strata are assignable to this phase. In Stratum 9 there is a very thin scatter of debris and a single feature which consists of a small basin hearth (F-120). There are no definite patternings in the relationships of the debris to the feature, although it does appear that flint flakes are slightly more concentrated in the immediate vicinity of F-120 (Fig. 63).

Strata 10 and 11 are combined for analysis purposes since Stratum 10 appears to represent a single episode which cannot be physically separated from the Stratum 11 materials due to the excavation methods (Fig. 64). One feature, a medium basin hearth (F-107), is included in the two strata. There seems to be a definite clustering of artifacts and debris surrounding the eastern and northern sides of the hearth while there is a decrease in flake density in the area immediately adjacent to it. The cores appear to be slightly clustered in the vicinity of the hearth while the other tools and the perforated marginella shell are more dispersed.

More-definite patternings are visible in the Stratum 12 materials (Fig. 65). A large flat hearth (F-87) in the northeastern corner of the unit is adjacent to a substantial concentration of chipping debris which may represent a feature not recognized in the field. Few tools are associated with the hearth and the concentration, but a hammerstone, a grinding slab fragment and a biface fragment are in or adjacent to the debris and the hearth. A mussel shell concentration (F-110) is adjacent to a medium basin hearth (F-109) in the southwestern corner of the unit, and the two are surrounded by several tool fragments which include seven projectile points and fragments. Just to the southeast of these two features are another mussel shell concentration (F-146) and another lithic debris concentration (F-142). Both of the mussel shell concentrations appear to represent waste debris from food consumption rather than tool caches as was the case for the shell concentration (F-15) in the Twin Sisters deposits in XU2. It would appear that a substantial amount of the activities were concentrated around the immediate areas of the hearths. Included are lithic reduction, tool maintenance, food processing, and food consumption. There are no indications of distinct organization to the distribution of materials in terms of a formal camp as was noted for the later Twin Sisters occupations; however, the small sample size obtained for the San Marcos Phase does suggest there are distinct patterns which can be detected and that more extensive excavations could reveal general camping patterns.

TABLE 30
FEATURE INVENTORY, SAN MARCOS PHASE

Type	Number	Percentage
Large flat hearth	1	12.5%
Medium basin hearths	2	25.0%
Small basin hearth	1	12.5%
Isolated cremation	1	12.5%
Lithic debris concentration	1	12.5%
Mussel shell concentration	2	25.0%
	8	100.0%

TABLE 31
ARTIFACT INVENTORY, SAN MARCOS PHASE

Type	Number
*Marshall	4
*Williams	1
Miscellaneous dart point	1
Miscellaneous dart point fragments	6
Miscellaneous biface, Group 2	1
Miscellaneous biface fragment, lateral	1
Miscellaneous biface fragments, basal	2
Small concave unifaces	2
Scraper, Group 2	1
Edge-damaged flakes, lateral	3
Edge-damaged flake, distal	1
Tested cores	2
Partially reduced cores	4
Expendable cores	6
Core fragments	5
Flint flakes	2592
Handstone	1
Grinding slab	1
Hammerstone and fragments	3
Marine shell bead	1
Perforated marine shell	1
	2639

TABLE 32
COMPARISONS AND INTERPRETATIONS OF ARTIFACT
GROUPINGS, SAN MARCOS PHASE

Comparison	Interpretation
(1) Flakes and cores: 98.9% (N = 2,609) All other artifacts: 1.1% (N = 30)	High ratio of chipping debris to other artifacts; considerable knapping required to produce desired tools.
(2) Flakes: 99.3% (N = 2,592) Cores: 0.7% (N = 17)	Disproportionate ratio of cores to flakes; initial reduction accomplished off-site and cores left at chipping station.
(3) Cores: 85% (N = 17) Hammerstones: 15% (N = 3)	Hard-hammer reduction an important part of lithic technology.
(4) Hammerstones: 100% (N = 3) Bone flaking tools: 0% (N = 0)	Poor bone preservation, or bone tools not important in lithic reduction process.
(5) Projectile points: 42.9% (N = 12) All other tools: 57.1% (N = 16)	Projectile points a significant part of tool kit; hunting an important economic pursuit.
(6) Bifacial tools: 36.4% (N = 4) Unifacial tools: 63.6% (N = 7)	Tools of convenience preferred over formal tools.
(7) Cutting tools: 66.7% (N = 4) Crushing tools: 0% (N = 0) Grinding tools: 33.3% (N = 2)	Cutting activities more important than grinding; crushing not important.
(8) Cutting tools: 36.4% (N = 4) Scraping tools: 63.6% (N = 7)	Scraping activities more frequent than cutting.
(9) All tools: 88.9% (N = 16) All ornaments: 11.1% (N = 2)	Relatively high ratio of ornaments to tools; ornaments important part of material culture.

Table 32, continued

Comparison	Interpretation
(10) Bone ornaments: 0% (N = 0) Freshwater shell ornaments: 0% (N = 0) Marine shell ornaments: 100% (N = 2) Stone ornaments: 0% (N = 0)	Strong preference for marine shell ornaments; implies either direct contact with coastal environment or trade net- work through which to procure marine resources.

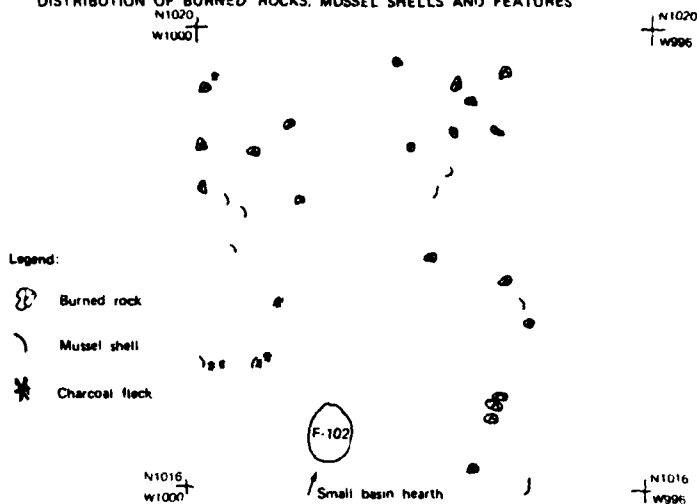
The general character of the San Marcos Phase occupations suggests hunting and gathering peoples who practiced a subsistence strategy which emphasized hunting to a greater degree than many of the later occupations. However, there is substantial evidence of gathering, and there appears to be a decided increase in the use of freshwater mussels as a food source. Two mussel shell concentrations and a noticeable increase in the frequency of occurrence of scattered mussel shells provide ample evidence to attest to the use of these animals as a food source. Whether this reflects a general tendency in the overall subsistence system in terms of a greater dependency on mussels or whether it reflects seasonal selection of specific food resources is undetermined at the present time. It is suspected that the former is the case, but this should be subjected to more detailed examination in future excavations.

The presence of a cremation in this phase provides at least some indications of the methods of disposal of the dead. Substantive burial data are generally lacking for the San Marcos Phase, and F-140 assumes greater significance in that it represents the first instance where reasonable associations can be made. The circumstances under which the cremation were found (the wall of BHR2) preclude observations on whether there is a cemetery present or whether this was an isolated event. Further, any precise associations in terms of placement in relation to the other camping activities within the site are lacking since controlled excavations in the appropriate strata were not accomplished in the immediate area of the burial. It is quite significant to note that grave goods were found with the cremation in the form of a conch columella bead. While one example does not constitute a pattern, this trait should be kept in mind in any future investigations of San Marcos Phase components.

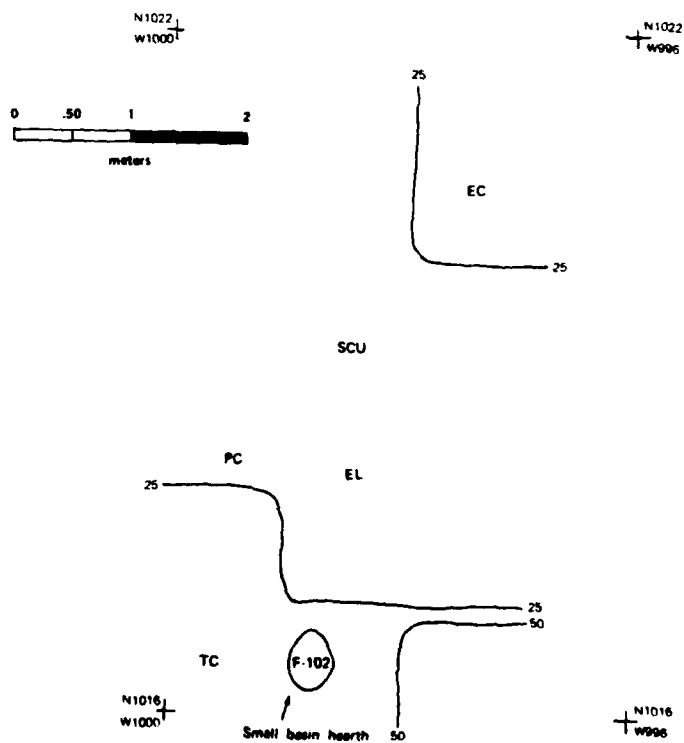
Further implications are derived from the presence of the conch shell bead and the marginella shell bead found adjacent to the F-107 hearth. As far as can be determined, this represents the earliest well-documented indication of either direct contact with the coast or the existence of an extensive trade network through which such items could be procured. The technology involved in the manufacture of the conch columella bead argues strongly that the most plausible explanation of their presence at the site is that they were obtained through trade, and this is the interpretation favored here. As has been shown in the

FIGURE 63
XU3 S9 FLOOR PLAN - SAN MARCOS PHASE

DISTRIBUTION OF BURNED ROCKS, MUSSEL SHELLS AND FEATURES



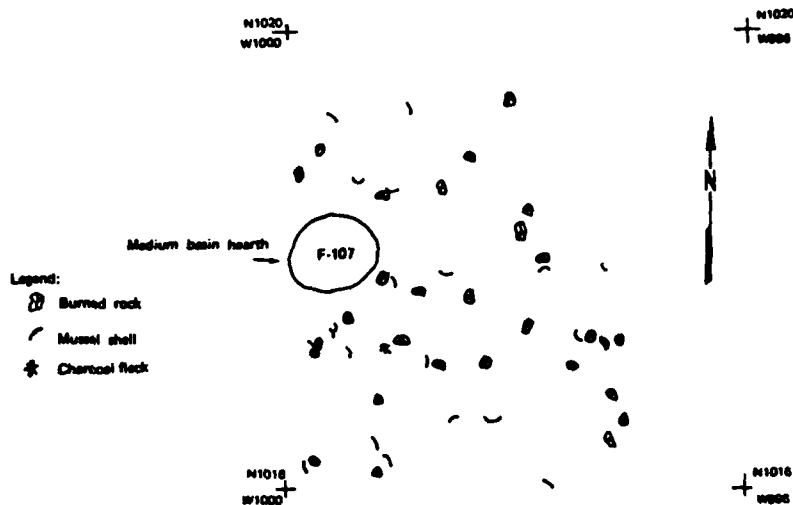
DISTRIBUTION OF FEATURES, ARTIFACTS AND CHIPPING DEBRIS



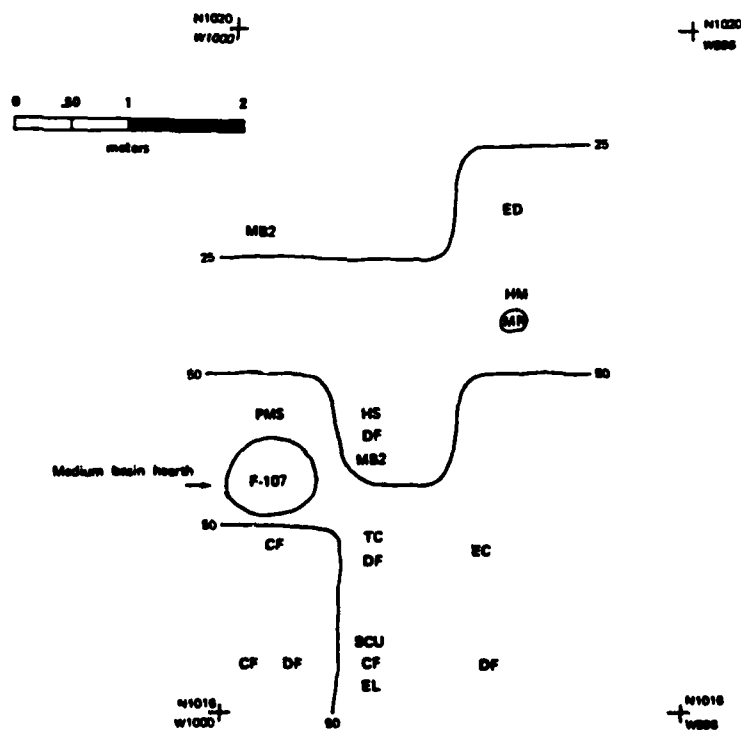
T.A.S./Dierlam/1982

FIGURE 84
XUS S10 and 11 FLOOR PLAN
SAN MARCOS PHASE

DISTRIBUTION OF BURNED ROCKS, MUSSEL SHELLS

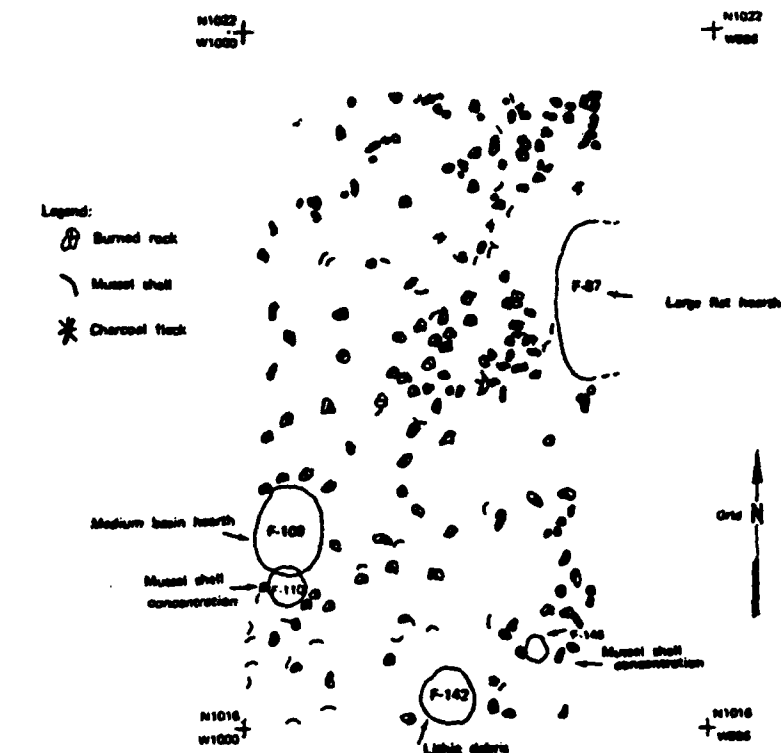


DISTRIBUTION OF FEATURES, ARTIFACTS AND CHIPPING DEBRIS

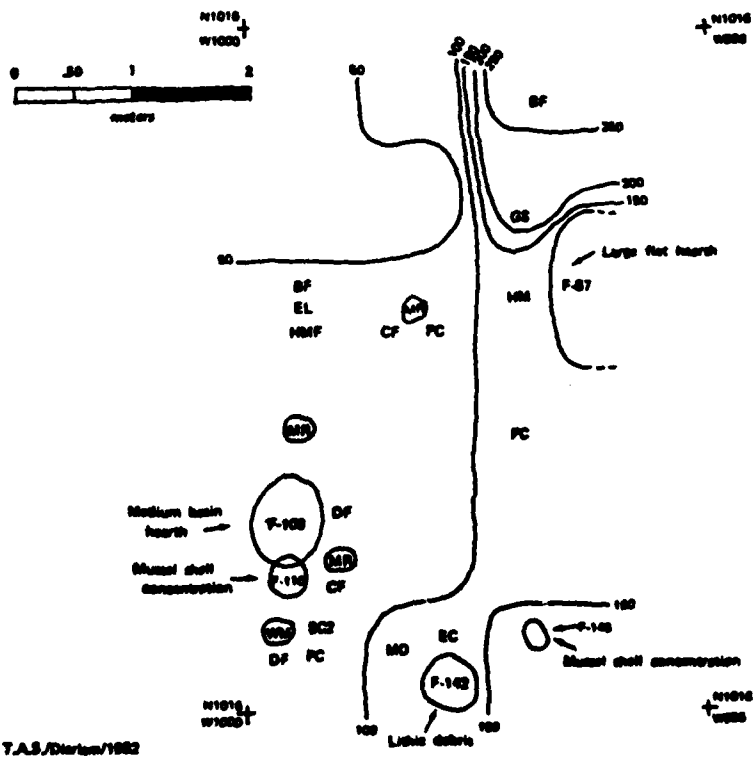


T.A.S./Overlaid/1982

FIGURE 85. NUS 812 FLOOR PLAN SAN MARCOS PHASE
DISTRIBUTION OF BURNED ROCKS, MUSSEL SHELLS AND FEATURES



DISTRIBUTION OF FEATURES, ARTIFACTS AND CHIPPING DEBRIS



T.A.S./Dierker/1982

previous discussions, many of the later occupational phases exhibit similar evidence in terms of the presence of marine shell artifacts. The value of the artifacts is demonstrated by the intentional placement of them in burial or other special-feature contexts. It may also be argued that this reflects a concern for the dead and the existence of religious beliefs dealing with death.

Round Rock Phase (Strata 14 through 16) (Tables 33 through 35)

The few scattered artifacts recovered from Stratum 13 have been ignored since that stratum is, for practical purposes, sterile. The single diagnostic artifact, a Pedernales dart point, was probably displaced upward and most likely should be included in the Stratum 14 materials; however, this and other items from Stratum 13 are not included in the tabulations given for the Round Rock Phase.

In terms of the quantities of features and debris, the Round Rock Phase was fairly intensively occupied and approaches the intensity noted in the Driftwood Phase of Stratum 2. This is the earliest occupation at the site for which substantial documentation was acquired, and it is characterized by the presence of Pedernales dart points, a variety of other tools, and a range of features dominated by small basin hearths and burned clay/charcoal lenses.

Round Rock Phase deposits were encountered in two areas of the site, XU3 and XU9; in both units there appear to be two distinct episodes of use represented. One very thinly distributed episode is contained in Stratum 14, while Stratum 15 probably represents a period of unoccupation. However, for analysis purposes, the materials which were recovered from Stratum 15 were combined with the relatively intensive occupations contained within Stratum 16.

In XU3 there is very little debris and no features in Stratum 14. One feature, a small basin hearth (F-113), was encountered in Stratum 14 in XU9; the thinly scattered chipping debris and the associated artifacts appear to be distributed around, but away from, the hearth (Fig. 66). It is probable that the disrupted hearth (F-108) exposed in the floor of BHR2 just to the west of XU9 may be associated with the F-113 hearth, but this is not demonstrable at the present time.

The Stratum 15 and Stratum 16 deposits in XU3 revealed a series of four features and a substantial quantity of associated debris (Fig. 68). A small basin hearth (F-116) in the east side of the unit has a burned clay/charcoal pit (F-117) adjacent to the northwestern edge, and a burned clay/charcoal lens (F-118) about a meter to the southwest. A dense concentration of chipping debris (F-143) is centered about a meter to the west of the hearth. Other debris, including tools, chipping debris, burned rocks, charcoal flecks and mussel shells, are scattered in a band around the hearth but are more concentrated on the west and south sides at a little over 1 meter from the hearth. It appears this represents a single episode of use and may even represent some of the activities of a nuclear family or a small extended family. Varied cooking activities are indicated by the hearth, the burned clay/charcoal pit, and the

TABLE 33
FEATURE INVENTORY, ROUND ROCK PHASE

Type	Number	Percentage
Medium basin hearths	2	16.7%
Small basin hearths	3	25.0%
Disrupted hearth	1	8.3%
Burned clay/charcoal pit	1	8.3%
Burned clay/charcoal lenses	3	25.0%
Lithic debris concentrations	2	16.7%
	<u>12</u>	<u>100.0%</u>

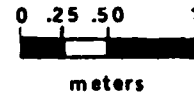
TABLE 34
ARTIFACT INVENTORY, ROUND ROCK PHASE

Type	Number
*Pedernales	6
Miscellaneous dart point fragments	3
Miscellaneous biface, Group 2	1
Miscellaneous biface, Group 3	1
Biface fragment, distal	1
Biface fragments, medial	3
Biface fragment, basal	1
Small concave uniface	1
Scrapers, Group 1	2
Edge-damaged flakes, lateral	4
Tested core	1
Partially reduced cores	2
Expended cores	6
Cores fragments	6
Flint flakes	5,251
Hammerstone fragment	1
Striated hammerstone fragment	1
*Quartz crystal fragment	1
	<u>5,292</u>

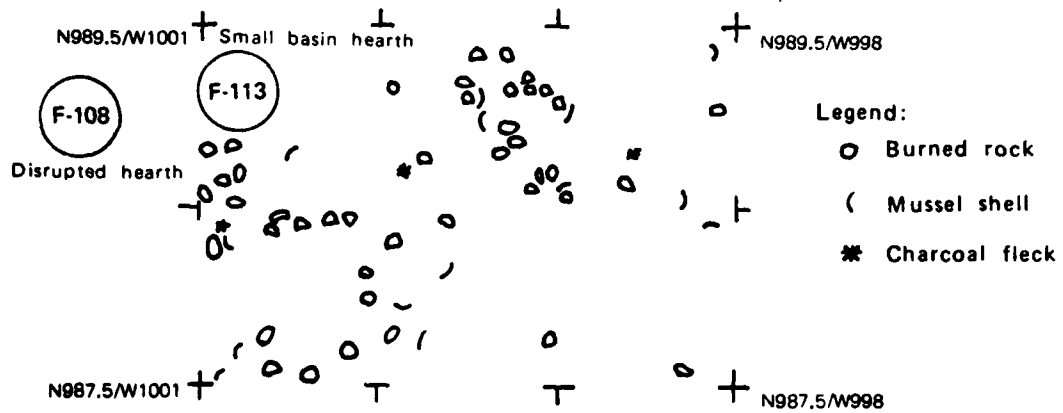
TABLE 35
COMPARISONS AND INTERPRETATIONS OF ARTIFACT
GROUPINGS, ROUND ROCK PHASE

Comparison	Interpretation
(1) Flakes and cores: 99.5% (N = 5,266) All other artifacts: 0.5% (N = 26)	Very high ratio of chipping debris to other artifacts; considerable knapping required to produce desired tools.
(2) Flakes: 99.7% (N = 5,250) Cores: 0.3% (N = 15)	Disproportionate ratio of cores to flakes; initial lithic reduction accomplished off-site, cores left at chipping station.
(3) Cores: 88.2% (N = 15) Hammerstones: 11.8% (N = 2)	Hard-hammer reduction an important part of lithic technology.
(4) Hammerstones: 100% (N = 21) Bone flaking tools: 0% (N = 0)	Poor bone preservation, or bone tools not important to lithic reduction process.
(5) Projectile points: 36% (N = 9) All other tools: 64% (N = 16)	Projectile points a significant part of tool kit; hunting an important economic pursuit.
(6) Bifacial tools: 50% (N = 7) Unifacial tools: 50% (N = 7)	Equal preference of formal tools to tools of convenience.
(7) Cutting tools: 100% (N = 7) Crushing tools: 0% (N = 0) Grinding tools: 0% (N = 0)	Crushing and grinding activities not carried out at site; cutting important.
(8) Cutting tools: 50% (N = 7) Scraping tools: 50% (N = 7)	Cutting and scraping activities of equal importance and frequency.

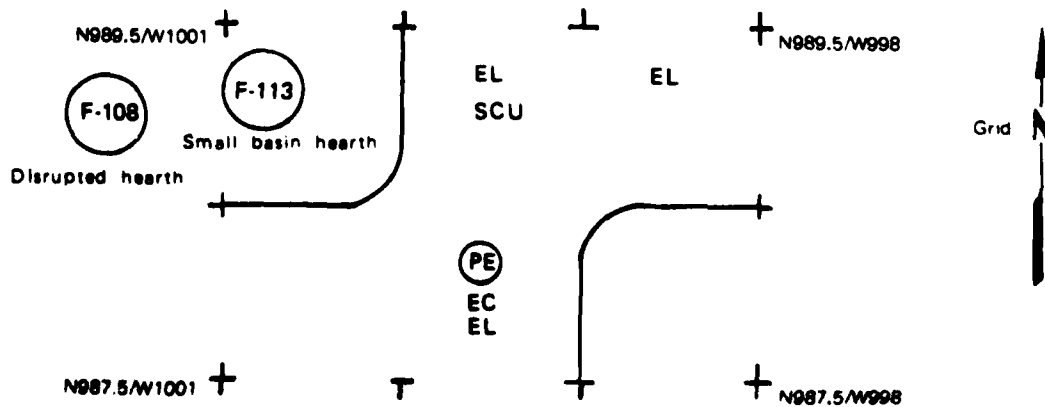
FIGURE 66
XU9 S14 FLOOR PLAN
41WM230
ROUND ROCK PHASE



DISTRIBUTION OF BURNED ROCK, MUSSEL SHELL, AND FEATURES



DISTRIBUTION OF FEATURES, ARTIFACTS, AND CHIPPING DEBRIS



T.A.S./Bement/1982

burned clay/charcoal lens; maintenance activities associated with these features are indicated by the discarded burned rocks and the charcoal staining which surround the hearth. Food processing and consumption is indicated by the discarded mussel shells which are intermingled with the other debris, while lithic processing and manufacturing activities are indicated by the lithic concentration and the cores.

In XU9 there is a similar set of features which was encountered in the Stratum 15 and Stratum 16 Round Rock Phase deposits (Fig. 67). A medium basin hearth (F-114) is located in the northwestern corner of the unit while a large burned clay/charcoal lens (F-112) is centered about a meter to the east and a smaller burned clay/charcoal lens (F-111) is located about 1.5 meters to the southeast. A tremendously dense lithic debris concentration (F-144) is situated between the hearth and the two burned clay/charcoal lenses. There is a slight concentration of burned rocks and charcoal staining which coincides with the lithic debris concentration. While the tools are distributed throughout the unit, they do tend to cluster in the area of the dense lithic debris. However, mussel shells are fairly evenly scattered throughout the unit.

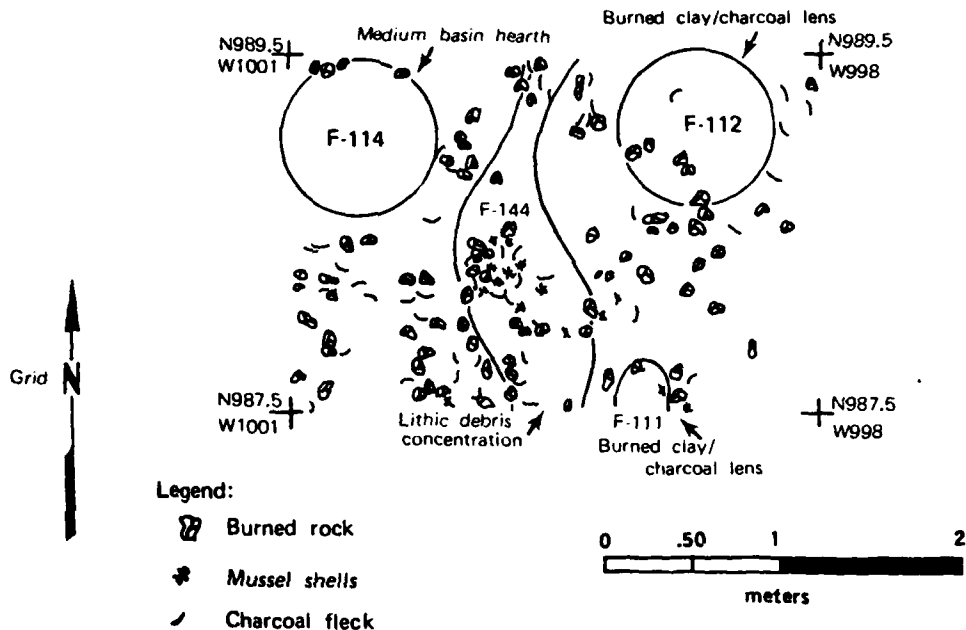
As with the counterpart in XU3, the feature and artifact patterning in XU9 leads to the suggestion that this represents the activities of a small group of people, and it is quite likely that the group consisted of a nuclear family or a small extended family. The patterning and the types of activities represented are practically the same as that discussed above for this phase in XU3. However, there is a greater quantity of discarded tools contained in the XU9 area, and there is no distinct band of feature maintenance debris around F-114 in contrast to that around F-116.

A significant aspect to the Round Rock Phase materials noted in XU3 and XU9 is the similarity in the feature/debris patterning within the two units. In view of the fact that the western portion of the arrangement was exposed in XU3 and the eastern portion was exposed in XU9, it is probable that the pattern continues in a more-or-less full circle around the central hearths in each case. This is, of course, speculative at the present time, but this possibility should be fully explored in order to determine the extent of the features, the range of feature types, and the overall patterning of the features and debris.

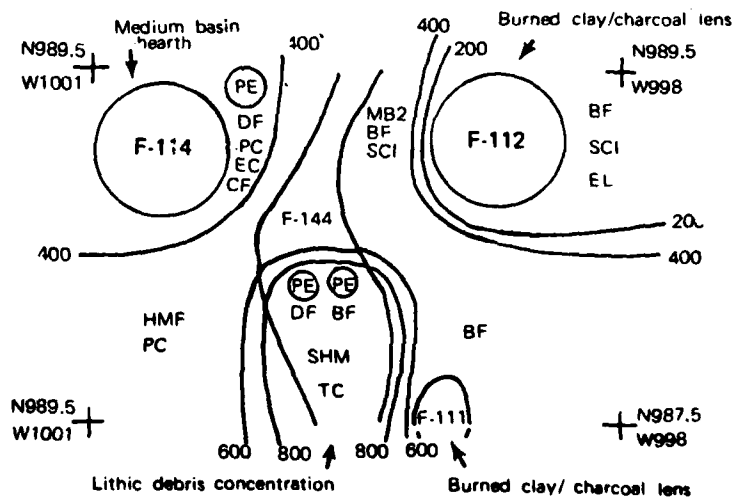
The general tendency of the Round Rock Phase materials is toward a fairly balanced hunting and gathering subsistence where hunting is more important than in some of the later phases, but where freshwater mussels formed a greater part of the meat diet than in all the later phases except for the immediately succeeding San Marcos Phase. Significant items which are lacking in the Round Rock Phase are grinding implements; with the exception of the Toyah Phase, these tools are present in at least limited quantities in all the other phases of occupation. Also lacking are ornaments and any marine shell artifacts; this may reflect a distinct trait in terms of minimum to no use of ornaments, and also may reflect the absence of any trade networks which included peoples who exploited the coastal environment during this time. This has further implications in that group identity and interaction restricted the possible exchange of goods to more localized areas.

FIGURE 67
XU9 S-15 and 16 Floor Plans
ROUND ROCK PHASE

DISTRIBUTION OF BURNED ROCKS, MUSSEL SHELLS AND FEATURES



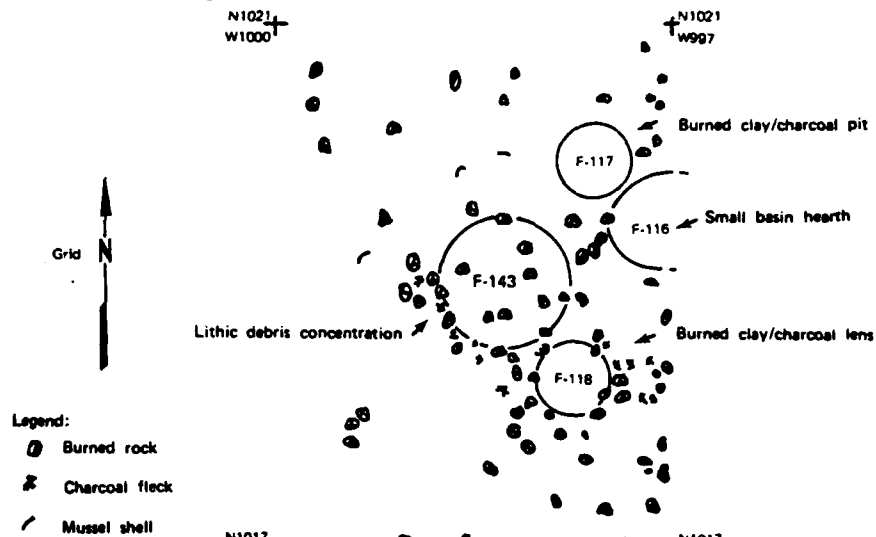
DISTRIBUTION OF FEATURES, ARTIFACTS AND CHIPPING DEBRIS



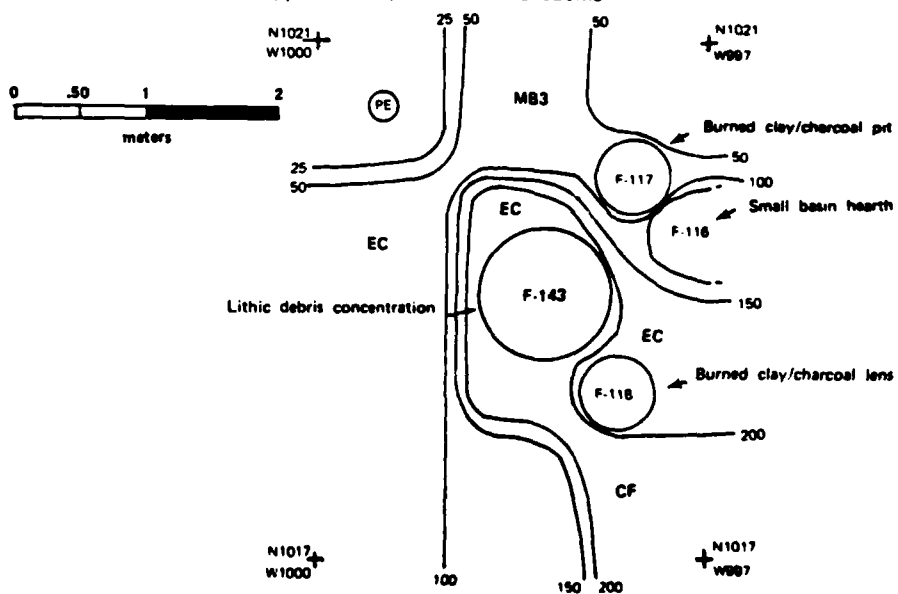
T.A.S./Dierlam/1982

FIGURE 68
XU3 S15-16 FLOOR PLAN
ROUND ROCK PHASE

DISTRIBUTION OF BURNED ROCKS, MUSSEL SHELLS, AND FEATURES



DISTRIBUTION OF FEATURES, ARTIFACTS, AND CHIPPING DEBRIS



T.A.S./Dierlam/1982

A distinct contrast exists between the Round Rock Phase occupations at the Loeve-Fox Site and the stereotypical sites on the Edwards Plateau to the west. This phase is normally associated with burned rock middens and the implied intensive exploitation of limited food resources. However, at the Loeve-Fox Site the occupations imply a more balanced exploitation by small groups of people. It is even more significant that the sets of features may indicate limited family (or other) groups, and that the documentation of these groups in single components could lead to reasonable estimates of population size and carrying capacity of the local environment. Further, this type of information is essential to arriving at any sort of reasonable interpretation of possible social organization similar to that which has been implied for the Twin Sisters Phase occupations at this site.

One additional aspect of the Round Rock Phase occupations is noteworthy. In terms of the contrast with the burned rock middens common to the Edwards Plateau, it is quite possible that the occupations at Loeve-Fox during this phase represent variations in the seasonal exploitation of the region. If burned rock middens represent intensive exploitation of specific foods, then there could be seasons (or years) in which those peoples ranged elsewhere in order to maintain their basic subsistence. In that case, the occupations in XU3 and XU9 could represent foraging activities wherein one would expect to find more of a balance between the hunting and the gathering activities, and this does seem to be reflected in the overall tool kit even though the grinding tools common to burned rock middens are absent. While this possible interpretation is not especially favored here, it is one that must be considered in any attempts to deal with the relationships of the Blackland Prairie and the Edwards Plateau during the Round Rock Phase.

Marshall Ford Phase (Strata 17 through 20)

No tabulations of materials are provided for the four strata included in this episode of site use; the materials encountered include thirteen flakes from Stratum 17, four flakes from Stratum 18, six flakes from Stratum 19, and two flakes from Stratum 20. Stratum 17 was encountered in a 1x1-meter-deep test in XU3 and in the bottom of BHR2; the remaining three strata were encountered only in the XU3 deep test. Of the strata, only Stratum 19 appears to represent a cultural occupation; this is based on the observed presence of a very few burned rocks in addition to six flint flakes. Since no tools or other time-diagnostic materials were recovered, it is not possible to determine the chronological assignment or the general character of the occupation. The primary implication is that the Round Rock Phase strata do not represent the earliest episode of site use, and points out the high potential for encountering earlier stratified deposits in the site.

THE LOEVE SITE, 41WM133

SITE DESCRIPTION

The Loeve Site is adjacent to and immediately downstream from the Loeve-Fox Site (41WM230). It is on the left (here north) bank of the San Gabriel River about 3.5 kilometers downstream (east-northeast) of the community of Circleville and roughly 7.6 kilometers south-southeast of Granger. The site is exposed in the vertical face of an outside bend of the river. The erosional face rises nearly 10 meters above the normal flow of the San Gabriel River.

A detailed description of the site and its environs as they appeared in 1968 is provided by Eddy (1973:303-318). Traces of Eddy's Test Pits 1, 2 and 3 are still visible, and his vertical datum (a 60d nail driven into the base of a hackberry tree) still exists. The extent of Clarence Loeve's uncontrolled excavations in the upper 1 to 1.5 meters of the site is much greater than in 1968 and has extended away from the river beyond the location of Eddy's Test Pit 4. Otherwise, the surface of the site and attendant vegetation remains the same as was described by Eddy.

Few of the specific features recorded by Eddy in the exposed face are still visible. This is due to the occurrence of up to 1 meter of horizontal erosion along the cutbank during the intervening 10 years. Additional features and materials which cannot be directly correlated to the previous work are now exposed in the face of the bluff.

The surface of the Loeve Site is covered with grasses and has an overstory vegetation cover consisting of pecans, elms and hackberries; understory brush is limited to the west (upstream) end of the site. This end of the site coincides with the extent of late Pleistocene or early Holocene point bar gravel deposits which form the lower depositional component of the site. A series of small springs originate along the edge of the gravel deposits and contribute the water flow of a small, sharply incised gully which enters the river at the upstream end of the site. This gully is the same one which extends across the northern end of the adjacent Loeve-Fox Site (see description for that site).

Immediately to the north and west sides of the Loeve Site is a shallow slough which functions as a floodwater chute; this channel is felt to represent a fossil Pleistocene channel scar (see discussion for the Loeve-Fox Site). The eastern, or downstream, end of the Loeve Site occurs where the terrace slopes noticeably toward another floodwater chute that marks the beginning of a cut-and-fill inside meander scar series which is similar to that described on the upstream end of the Loeve-Fox Site and which is mirrored immediately across the river from both sites.

EXCAVATION PROCEDURES

A somewhat different strategy from that at the Loeve-Fox Site was employed for the limited excavations at the Loeve Site. It is fairly clear that the late Archaic and Neoarchaic deposits at the site are badly disrupted as a result of the years of digging by Clarence Loeve. The significant intact deposits remaining at the site are felt to be the late Paleoindian or early Archaic deposits within the gravels which were reported by Eddy (1973:303-318). Eddy (1973:34-38) obtained radiocarbon dates on two hearths within the upper part of the lower component of the site which indicate an age of about 7,000 years B.P. as an ending date for the gravel accumulations. Another date was obtained from a hearth exposed in the upper part of the gravels by Texas A&M University; this date of approximately 8,500 B.P. is from a hearth which probably represents an extension of Hearth 3 investigated by Eddy, although it was reported to be slightly lower than Hearth 3 by Bond (1978:25).

Based on these radiocarbon dates and Clarence Loeve's statements regarding the occasional occurrence of Angostura-like projectile points within the upper part of the gravels, there seems to be little question that a series of encampments are represented in that depositional unit. In order to more fully explore these deposits (in contrast to the stepped trench excavated by Eddy), it was decided that machine assistance was necessary. Consequently, a bulldozer was used to cut a "T" trench into the site and the trench was extended as close to the edge of the riverbank as was possible. The upper deposits were removed until the bottom of the bulldozer trench was approximately 1 meter above the top of the gravels. A backhoe was then used to remove additional fill from the upstream end of the trench so that the trench intersected the exposed cutbank and a working platform was established above a fire hearth located near the upstream limits of the site.

Eddy's previous horizontal and vertical controls were discarded in favor of extending the grid system and elevation references used at the Loeve-Fox Site onto the Loeve Site. This was accomplished by extending the main north-south gridline, W1000, across the erosional gully and into the old field to the west of the Loeve Site; a steel reinforcement rod set in concrete was placed at grid coordinate N1150/W1000. This point was used as a basis to superimpose a grid within the areas selected for work.

The numbering system used by Eddy to label test pits was retained in modified form. While each pit was not given separate designations (e.g., Test Pit 5, etc.), each area of adjacent units was designated as an Excavation Unit (XU) as was done at the Loeve-Fox Site (Fig. 69). These XU numbers continued the series begun for test pits by Eddy. Within the XU's, excavations were carried out in 2x2-meter units with the southeast stake coordinates serving as the designator for each of the 2-meter units. Within the 2-meter units, provenience was maintained on the basis of 1x1-meter cells; these were designated according to quadrant in relation to cardinal directions (e.g., northeast, southeast, etc.). As at the Loeve-Fox Site, the northwest 50-centimeter subcell of the northwest 1-meter cell in each 2-meter unit was designated for fine-screen processing.

All excavated matrix was washed through $\frac{1}{4}$ -inch mesh hardware cloth for artifact recovery. The northwest subcell matrix and feature matrix was processed through both the coarse screen and window screen to enhance recovery of a sample of materials normally not obtained from coarse screening. Provenience of the coarse and fine fractions was maintained separately. While feature materials were treated independently from nonfeature matrix, provenience was kept dually for the features in terms of both the feature designation and the standard grid designation.

The recording system employed at the Loeve-Fox Site was used at the Loeve Site as well. Basic series of notes included site journal, excavation unit journal, level reports within each 2-meter unit, and feature notes. Measured drawings, photographs and other documentation were made as necessary.

Controlled excavations were carried out in 10-centimeter vertical increments. All elevation measurements were taken with the aid of a transit and stadia; line levels and hand tapes were not used for the maintenance of vertical controls.

A series of short backhoe trenches was dug to identify the margins of the site; no features were encountered in the backhoe trenches, and no materials were collected from them.

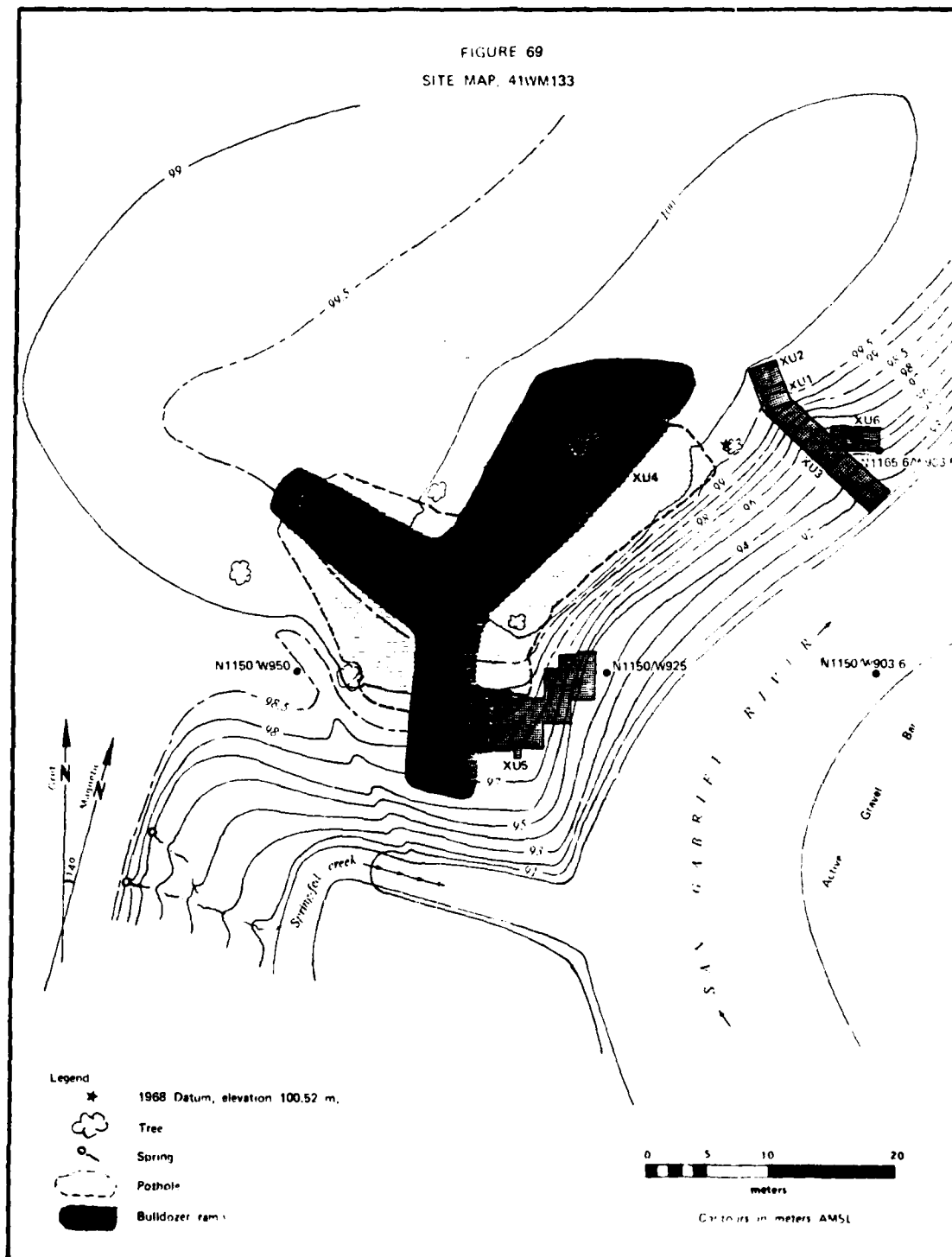
STRATIGRAPHY

Eddy recognized three major stratigraphic units in the 1968 testing at the Loeve Site. These he labeled in reverse geologic order as Unit I, II and III (Eddy 1973:310-318). His terminology is retained here in modified form; no change is made in the basic extent of the three major strata. However, due to the extensive use of the term "unit" to refer to the horizontal excavation controls, the qualifier "stratigraphic" is added so that Stratigraphic Unit III (abbreviated StU III) replaces Eddy's Unit III and so on. The use of Roman numerals to identify StUs readily segregates them from excavation units (XUs) which are identified with Arabic numerals.

The current excavations were not concerned with StU I and StU II; as noted in the previous section, these deposits were removed grossly in order to provide access to StU III. As described by Eddy, StU III is composed of "[l]enses of fine mottled clay particles alternating with stringers of gravel, the gravel matrix is either a coarse or sometimes a dense clay" (1973:317). As can be seen in Figure 70, StU III extends up to roughly 4.5 meters above normal river level and consists of an extremely complex series of interbedded gravels and clays.

The size-grading of the gravels and sediments, and the complex interdigitation of the gravel stringers and clay lenses, indicate that these accumulations resulted from a point bar depositional environment. Cultural materials are interspersed among the upper 2 meters of StU III

FIGURE 69
SITE MAP, 41WM133



in a series of apparently rapidly sealed living surfaces which coincide with the continually changing surface of the point bar. It is practically impossible to assign sequentially meaningful stratigraphic designations to the irregularly distributed lenses which occur throughout StU III; however, a gross designation system will be used which, hopefully, may reflect some reasonable facsimile to the overall sequence of events which occurred during the accumulation of the gravel deposits and the accompanying cultural materials.

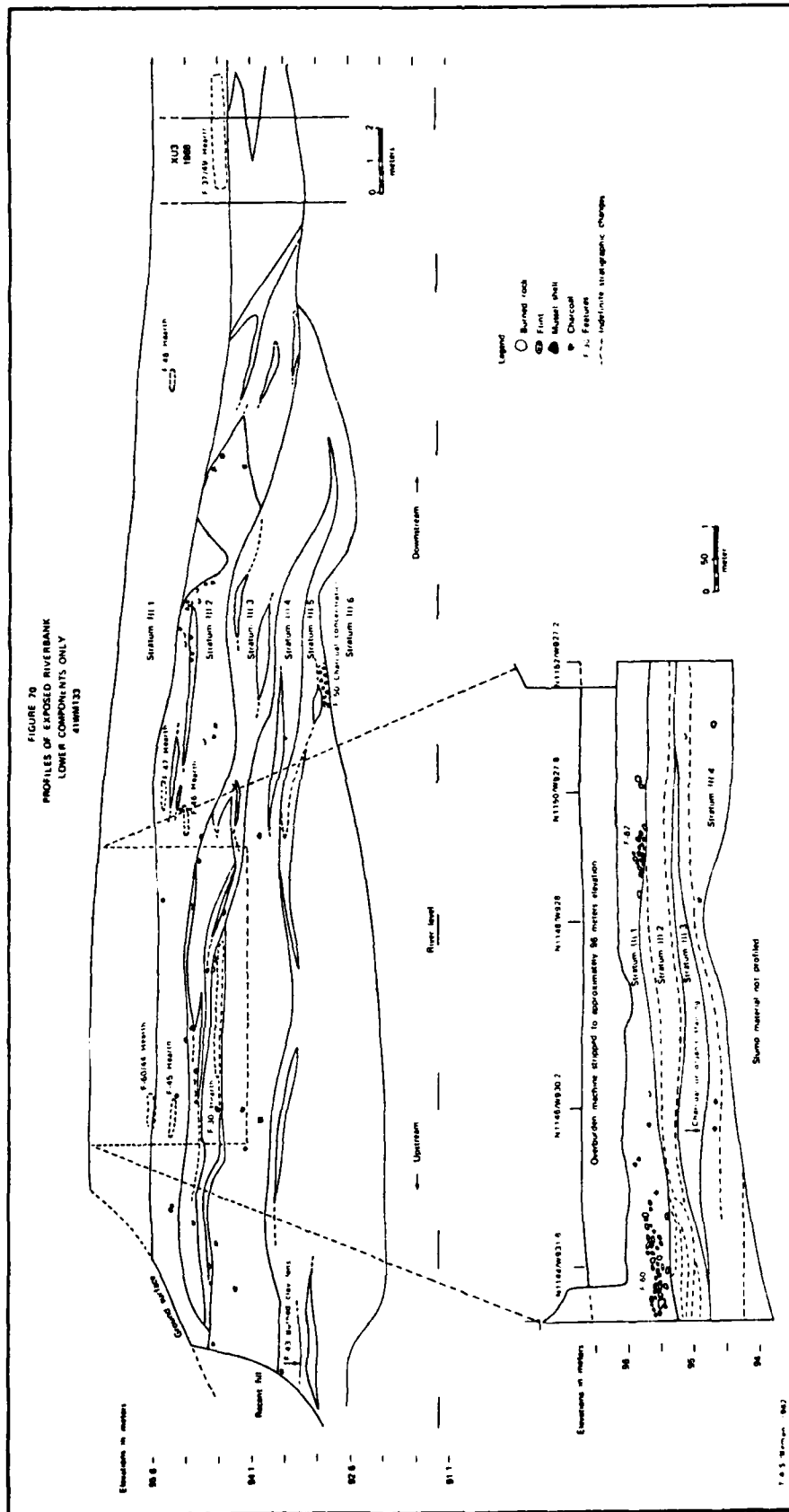
For purposes of this report, the lower 1 meter of clayey deposits assigned by Eddy to StU II are considered to be the upper component of the gravelly StU III. This is done because of a series of minor gravel stringers which occur at that level (roughly 96.5 meters elevation in the area of XU5 and 95.5 meters elevation in the area of XU6); these stringers are felt to represent the final vestiges of significant intensive flood episodes following the close of the Pleistocene. Further, this places all of the cultural occupations at this site which are known to be associated with the late Paleoindian lithic tradition within the boundaries of StU III.

Strata Descriptions

The six stratigraphic divisions recognized in StU III are briefly described below. Lacking intersecting profiles, it is difficult to interpret several aspects of the sequential accumulation of the point bar gravels. No pretense is made to any claims that the strata as herein described represent continuous or closely related sequential depositional events across the extent of the exposed gravels; rather, the generalized segments of apparent possible related lenses are designated in terms of convenience in discussing the composition of the deposits.

Stratum III-1: This light grayish brown massive clay forms the transition zone between the primary gravel deposits and the overlying alluvial soils. Sporadic gravel stringers composed of pebble-sized stones are interspersed throughout this stratum. Cultural materials are more prevalent in the lower portions of the stratum, and, in fact, some of the features which originate in Stratum III-1 penetrate into the upper surface of the underlying stratum. While the profile exposure gives an impression of thinly scattered gravels, excavations in XU5 and XU6 revealed that gravels are more prevalent in this stratum than the outward appearance suggests.

Stratum III-2: This stratum is characterized by a complex series of size-graded gravel lenses which are occasionally interspersed with clay lenses. Toward the downstream end of the site there is a hiatus in the gravels; the intervening area is filled with dense gravelly clay. It is highly likely that two or three separate and distinct episodes of interrupted deposition are included in this stratum; however, the internal complexities of the point bar deposits preclude confident definition of these episodes at the present time. Cultural materials are liberally distributed throughout the upstream portions of Stratum III-2.



Stratum III-3: This stratum is characterized by dense clay with interspersed gravel lenses and stringers. The stratum itself is a huge lens which pinches out at both the upstream and downstream ends of the site. As with the overlying two strata, cultural materials are liberally interspersed among both the clay and gravel lenses in Stratum III-3.

Stratum III-4: This well-defined stratum of gravels is thickest on the upstream end and pinches out toward the downstream end of the site. Clay lenses and cultural materials are interspersed sporadically throughout the stratum. The component gravels are size-graded in a complex series of internal lenses; the gravels vary from small pebble to small cobble in size.

Stratum III-5: This is a thick stratum of dense gray clay which is thickest at the upstream end and merges with Stratum III-3 and III-2 before pinching out on the downstream end. Gravel stringers are interspersed throughout the stratum and thinly distributed cultural debris occurs sporadically. The lower boundary of Stratum III-5 is obscured over a large extent of the site and in places has not been mapped accurately.

Stratum III-6: This is the lowest recognized stratum in the site; it extends below the level of the San Gabriel River waters, so it is not known whether it rests on underlying bedrock or the thickness of the stratum. The upper boundary and contact with Stratum III-5 is masked in parts of the site by slumpage. Stratum III-6 is composed of size-graded gravels which vary from large pebble to cobble and occasionally small boulder in size. Clay lenses are sparse within the stratum and are thin when they do occur. This stratum is interpreted to represent the final Pleistocene deposition at the site while the overlying components of StU III are interpreted to be early Holocene deposits. The assignment of Stratum III-6 to the Pleistocene is based on four factors: (1) the apparent massive continuity of the stratum; (2) the generally large size of the component gravels; (3) the occurrence of a cervicle vertebra of a mammoth or a mastodon in this stratum; and (4) a series of radiocarbon dates which firmly place the upper three components of StU III in the early Holocene range of 7,000 to 9,000 years B.P.

RADIOCARBON DATING

Four radiocarbon assays have been reported previously from the Loeve Site; three were reported by Eddy (1973:34-38) and one was reported by Bond (1978:25). All of these assays were made on materials collected from features within StU III. Two samples of charcoal and charcoal-stained soil were submitted for assay during the current season of work at the Loeve Site; both are from features within Stratum III-1. The sample taken from Feature 60 was too small for meaningful assay and will not be considered further. The sample collected from Feature 59 yielded an assay which is generally compatible with the previously reported dates, but does raise some questions regarding the internal characteristics of the materials within StU III (see Table 36).

TABLE 36
RADIOCARBON ASSAYS, LOEVE SITE

Sample No.	B.P. Date	B.C./A.D. Date	Feature Associations	Stratum	XU	Cultural Phase	Remarks
Tx-802	6,810±300	4,860±300 B.C.	Hearth 3 (F-37)	III-1	3	Circleville	Eddy 1973; same as F-59 Hearth (?)
Tx-803	7,190±80	5,240±80 B.C.	Hearth 3 (F-37)	III-1	3	Circleville	Eddy 1973; same as F-54 Hearth (?)
Tx-805	6,900±110	4,950±110 B.C.	Hearth 2 (F-30)	III-1	-	Circleville	Eddy 1973
Tx-1675	8,500±130	6,550±130 B.C.	F-59 Hearth	III-1	-	Circleville	Bond 1978
Tx-3405	9,650±910	7,700±910 B.C.	F-59 Hearth	III-1	-	Circleville	

Sample Tx-3405 yielded an assay of $9,650 \pm 910$ radiocarbon years B.P. While the range of deviation is large, it is comparable in age to the $8,500 \pm 130$ B.P. date reported by Bond (1978:25; sample Tx-2675). Both of these samples were taken from the same feature (F-59 in this report) and overlap at about 8,600 B.P. in their 1-sigma deviation. This seems to firmly establish the radiocarbon age of the F-59 hearth at about 8,600 B.P.

However, two of the dates obtained by Eddy are from his Hearth 3 which is felt to be part of the same living surface complex as F-59 and should yield compatible dates. Sample Tx-802 yielded an assay of $6,810 \pm 300$ B.P. and sample Tx-803 yielded an assay of $7,190 \pm 80$ B.P.; the average date of these two samples as reported by Eddy is $7,000 \pm 160$ B.P. If it is accepted that Hearth 3 and F-59 are indeed parts of a single feature complex, then there is a 1,600 year discrepancy in the series of dates which is not readily explainable.

Eddy's data, including his original field notes and measured drawing, have been examined in great detail to arrive at the present correlation of the features; further, the present author served as Eddy's field assistant and personally excavated a substantial portion of Hearth 3 during the 1968 field season. Based on Eddy's notes and the personal excavation experience at the site, there is little room for doubt concerning the relationship of the features which were documented during the investigations which were separated by 10 years. This still leaves the variance of the dates unexplained; whether the differences can be attributed to sample size, sample composition, external contamination, or to some other reason is unknown and no plausible rectification of the variance is offered here.

There is a further complication with the third date reported by Eddy. Sample Tx-805 was obtained from Eddy's Hearth 2 and yielded a date of $6,900 \pm 110$ B.P. While Hearth 3/F-59 rests at the bottom of Stratum III-1, Hearth 2 rests near the bottom of Stratum III-3 and theoretically should be no older than the features in Stratum III-1. As was noted in the stratigraphic descriptions, there is great difficulty in precisely (or even grossly, for that matter) determining the chronological sequence of events which were involved in the deposition of the point bar which contains the cultural materials. Thus, if the dates are accepted as relative and the general stratigraphy is also accepted as relative, then the two are not compatible. Again, no plausible explanations can be offered for these discrepancies.

Only two things seem to be relatively certain at this point in terms of age; first, the upper gravel components (Stratum III-1 through Stratum III-5) represent early Holocene point bar deposition; and, secondly, the deposition occurred sometime between 10,000 years B.P. and 7,000 years B.P. Given this 3,000-year range and the extremely complex nature of the deposits, it seems best that, on the basis of the present evidence, the fine points regarding the internal consistencies and variations of StU III be left as moot questions which should be explored further in additional investigations at the site.

FEATURE DESCRIPTIONS

The nine features encountered with the controlled excavations in XU5 and XU6 are described in this section. Several features which were exposed in the walls of the bulldozer cut and which are contained within StU I and the upper parts of StU II were not recorded or explored since the focus of the investigations were on the earlier StU III materials. It is sufficient to note that the cross section views of those features indicate they are similar in construction and composition, including intensively burned pit walls, in some instances, as the Twin Sisters Phase, Driftwood Phase and Austin Phase materials described for the adjacent Loeve-Fox Site. Additional features which are exposed in the vertical face of the cutbank of the site and which are associated with StU III but which are not within either of the two excavation units investigated during the current season of work are not described. For the present purposes, it is sufficient to note that these features are indeed present and that the current investigations exposed a very limited part of the full extent of the Circleville Phase materials which appear to exist at the site.

Features which were examined in detail in the controlled excavation units were treated in the same manner as those at the Loeve-Fox Site. Emphasis was directed toward documenting the initial recognition elevation, horizontal and vertical extent, internal composition, cross section and associations of the features. Horizontal and vertical controls remained the same as was used at Loeve-Fox, and feature matrix was washed through both coarse ($\frac{1}{4}$ -inch mesh) and fine (window screen) sieves to assist in the recovery of material culture remains.

For analysis purposes, the nine features encountered in StU III are segregated into morphological groupings in the same manner as was done at the Loeve-Fox Site. Only two of the major morphological groups are represented at the Loeve Site; these are: (1) cooking/heating features, and (2) other cultural features. These major groups are further subdivided on the basis of internal composition and presumed function. Brief narrative descriptions of the feature groupings are presented below; a summary of the individual feature data is included in tabular form following the description of each group.

Cooking/Heating Features

Two major morphological categories, Rock-lined Hearths and Burned Clay/Charcoal features, are included within this broad functional grouping. It is assumed that these features served as cooking facilities or for the production of heat for other purposes.

Rock-lined Hearths

These features are distinguished by the presence of intentionally placed cobbles which have been subsequently thermally altered. Two varieties of Rock-lined Hearths are recognized.

Large Basin Hearths (3 examples; Figs. 71, 72 and 74)

Description: In plan form, these features are circular arrangements of contiguous, frequently overlapping, thermally altered stones while in cross section they exhibit a shallow basin shape. Each of the three examples in this category appears to contain multiple layers of stones, and two of them (F-59 and F-66) exhibit intensive firing of the immediately surrounding matrix.

Composition: The primary elements of these features consist of thermally altered cobbles and spalls which appear to be readily available limestone and conglomerate gravels. However, chert cobbles are also included (although this was probably unintentional) and fire-fractured chert spalls are common. Substantial quantities of charcoal staining imbue the feature matrix with a medium gray to dark gray color. Grayish ash is also present in at least one of the features (F-66), and burned clay lumps are scattered throughout the fill. As noted above, the surrounding matrix, including clay and in situ gravels, is intensively burned in the area of F-59 and F-66.

Discussion: Two of the features, F-59 and F-66, are closely superimposed; the larger hearth, F-59, is earlier and the later F-66 hearth is wholly contained within the boundaries of F-59. While there is little question that the two hearths were constructed and used within a short period of time, there is at least one minor flood episode which separates the two features. In plan view it is practically impossible to separate the two hearth outlines; however, a distinctive burned clay lining readily indicates the extent of F-66 in profile view.

Dimensions:

<u>F#</u>	<u>Recog. El.</u>	<u>Base El.</u>	<u>Max.L.</u>	<u>Max.W.</u>	<u>Max. Depth</u>
59	94.74	94.47	190	150+	27
60	95.74	95.40	170	120+	34
66	94.74	94.55	145	105+	19

Provenience:

<u>F#</u>	<u>XU</u>	<u>Grid. Coord.</u>	<u>Stratum</u>	<u>Cultural Phase</u>	<u>Remarks</u>
59	6	N1170.1/W905.35	III-1	Circleville	F-65 & F-66 associated; 9,650 ± 910 (Tx-3405)
60	5	N1143.75/W931.65	III-1	Circleville	F-61 & F-64 associated
66	6	N1170.1/W905.2	III-1	Circleville	F-59 & F-65 associated

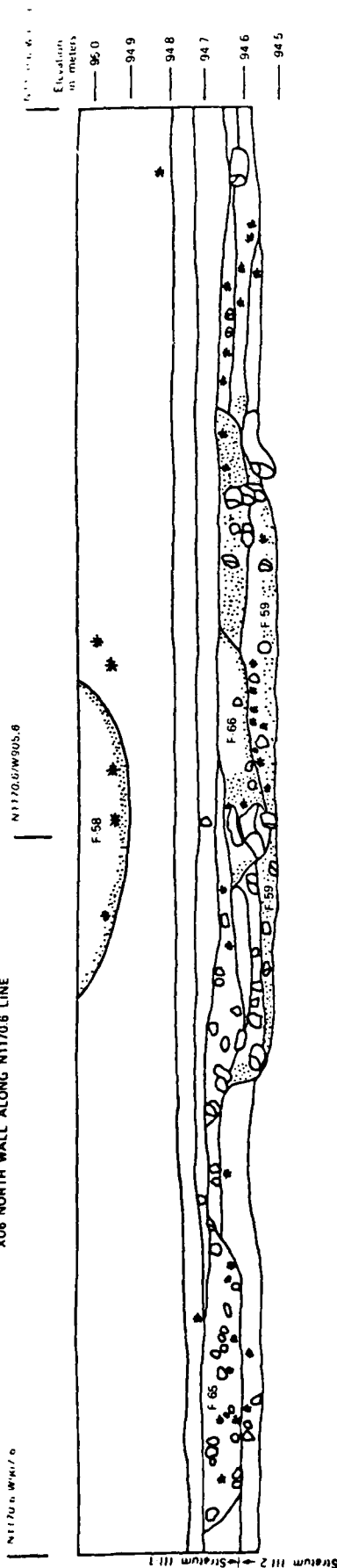
FIGURE 71

41WM133, X116

PROFILES: F-58, F-59, F-65, F-66

X16 NORTH WALL ALONG N1170.6 LINE

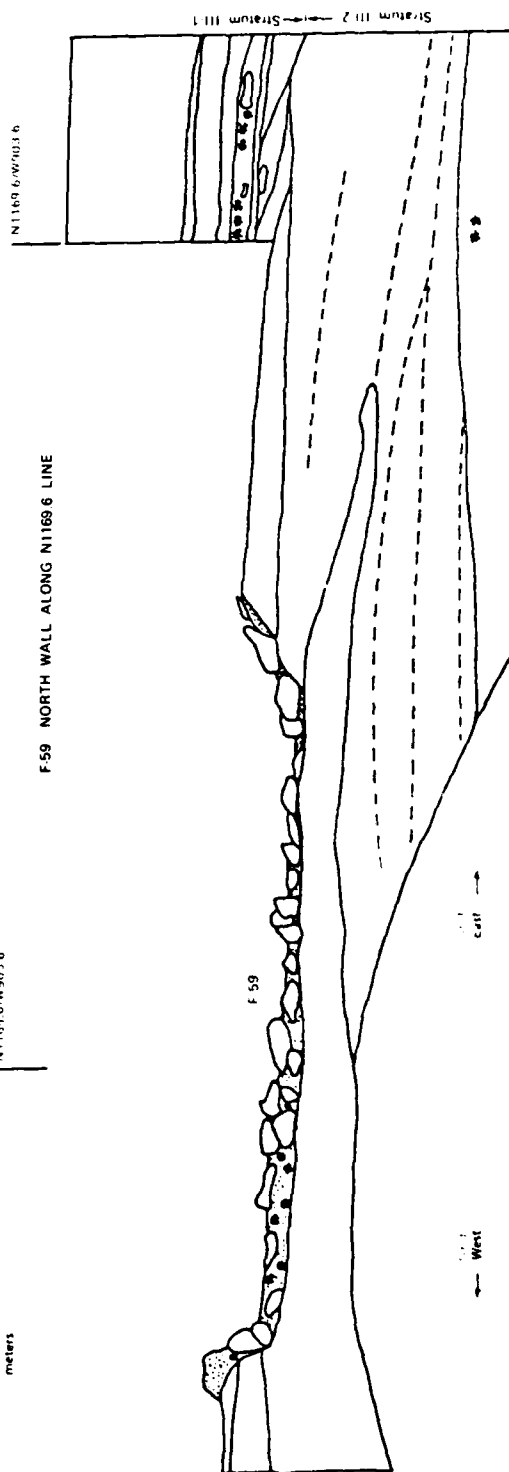
N1170.6/W1170.6



F-59 NORTH WALL ALONG N1169.6 LINE

N1169.6/W1169.6

Elevations in meters
95.0
94.9
94.8
94.7
94.6
94.5
94.4
94.3
94.2



Medium Basin Hearth (1 example; Figs. 71 and 72)

Description: This feature is segregated from the preceding group on the basis of size alone. The basic characteristics, circular plan form, shallow basin cross section, and formal arrangement of hearth stones, are the same as for the Large Basin Hearths. As was the case with F-60, the surrounding matrix is not scorched.

Composition: Similar to its larger counterparts, the primary elements in this feature are burned limestone cobbles, charcoal staining, and burned clay lumps. No ash was noted in the feature fill.

Discussion: This feature is not as well defined as its immediately adjacent neighbors, F-59 and F-66. Although it appears to be a formally constructed hearth, there may have been post-depositional disturbances which have partially disrupted it. It is clear that it is associated with the same general occupational episode(s) represented by F-59 and F-66; however, it is not clear whether it represents a third short-term event (it is slightly higher than the adjacent two features) or whether it is one of a series of features on a single surface. This feature is probably associated with the previously designated F-37/F-49 hearth complex described as Hearth 3 by Eddy, and represents a continuation of a relatively widespread distribution of occupational debris.

Dimensions:

<u>F#</u>	<u>Recog. El.</u>	<u>Base El.</u>	<u>Max.L.</u>	<u>Max.W.</u>	<u>Max. Depth</u>
65	94.84	94.55	75	65+	29

Provenience:

<u>F#</u>	<u>XU</u>	<u>Grid. Coord.</u>	<u>Stratum</u>	<u>Cultural Phase</u>	<u>Remarks</u>
65	6	N1170.5/W907.2	III-1	Circleville	F-59 & F-66 associated; F-37/F-49 probably associated

Burned Clay/Charcoal Features

As was the case at the Loeve-Fox Site, this feature category is separated from Rock-lined Hearths on the basis of a lack of intentionally placed hearth stones although the internal composition does not differ significantly.

Burned Clay/Charcoal Pit (1 example; Figs. 71 and 73)

Description: The one example in this group is roughly circular in plan form and is basin-shaped in cross section. It appears to be a shallowly excavated basin which is very similar to those dug for the construction of Rock-lined Hearths.

XUG, FLOOR PLANS F 59, F-65 and F 66



Composition: Very few small burned rock spalls were noted in the feature fill. The primary identifying elements are charcoal staining and burned clay lumps with traces of possible ash. The walls of the pit are intensively scorched and provide ready visibility of the limits of the feature.

Discussion: The single feature in this category, F-58, is clearly higher in the deposits than the nearby F-59, F-65 and F-66; it is separated from the top of F-66 by a minimum of 12 centimeters and undoubtedly represents a slightly later occupation of the site during the Circleville Phase. One additional aspect of this feature should be noted; a dense concentration of *Rabdotus* sp. snail shells covered the top of the feature. It appears that following the abandonment of the feature, one of two things occurred; either the snails were attracted to decomposing organic materials in the pit, or a low-intensity flood washed the snail shells into the surficially exposed shallow depression which marked the feature. The latter interpretation of the presence of the snail shells is favored here.

Dimensions:

<u>F#</u>	<u>Recog. El.</u>	<u>Base El.</u>	<u>Max.L.</u>	<u>Max.W.</u>	<u>Max. Depth</u>
58	95.05	94.91	95	60+	14

Provenience:

<u>F#</u>	<u>XU</u>	<u>Grid. Coord.</u>	<u>Stratum</u>	<u>Cultural Phase</u>	<u>Remarks</u>
58	6	N1170.45/W905.6	III-1	Circleville	

Other Cultural Features

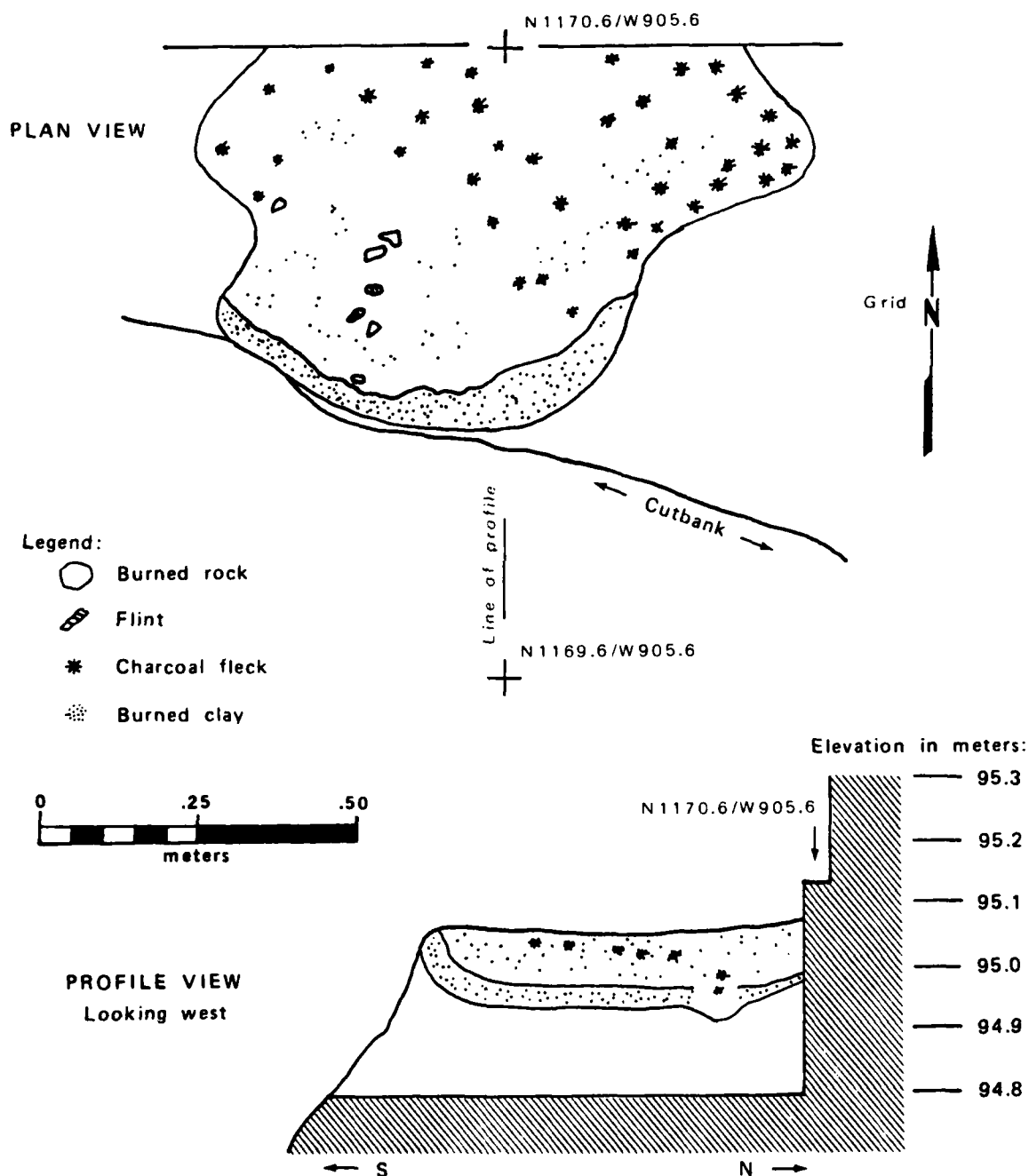
An additional two major categories of features are included in this grouping. In contrast to the formally constructed Cooking/Heating features described above, the features in this group are considered to be informal in that they represent the by-products of cultural activities and are not resultant from intentional construction efforts.

Mussel Shell Concentration (1 example; Figs. 74 and 75)

Description: The single feature in this category, F-64, is quite similar to the two mussel shell concentrations described for the San Marcos Phase of the Loeve-Fox Site. F-64 is oval in plan view and is essentially flat in cross section. The cluster of shells appears to have been discarded in a small heap on a living surface; there is no evidence of intentional placement in a pit, nor is there any evidence to suggest the shells were used for tools or other purposes other than that the animal was eaten and then the valves were discarded.

Composition: The single component of this feature consists of the valves of discarded mussel shells. Several burned rocks associated with

FIGURE 73
F-58 BURNED CLAY/CHARCOAL PIT
PLAN AND PROFILE VIEWS



T.A.S./Bement/1982

Figure 74. Photograph of XU6; general view and F-59, looking east.

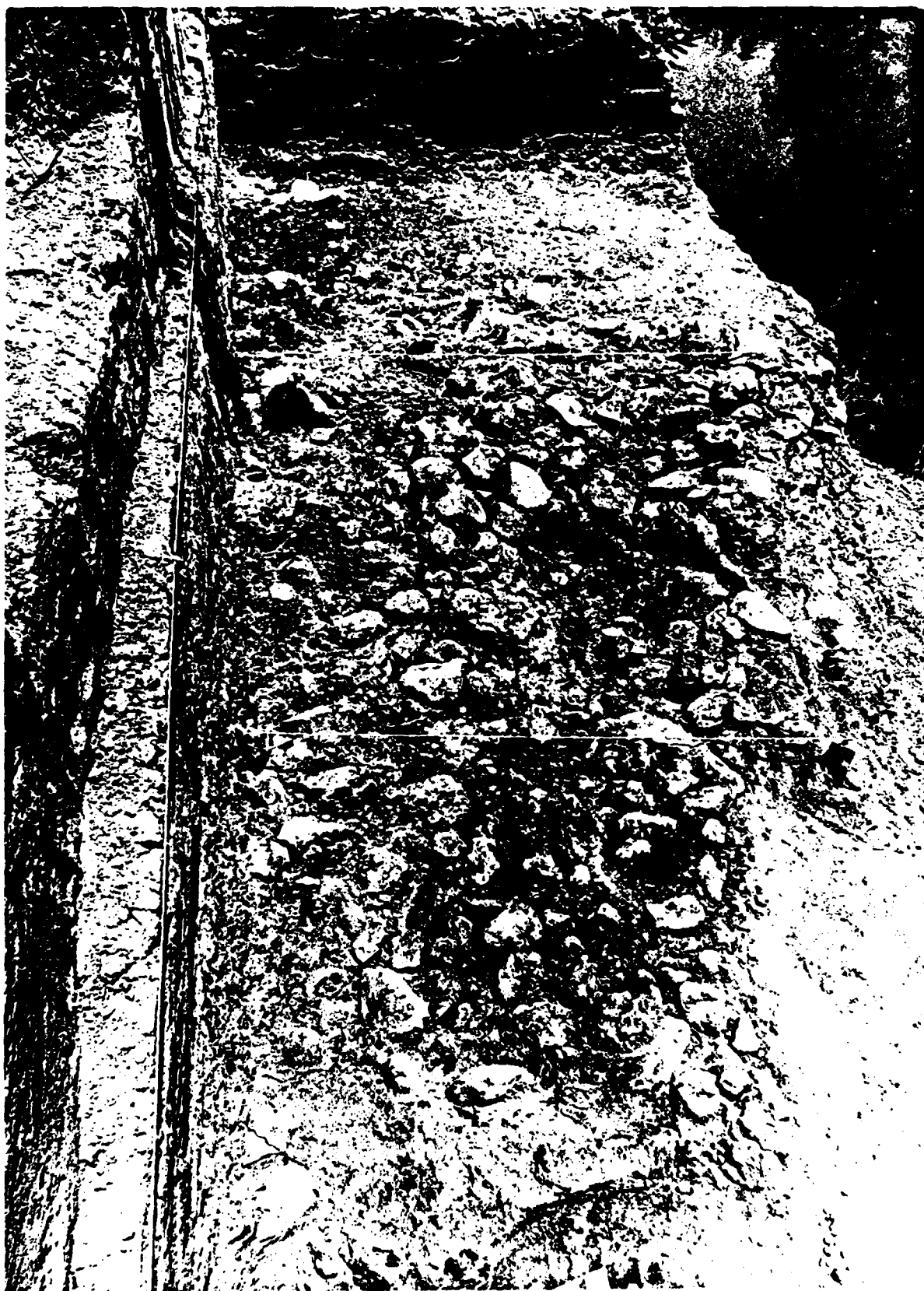


FIGURE 72

the encompassing F-61 are contained within the limits of the concentration, but are not considered to be essential components of F-64.

Discussion: The F-64 mussel shell concentration is adjacent to the F-60 Large Basin Hearth and is contained within the broadly distributed F-61 burned rock scatter. It appears that the shells represent the remains of one or more meals and form one activity-specific component of an apparent living surface.

Dimensions:

<u>F#</u>	<u>Recog. El.</u>	<u>Base El.</u>	<u>Max.L.</u>	<u>Max.W.</u>	<u>Max. Depth</u>
64	95.65	95.54	85	40	11

Provenience:

<u>F#</u>	<u>XU</u>	<u>Grid. Coord.</u>	<u>Stratum</u>	<u>Cultural Phase</u>	<u>Remarks</u>
64	5	N1145/W931.7	III-1	Circleville	F-60 & F-61 associated

Burned Rock Scatters (3 examples; Fig. 76)

Description: The features included in this category consist of informal scatters of fire-fractured rocks. The plan form of these scatters is irregular although they may form roughly circular or oval patterns if they are ever fully exposed and documented. In cross section, the scatters are essentially flat; however, this is somewhat misleading in that the surface on which the scatters are deposited appears to have been irregular and probably slightly undulating.

Composition: The primary recognition element of these features consists of fire-cracked rocks. Other materials are present, though, and consist of scattered charcoal staining, burned clay lumps, discarded animal bones, mussel shells, waste chipping debris and discarded stone tools. One concentration of mussel shells is described separately as F-64.

Discussion: All three of the burned rock scatters are contained within XU5 and appear to be associated with the F-60 Large Basin Hearth. The scatters appear to represent the trash which accumulated during normal camping activities and the accompanying daily subsistence and maintenance which would have been required of a small hunting and gathering group.

Dimensions:

<u>F#</u>	<u>Recog. El.</u>	<u>Base El.</u>	<u>Max.L.</u>	<u>Max.W.</u>	<u>Max. Depth</u>
61	96.00	95.70	300+	250+	30
62	95.85	95.70	250+	125+	15
63	96.10	96.00	125+	65+	10

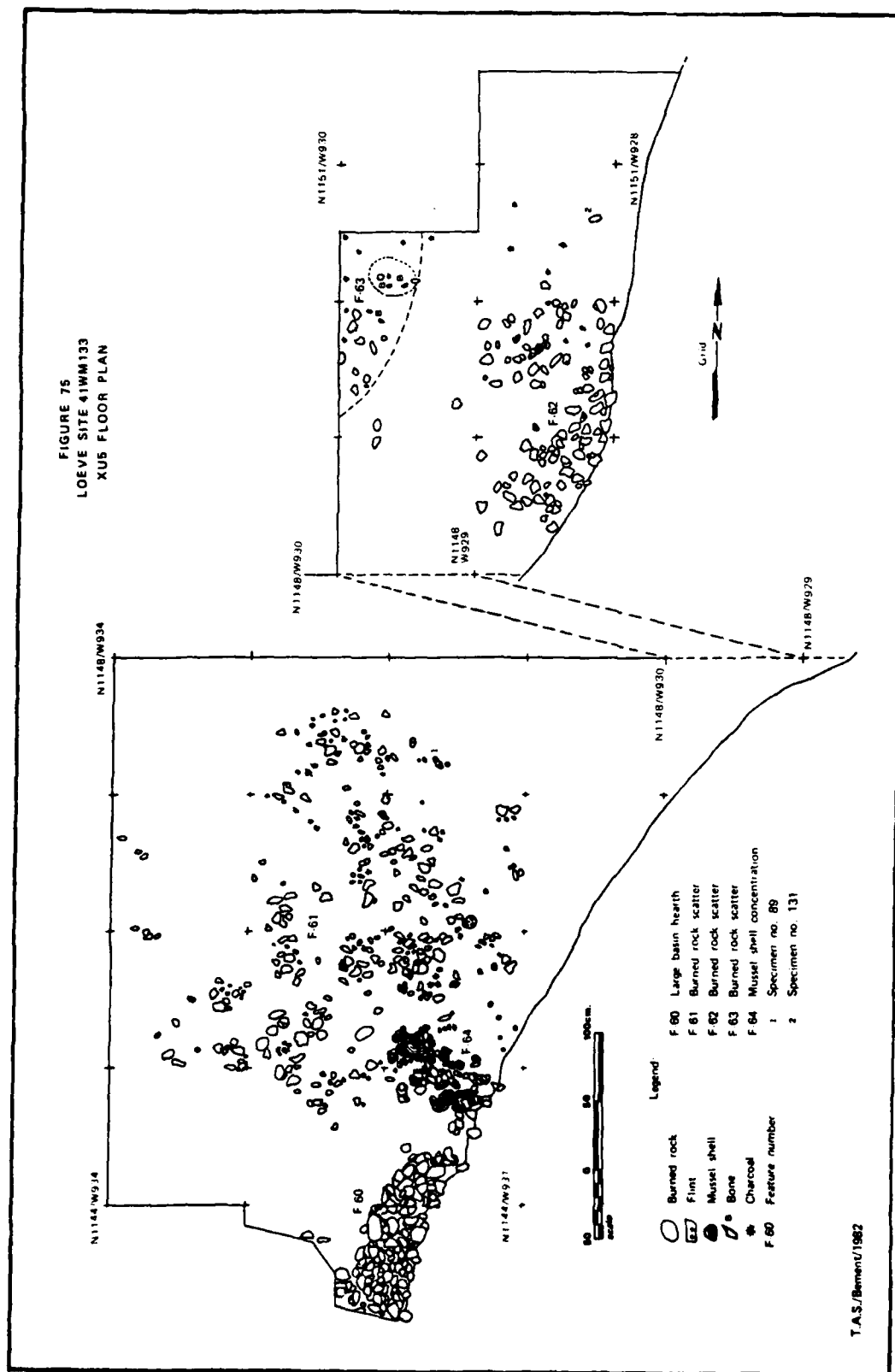


Figure 76. Photographs of XU5; F-61 and F-64

- a. Burned rock scatter, F-61, exposed in curtbank. Looking northwest.
- b. Mussel shell concentration, F-64, looking west.



FIGURE 76

Provenience:

<u>F#</u>	<u>XU</u>	<u>Grid. Coord.</u>	<u>Stratum</u>	<u>Cultural Phase</u>	<u>Remarks</u>
61	5	N1146/W932	III-1	Circleville	F-60 & F-64 associated; F-62 & F-63 probably associated
62	5	N1149.25/W928	III-1	Circleville	F-60, F-61, F-63 & F-64 probably associated
63	5	N1150/W930	III-1	Circleville	F-60, F-61, F-62 & F-64 probably associated

ARTIFACT DESCRIPTIONS

The artifacts recovered from the Loeve Site during the 1978 investigations are treated in the same manner as were the artifacts from the Loeve-Fox Site. All of the 1,241 artifacts are lithics; no shell, bone or other prehistoric artifacts were recovered. The lithic artifacts are divided into general categories on the basis of overall treatment, then further divided on the basis of gross morphological descriptive groupings. These, then, are subdivided into specific groupings which correspond to formal types. Measurements and notations for artifacts are presented in the same manner as was done for those described from the Loeve-Fox Site earlier in this report.

Chipped Stone

Projectile Points (2 specimens; Fig. 77a and b)

Description: Both of these specimens are lanceolate in outline and both are fragmentary in that they lack their distal tips. The first specimen (No. 89) appears to have been long and relatively narrow in relation to its length. The distal tip was removed as a result of a transverse roll fracture; burinlike blows are exhibited on both lateral edges and originate from the platform created by the roll fracture. No evidence of wear (which would indicate use) is visible on either of the burinlike bits; it is probable that the entire set of fractures resulted from impact with a hard object as opposed to intentional shaping into a second generation tool form. The lateral edges appear to have been gently convex and grade into the stem or hafting element. A short projection marks the juncture of the blade with the stem on either lateral edge; one of these has been partially removed by a blow originating from this juncture; one lateral edge is gently convex while the other is gently concave. Both stem edges are smoothed while the shallowly concave base shows no evidence of smoothing. Oblique transverse flaking occurs on both faces of this specimen. The alternate faces of the

lateral edges of the blade show evidence of at least one episode of resharpening, and a short projection at the base of one lateral fracture indicates that, prior to breakage, the lateral blade edges may have been unevenly serrated.

The second specimen (No. 131) appears to have been slightly shorter than and the blade more uniformly wide in relation to the overall length. The distal tip has been removed by striking a burinlike blow diagonally from one lateral edge. There is no evidence of wear to suggest this piece was used as a burin, and it probably did not function as a second generation tool. The lateral blade edges are fairly uniformly parallel although one is gently convex and the other is gently concave. The blade edges are fairly steeply beveled on alternate faces, and both are uniformly serrated. Neither face exhibits collateral flaking except on the bevels; both faces of either lateral edge indicate at least one episode of resharpening. The serration and beveling cease at the juncture of the blade with the stem. The lateral edges are smoothed; one is straight and the other is very gently convex. The stem contracts strongly to the gently concave base which is not smoothed; however, a tiny portion of one corner of the base is lacking.

Discussion: Both of these specimens, particularly No. 89, resemble artifacts which are commonly and loosely referred to as the Angostura type in Texas (Suhm and Jelks 1962:167). While there are vague similarities, to the Angostura and Agate Basin types as discussed and illustrated by Wormington (1957:138-142), the present two specimens do not compare comfortably with these groups. There are greater similarities with the Angostura-like points reported from the Levi Rockshelter about 75 kilometers to the southwest of the Loeve Site (Alexander 1963:513-516) although beveling and serration apparently do not occur on the Levi Rockshelter specimens. The two specimens from the Loeve Site are quite similar to Angostura points collected from the nearby Tombstone Bluff Site by Clarence Loeve (see description later in this report); however, the Tombstone Bluff examples consist mainly of basal fragments and precludes adequate comparison of the blade characteristics. Probably the most similar specimens are those included in Group VI and Group VII at the Granite Beach Site by Crawford (1965:82-86); both serrations and beveling of the blades are reported on those specimens. Numerous other finds of generally similar specimens have been reported from sites throughout Central Texas and include examples such as those reported by Schuetz (1957:141-145), Suhm (1957:37-38), Kelly (1961:255-256) and Sollberger and Hester (1972:329-300).

Dimensions:

<u>Sp.#</u>	<u>ML</u>	<u>MW</u>	<u>MT</u>	<u>NW</u>	<u>BW</u>	<u>HL</u>	<u>BD</u>	<u>BB</u>	<u>BS</u>	<u>EG</u>	<u>Ser.</u>
89	115*	30*	8	21	11	30	+1	-	-	Y	Y
131	94*	30	9	29	14	24	+1	Y	-	Y	Y

Figure 77. Artifact photographs

- a-b. Angostura-like projectile points
- c-e. Other bifacial implements
- f. Small concave uniface
- g. Graver
- h-i. Scrapers

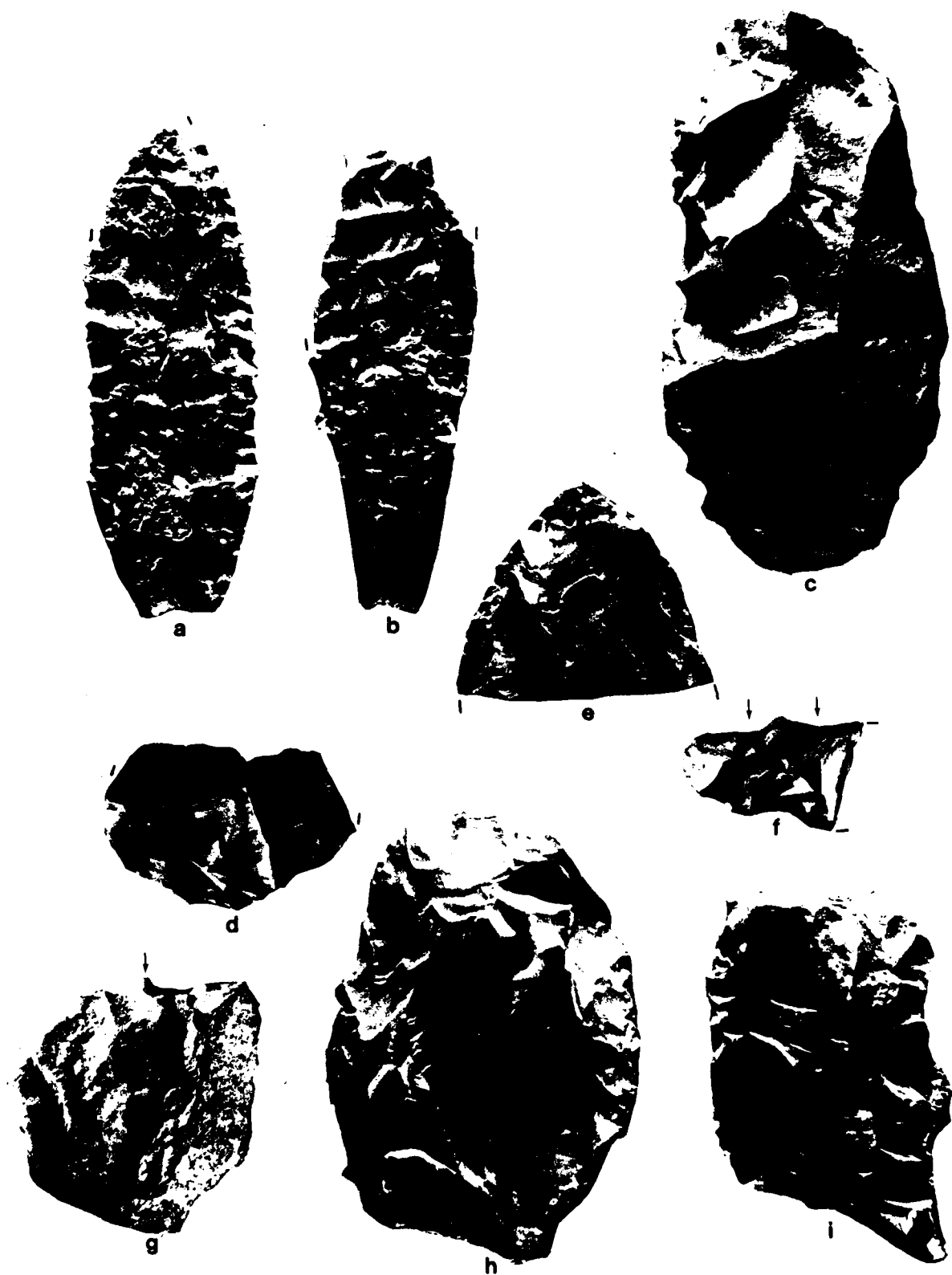


FIGURE 77

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
89	5	N1146/W930	NW	III-1	96.1-96.0	F-61
131	5	N1150/W928	SE	III-1	96.1-96.0	F-62 and F-63

Other Bifacial Implements (3 specimens; Fig. c-e)

Description: The first specimen (No. 202) is a nearly complete elongated core tool or preform. Both ends are convex and the one remaining original lateral edge is gently convex; the other lateral edge appears to have been gently convex, but over half of it is lacking. The entire piece has been thermally altered; a simple small potlid fracture occurs on one face while two larger thermal fractures are exhibited on the other face. Two very small patches of cortex are visible on either face.

The second specimen (No. 207) is a fragment of a crude biface or preform and consists of the lateral edge segment. The remaining bifacially worked edge is sinuous and strongly convex. The remaining specimen (No. 262) consists of the distal end of a large biface which could have been a completed tool but is more likely a preform. The lateral edges are convex and a patch of cortex remains on one face.

Dimensions:

<u>Sp.#</u>	<u>Max. L.</u>	<u>Max. W.</u>	<u>Max. Thick.</u>
202	102	56*	21*
207	44*	30*	13*
262	39*	45*	12*

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
202	5	N1142/W932	NE	III-1	95.5-95.4	
207	5	N1144/W930	NE	III-1	96.0-95.9	
262	5	N1144/W930	NW	III-1	95.7-95.5	

Unifacial Implements

Small Concave Uniface (1 specimen; Fig. 77f)

Description: This fragment consists of one end of an elongated planoconvex implement which retains cortex over about half of the convex surface and which has a rounded edge. A single concave bit occurs along one lateral edge while the other lateral edge exhibits two concave bits. The piece is similar to what has been frequently referred to as spoke shaves.

<u>Sp.#</u>	<u>Max Length</u>	<u>Max Width</u>	<u>Max Thickness</u>	<u>Bit Width</u>
244	30*	20*	14*	14, 11, 10

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
244	5	N1146/W932	SW	III-1	96.0-95.9	

Graver (1 specimen; Fig. 77g)

Description: A small graver bit has been fashioned along one lateral edge of this secondary cortex flake by unifacially chipping from adjacent shallow concavities. The juncture of the two shallow concavities forms a small beaklike projection.

Dimensions:

<u>Sp.#</u>	<u>Beak Length</u>	<u>Beak Width (Base)</u>	<u>Beak Thickness</u>
80	2	3	1

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
80	5	N1146/W930	NE	III-1	96.2-96.1	

Scrapers (4 specimens; Fig. 77h and i)

Description: Two of the specimens are complete and two are fragmentary. Specimen No. 61 is fashioned from a stream-tumbled large natural flake; the dorsal face has been rechipped and a scraping bit fashioned along both lateral edges while the ventral face of the flake remains unmodified. The second complete specimen, No. 72, is fashioned from a large percussion flake. The striking platform, one lateral edge and the distal end are unmodified; however, the remaining lateral edge has been unifacially worked to form a scraper bit. The first of the fragmentary specimens, No. 135, consists of an irregular portion of a larger piece which retains a portion of one unifacially retouched lateral edge. The second fragmentary specimen, No. 218, consists of the distal end of a large flake which has been retouched to form a scraper bit. Portions of the dorsal surface are covered with cortex.

Dimensions:

<u>Sp.#</u>	<u>Bit Length</u>	<u>Bit Thickness</u>	<u>Bit Angle</u>
61	71, 61	13, 9	65°, 30°
72	46	10	66°

<u>Sp.#</u>	<u>Bit Length</u>	<u>Bit Thickness</u>	<u>Bit Angle</u>
135	24*	8	46°
218	34	5	37°

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
61	5	N1144/W930	SW	III-1	96.1-96.0	
72	5	N1144/W932	SE	III-1	96.1-96.0	
135	6	N1168.6/ W903.6	NE	III-1	95.05-95.0	
218	5	N1144/W932	NE	III-1	96.0-95.9	

Edge-damaged Flakes, Lateral (5 specimens)

Description: Three of these specimens are complete and two are fragmentary. Each flake exhibits minor retouch along one lateral edge, but is not otherwise worked into any particularly consistent form. This group appears to represent tools of convenience.

Dimensions:

<u>Sp.#</u>	<u>Max Length</u>	<u>Max Width</u>	<u>Max Thickness</u>	<u>Bit Length</u>
65	23*	17*	5*	18*
73	39	26	4	18
80	37	29	6	27
221	18*	7*	3	9*
244	47	41	5	39

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
65	5	N1144/W932	NE	III-1	96.2-96.1	
73	5	N1144/W932	SW	III-1	96.1-96.0	
80	5	N1146/W930	NE	III-1	96.2-96.1	
221	5	N1144/W932	NW	III-1	96.0-95.9	
244	5	N1146/W932	SW	III-1	96.0-95.9	

Edge-damaged Flakes, Distal (1 specimen)

Description: This heavily patinated piece is similar to the previous grouping except that the retouched edge is on the end opposite the bulb of percussion.

Dimensions:

<u>Sp.#</u>	<u>Max Length</u>	<u>Max Width</u>	<u>Max Thickness</u>	<u>Bit Length</u>
86	39	24	6	20

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
86	5	N1146/W930	NE	III-1	96.1-96.0	

Chipping Debris

Cores

This head category includes chert cobbles which appear to have served as sources of flint. The categorization of these locally obtainable materials follows the system used in the description of similar materials from the Loeve-Fox Site.

Tested Cores (2 specimens)

Description: Each of these two small cobbles has had two opposing flakes removed where the facet created by the first flake served as a striking platform for the second flake. Both were apparently deemed unsuitable for further reduction by the prehistoric knappers and were discarded without further modification.

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
122	5	N1150/W926	SW	III-2	95.6-95.5	
250	5	N1146/W932	NW	III-1	95.9-95.8	

Partially Reduced Cores (2 specimens)

Description: These specimens differ from the previous category in that ground flakes were removed, but the cores were not reduced beyond the point where additional flakes could be removed.

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
239(2)	5	N1146/W930	NE	III-1	95.9-95.8	

Expended Cores (7 specimens)

Description: These small specimens appear to be cores which have been reduced to the point where additional desirable flakes could not be removed.

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
74	5	N1144/W932	NW	III-1	96.1-96.0	
93	5	N1146/W930	NW	III-1	96.2-96.1	
98	5	N1146/W932	SE	III-1	96.1-96.0	
110	5	N1148/W928	SW	III-1	95.9-95.8	
120a	5	N1150/W926	SW	III-1	95.8-95.7	
199	5	N1142/W932	NE	III-1	95.6-95.5	
209	5	N1164/W930	NW	III-1	96.0-95.9	

Core Fragments (11 specimens)

Description: These fragmentary pieces could be classified as large flakes; however, they appear to be segments of cores which were accidentally split during the reduction process.

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
141	6	N1168.6/ W903.6	NE	III-1	94.9-94.8	
203(3)	5	N1144/W930	SW	III-1	95.7-95.6	
204	5	N1144/W930	SW	III-1	95.6-95.5	
210	5	N1144/W930	NW	III-1	96.0-95.9	
212	5	N1144/W930	NE	III-1	95.9-95.8	
238(2)	5	N1146/W930	NW	III-1	95.9-95.8	
239	5	N1146/W930	NE	III-1	95.9-95.8	
258	5	N1148/W928	NW	III-1	96.1-96.0	

Waste Flakes

Flint Flakes (1,192 specimens)

Description: Flakes and chips which appear to represent waste debris resulting from core reduction and tool manufacture are included in this category. Flakes which were produced as a result of fire-fracturing (potlids) are not included; however, flakes which were apparently accidentally burned following their removal from a tool are placed in this category. Tiny flakes recovered from fine-screening of feature silt are not recorded in the present tabulation of waste flakes.

Provenience: See Table 37 for provenience of the flakes.

TABLE 37. 41WM133, Loeve Site. Provenience of All Artifacts

		XU5												XU6																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
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Quadrats Within a Square Are Designated by: 1=NW, 2=SW, 3=SE, 4=NE

Battered Stone

Hammerstones (3 specimens)

Description: Each of these large pebbles exhibits battering which indicates use as a hammerstone. Specimen No. 239 is a thin, fine-grained limestone pebble which exhibits intensive battering on one end and on both lateral edges. Two large flakes have been removed from one face as a result of the edge battering. Specimen No. 250 is a thin, pear-shaped limestone pebble which exhibits moderate battering on two lateral edges. This specimen has been lightly burned following its use as a hammerstone. The third specimen, No. 253, is a large thick chert pebble which is battered along two lateral edges and one corner. The stream-tumbled pebble is otherwise unaffected.

Dimensions:

<u>Sp.#</u>	<u>Max. L.</u>	<u>Max. W.</u>	<u>Max. Thick.</u>	<u>Material</u>
239	64	50	26	Limestone
250	60	52	22	Limestone
253	58	57	32	Chert

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
239	5	N1146/W930	NE	III-1	95.9-95.8	
250	5	N1146/W932	NW	III-1	95.9-95.8	
253	5	N1148/W928	NE	III-1	95.8-95.7	

Hammerstone Fragments (4 specimens)

Description: These artifacts appear to be fragments which resulted from hammerstone failure. All are too fragmentary for meaningful measurements.

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
195	5	N1142/W932	NE	III-1	95.7-95.6	
201	5	N1142/W932	NE	III-1	95.6-95.4	
262(2)	5	N1144/W930	NW	III-1	95.7-95.5	

Miscellaneous Stone

Ocher (3 specimens)

Description: These three specimens consist of small nodules of fine-grained hematite. There are no facets or striations visible on any

of the pieces, and it is doubtful that they were used as sources of red pigment. They are included here to demonstrate that this resource is present at the site.

Dimensions:

<u>Sp.#</u>	<u>Max. L.</u>	<u>Max. W.</u>	<u>Max. Thick.</u>
248	19	12	12
249	14	13	9
249	11	9	4

Provenience:

<u>Sp.#</u>	<u>XU</u>	<u>2x2 Unit</u>	<u>Cell</u>	<u>Stratum</u>	<u>El.(m)</u>	<u>Association/ Remarks</u>
248	5	N1146/W932	SW	III-1	95.9-95.8	
249(2)	5	N1146/W932	NW	III-1	95.9-95.8	

INTERPRETATIONS

The limited excavations at the Loeve Site obviously produced limited information (Tables 38 through 43) in comparison to the large quantity of data recovered from the adjacent Loeve-Fox Site. However, the importance of the features and materials recovered from the lower components of the Loeve Site should not be underestimated. The interpretation format used for this site is similar to that used for the Loeve-Fox Site; however, since the excavations were concentrated in one stratum, the interpretations are not presented as a reconstruction of the cultural history of the site. Rather, the interpretations deal with the reconstruction of some of the events which occurred in what has been labeled as Stratum III-1 at the Loeve Site.

The cultural remains encountered in Stratum III-1 are felt to be assignable to the Circleville Phase of the Central Texas chronological scheme (Prewitt 1981). The general characteristics of this phase, and the reasoning for the placement of the phase in the early Archaic Stage, are described later in this report following a discussion of the nearby Tombstone Bluff Site.

The Circleville Phase occupations at the Loeve Site are characterized by the presence of Angostura-like projectile points, large basin hearths, and burned rock scatters. The horizontal patterning of the features and debris is difficult to interpret due to the small areas excavated; however, XU5 in particular seems to exhibit hints of patterning which may be significant to the interpretation of the activities which may have been carried out at this site.

The placement of XU5 was intentional in the sense that it was situated in such a way that the F-60 hearth exposed in the cutbank could be examined. Further, thinly scattered debris extending downstream from

TABLE 38
FEATURE INVENTORY, CIRCLEVILLE PHASE, StU III-1

Type	Number	Percentage
Large basin hearths	3	33.33%
Medium basin hearth	1	11.11%
Burned clay/charcoal pit	1	11.11%
Mussel shell concentration	1	11.11%
Burned rock scatters	3	33.33%
	<u>9</u>	<u>99.99%</u>

TABLE 39
ARTIFACT INVENTORY, CIRCLEVILLE PHASE, StU III-1

Type	Number
*Angostura-like dart points	2
Other bifacial implements	3
Small concave uniface	1
Graver	1
Scrapers	4
Edge-damaged flakes, lateral	5
Edge-damaged flake, distal	1
Tested core	1
Partially reduced cores	2
Flint flakes	1141
Expended cores	7
Core fragments	11
Hammerstones and fragments	7
Ocher	3
	<u>1189</u>

TABLE 40
COMPARISONS AND INTERPRETATIONS OF ARTIFACT
GROUPINGS, CIRCLEVILLE PHASE

Comparison	Interpretation
(1) Flakes and cores: 97.7% (N = 1,162) All other artifacts: 2.3% (N = 27)	High ratio of chipping debris to other artifacts; considerable knapping required to produce desired tools.
(2) Flakes: 98.2% (N = 1,141) Cores: 1.8% (N = 21)	Low ratio of cores to flakes; initial reduction and subsequent knapping carried out on-site rather than at separate chipping station.
(3) Cores: 75% (N = 21) Hammerstones: 25% (N = 7)	Hard-hammer reduction of cores an important part of lithic technology.
(4) Projectile points: 8.3% (N = 2) All other tools: 91.7% (N = 22)	Projectile points unimportant in terms of full range of tools; hunting not a primary economic pursuit.
(5) Bifacial tools: 20% (N = 3) Unifacial tools: 80% (N = 12)	Tools of convenience preferred over formal tools.
(6) Cutting tools: 100% (N = 3) Crushing tools: 0% (N = 0) Grinding tools: 0% (N = 0)	Crushing and grinding activities not important in comparison to cutting activities.
(7) Cutting tools: 42.9% (N = 3) Scraping tools: 57.1% (N = 4)	Scraping activities slightly more important than cutting activities.

TABLE 41
ARTIFACT INVENTORY, CIRCLEVILLE PHASE, StU III-2

Type	Number
Tested core	1
Flint flakes	32
	<u>33</u>

TABLE 42
ARTIFACT INVENTORY, CIRCLEVILLE PHASE, StU III-3

Type	Number
Flint flakes	8

TABLE 43
ARTIFACT INVENTORY, CIRCLEVILLE PHASE, StU III-4

Type	Number
Flint flakes	7

F-60 was thought to represent associated camping debris, and one intent was to strip the overburden in such a way that the feature and the surrounding materials could be exposed on a horizontal basis. This approach revealed a well-defined mussel shell cluster, F-64, situated within a relatively dense concentration of tools and chipping debris adjacent to the north side of the F-60 large basin hearth (Fig. 78). A well-defined scatter of burned rocks, charcoal flecks and other debris (F-61) partially overlapped the mussel shell concentration and lithic debris concentration in a kidney-shaped area which extends to the north and northwest. Relatively little chipping debris and few tools were recovered from within the burned rock scatter.

In the northwest and northeast corners of XU5, and outside the burned rock scatter, definite increases in chipping debris and tool quantities were noted. Further to the northeast, in the extreme northeast corner of the XU, small portions of two additional burned rock scatters were encountered; however, so little of these features were exposed that definite covariations of other debris and tools could not be determined. It does appear significant, though, that the two projectile points were recovered from areas just outside the burned rock scatters, and in one case there appears to be a fairly discrete association of several tools and cores.

The implications of these apparent patternings are that certain activities were carried out in discrete areas. In particular, mussel consumption and resultant discarding of the shells, lithic reduction, tool manufacture, and tool use were accomplished immediately adjacent (within 2 meters) to the large basin hearth while unusable hearthstones were then discarded in an area immediately adjacent to where those activities were carried out. In terms of food preparation, it is quite likely that the F-64 freshwater mussels were cooked in the F-60 hearth prior to their consumption. Further, it seems that the pattern of hearth, shell concentration, lithic debris concentration, tool concentration, and segregated burned rock scatter probably extends outside the present excavation unit limits and may reflect a generalized patterning for the Circleville Phase occupations of the site. This is partially substantiated by the presence of an apparent mussel shell concentration 2 or 3 meters to the west of the northwest corner of the XU; this feature (not assigned a number) was encountered in an exploratory backhoe trench. Unfortunately, heavy rains occurred shortly after the trench was dug, and the trench filled with mud before the feature could be recorded in detail.

Although XU6 is even smaller than XU5, a slight variation in the feature patterning is indicated in that unit. Similarly to XU5, this unit was strategically placed to provide documentation of the exposed F-59 large basin hearth. Excavation revealed that not only did this hearth consist of two closely superimposed hearths (F-59 and F-66) and an adjacent medium rock hearth (F-65), but the whole complex was overlain by a stratigraphically separable burned clay/charcoal pit (F-58). The presence of F-58 conclusively demonstrates that more than one basic type of cooking/heating feature was used during Circleville Phase times. Further, the closely superimposed nature of these features indicates

successive rapid occupation of the gravel bar and separation of these episodes of use by intervals of flooding.

Since no diagnostic artifacts were recovered from XU6, the assignment of those materials to the Circleville Phase is based on generalized stratigraphy and radiocarbon dating (see previous discussions). It is indeed unfortunate that sufficient areas could not be exposed in this unit to provide a detailed comparison with the apparent patterning noted in XU5.

It is even more unfortunate that the stratigraphically lower components of the Loeve Site were not adequately sampled. A single 1x1-meter cell in the extreme northeastern corner of XU5 penetrated Strata III-2 and III-3, and the top of III-4. This deep test served only to confirm that earlier materials are indeed present in the site, and the full extent of these earlier occupations was not documented either on a vertical or horizontal basis. It may be of significance that Clarence Loeve collected a cervical vertebra fragment of either mammoth or mastodon from Stratum III-6 in an area just downstream from XU6. No direct cultural associations were noted, but this reinforces the interpretation that this stratum represents terminal Pleistocene-age deposits, and the potential presence of associated human occupations should not be ruled out.

While the presence of materials in Stratum III-2 through Stratum III-6 indicates that earlier occupations occurred at the site, the present interpretations must be limited to the small, but significant, areas examined in Stratum III-1.

The overall tone of the occupational features, tools and debris in Stratum III-1 is one of an Archaic Stage hunting and gathering group(s) which camped on an active gravel bar for the basic purposes of collecting freshwater mussels for food, and for the procurement and reduction of lithic materials for the production of lithic tools. That an Archaic lifeway was practiced is indicated by the heavy orientation toward food gathering (or collecting) as demonstrated by the mussel shells and by the ratio of projectile points to other tools. Activity areas appear to be specifically defined and suggest some sort of generalized structure to the encampment although the full magnitude of this possible structuring has not been explored in the present investigations. The nature of the features encountered in XU6 suggests repeated short-term occupations, and this may be reflected to some extent in XU5. The potential patterning noted in XU5 was discussed above as if it encompassed a single event; this has not been satisfactorily demonstrated to be the case. In fact, the vertical distribution of the materials described in Stratum III-1 in XU5 extends over a range of something on the magnitude of 30 to 40 centimeters. While there is no doubt that the surface of the point bar was uneven and undulating to some degree, this may not account for the extent of the vertical distribution. The interpretation favored here is that the features and debris in XU5 represent at least three closely spaced episodes of use and that each of the burned rock scatter/chipping debris/tool/feature associations represents a single camping episode. Unfortunately, this can no more be proven on the basis

of the present evidence any more than can it be proven that these represent a single episode of site use.

It is a certainty that a number of colleagues will be disturbed (more accurately -- violently upset) by the characterization of the Circleville Phase as an Archaic adaptation. Most assuredly, the diagnostic projectile points (Angostura-like) reflect the lithic tradition which is entrenched in the literature as being of the Paleoindian Stage. However, the cultural context suggests an Archaic adaptation, and it is felt that these materials should be referred to as such even in the face of massive inertia in the existing literature.

TOMBSTONE BLUFF SITE, 41WM165

SITE DESCRIPTION

The Tombstone Bluff Site is located 6 kilometers downstream from the Loeve-Fox Site (41WM320). It is 9.5 kilometers northeast of Circleville and 9.5 kilometers southwest of Granger. The site is situated on the edge of the uplands on the south (right) side of the San Gabriel River valley and overlooks the juncture of that valley and the Wills Creek valley.

The remains of a modern farmhouse complex are situated on the western edge of the site. The remainder of the site is in a fallow field which was formerly intensively cultivated. The site name is derived from the presence of two historic-age graves which are located on the edge of the bluff near the north-central portion of the site. Initially recorded by Frank W. Eddy in 1969, the site was reported by Prewitt (1974:143-144).

Surface debris exposed at the site consists of an extensive scatter of lithic debris and occasional tool fragments. However, during the later years in which the site was actively cultivated, Clarence Loeve frequently collected projectile points which were exposed on the surface. On the basis of the materials collected by Loeve, it is clear that the site is of an early Archaic affiliation and this prompted a recommendation that the site be tested to determine if there were intact subsurface deposits contained within the site. This recommendation was carried out during the 1978 season of work in the Granger Lake Archeological District.

EXCAVATION PROCEDURES

The testing strategy employed at the Tombstone Bluff Site is admittedly gross, but it was designed to answer one specific question: Are there intact subsurface cultural deposits present at the site? To answer this question, a series of ten backhoe trenches were excavated to the surface of weathered bedrock. Five of these trenches were excavated along a north-northwest to south-southwest line near the center of the

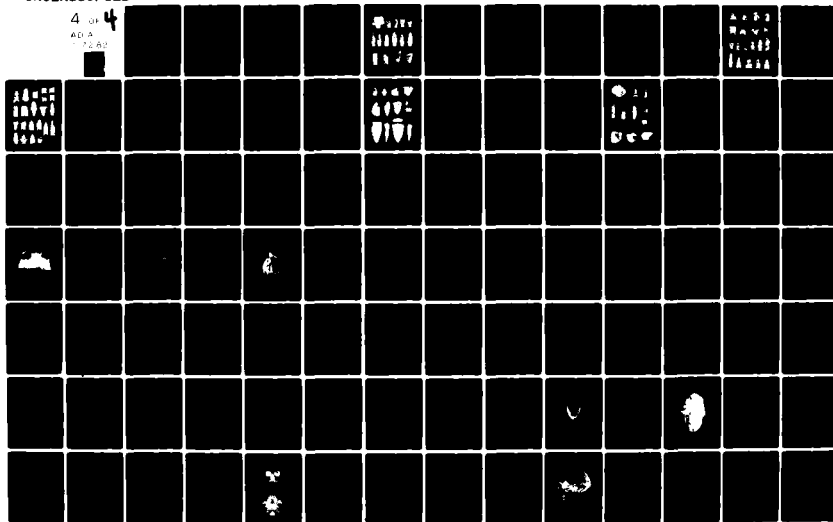
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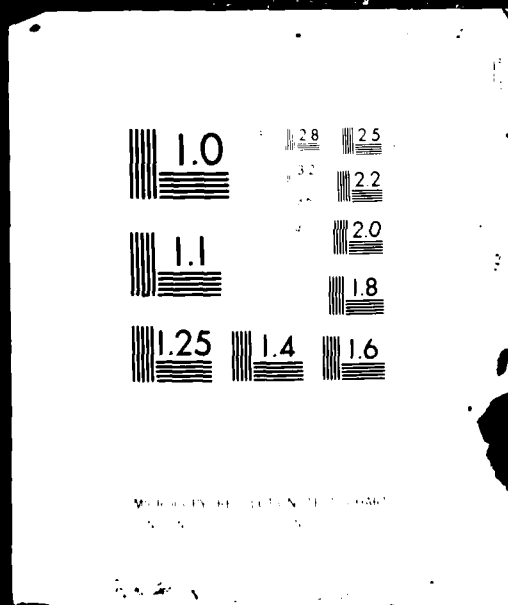
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site while five of the trenches were excavated along a west-southwest to east-northeast axis of the site (Fig. 79).

One face of each backhoe trench was troweled clean and a measured profile sketch was made of each cleaned face (Fig. 80). No additional artifacts were collected, and no hand-excavated units were made at the site. None of the trenches exceeded 1.25 meters in depth, and most ranged from 75 centimeters to 1 meter in maximum depth.

STRATIGRAPHY

The backhoe trenches revealed four major strata within the site. These are labeled in reverse geologic order and are described below. Cultural materials were extremely sparse, and those few items which were noted appear to have been displaced downward through the normal cracking which is characteristic of the clayey soil matrix.

Stratum 1: This dark brown clay loam varies from about 7 to 25 centimeters in thickness. It composes the surface plowzone at the site. Even though considerable lithic debris is exposed on the surface, practically no artifacts were noted in this stratum while recording the backhoe trenches.

Stratum 2: This culturally sterile medium brown clay loam exhibits dark brown vertical illuviation streaks and contains moderate amounts of small caliche gravels. The upper boundary is imprecise and grades into Stratum 1 while the lower boundary with Stratum 3 is very irregular.

Stratum 3: This yellowish brown clay loam is culturally sterile. It contains extensive amounts of caliche gravels and intermittently distributed pockets of weathered chert cobbles. The lower boundary with Stratum 4 is irregular.

Stratum 4: This is the lowest stratum encountered in the backhoe trenches; it is composed of a massive dense white caliche deposit.

ARTIFACT DESCRIPTIONS

The 274 artifacts collected from the surface of the Tombstone Bluff Site by Clarence Loeve, Frank Eddy and the present author are described in this section. None of these materials were collected during the current investigations, and all of the artifacts are lithics; no shell, bone or ceramic artifacts were noted. The lithic artifacts are grouped and described in a manner similar to that used for the Loeve-Fox and Loeve sites earlier in this report.

Projectile Points

Almagre (1 specimen; Fig. 81a)

Description: This broad specimen lacks the distal tip; the blade appears to have been triangular with straight to gently convex lateral

FIGURE 79
SITE MAP, 41WM165

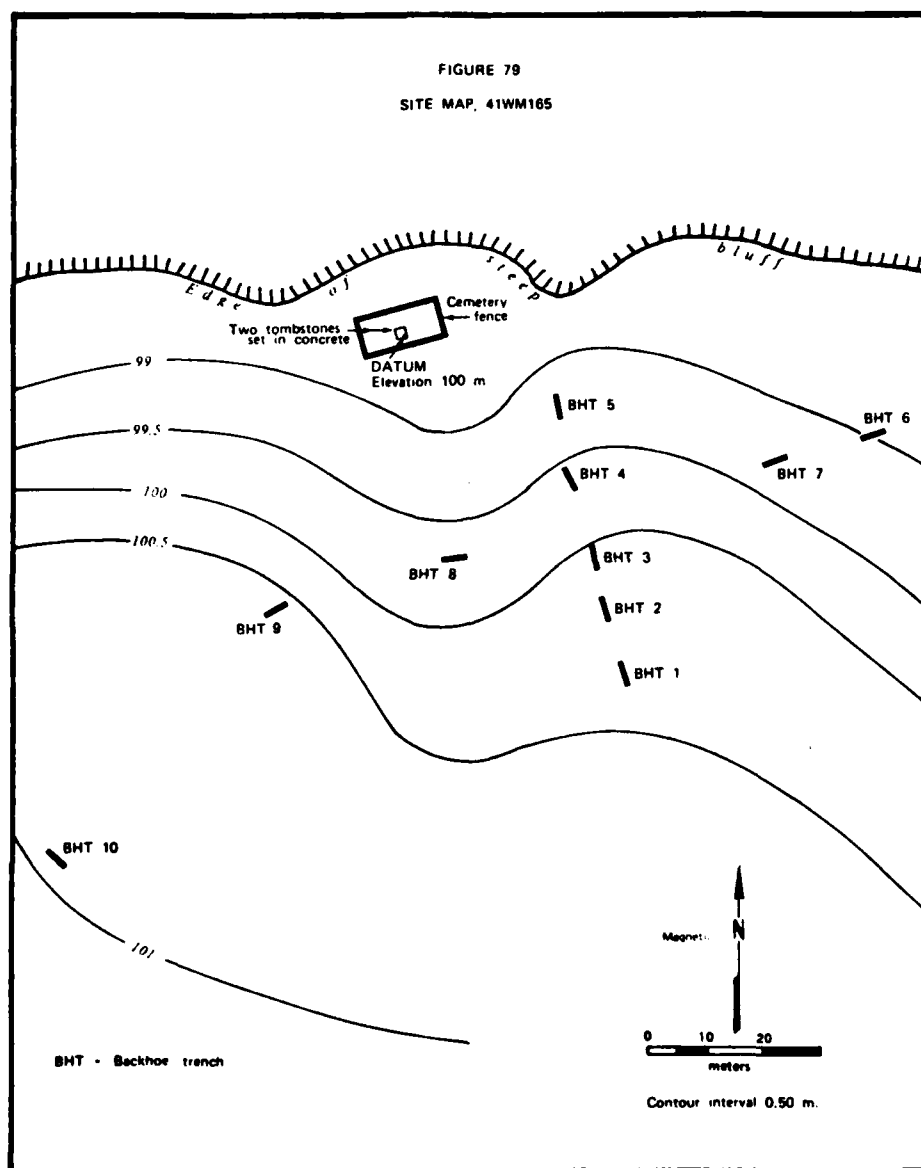


FIGURE 80
REPRESENTATIVE BACKHOE TRENCH PROFILES
41WM165

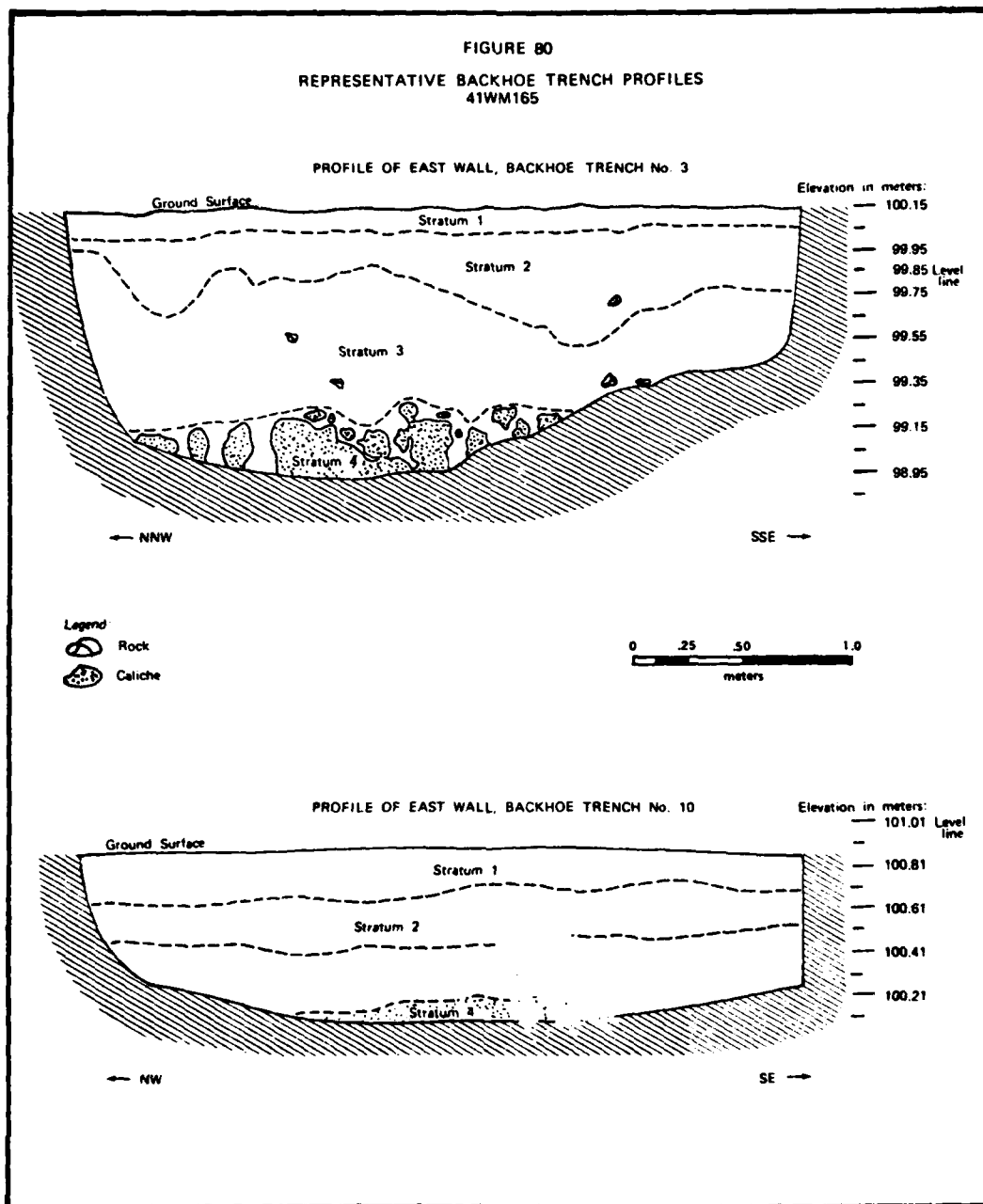
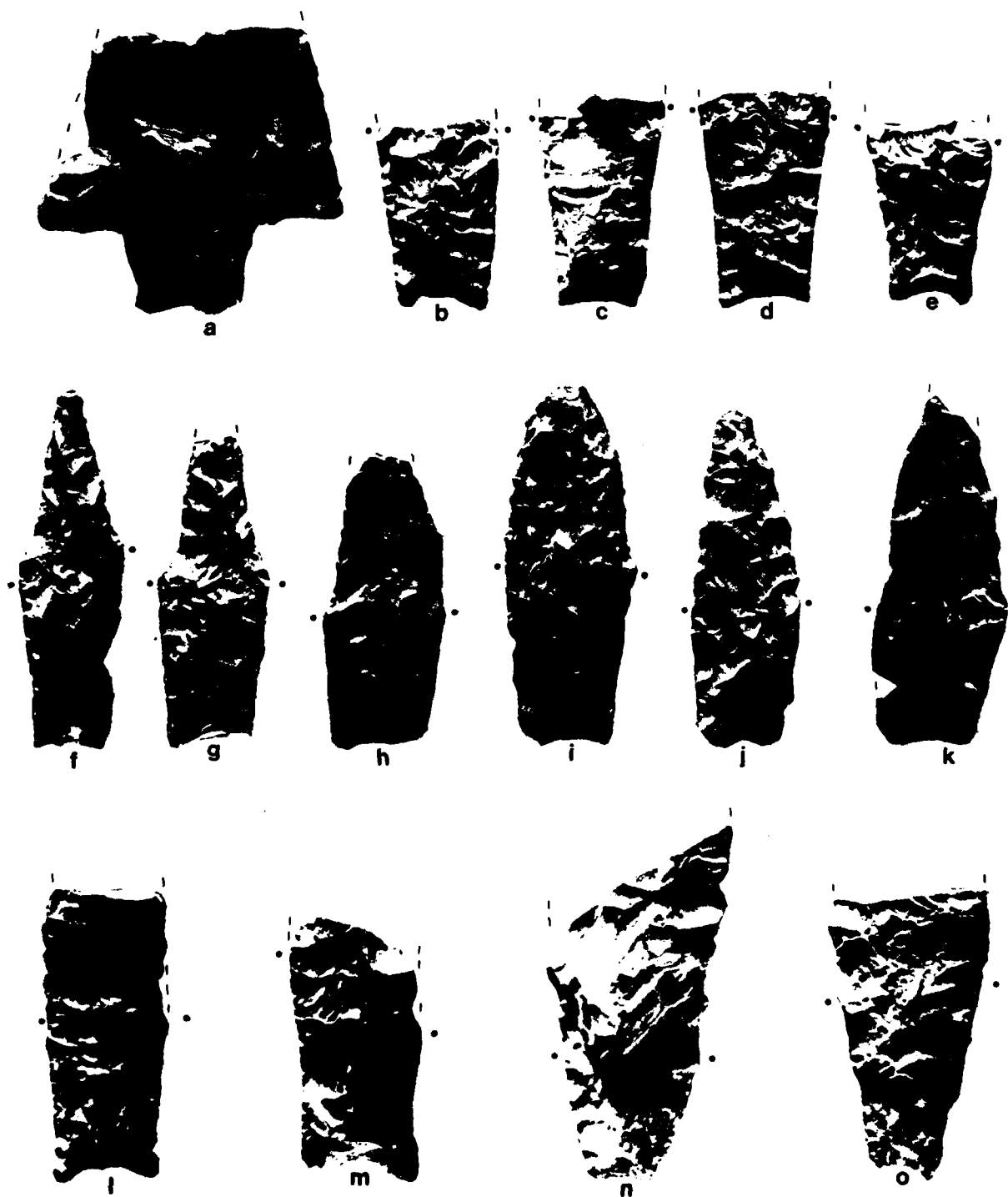


Figure 81. Artifact photographs

- a. Almagre
- b-e. Angostura, Group 1
- f-g. Angostura, Group 2
- h-k. Angostura-like, Group 1
- l-m. Angostura-like, Group 2
- n-o. Angostura-like, Group 3

FIGURE 81



edges, and the shoulders are squared. The short stem contracts gently and has straight lateral edges; the base appears to have been straight to slightly convex, although a burinlike blow from one corner has removed a portion of the base.

Dimensions:

<u>Sp.#</u>	<u>ML</u>	<u>MW</u>	<u>MT</u>	<u>NW</u>	<u>BW</u>	<u>HL</u>	<u>BD</u>	<u>BB</u>	<u>BS</u>	<u>EG</u>	<u>Ser.</u>
1	78*	51	9	23	19	14	0	-	-	-	-

Angostura, Group 1 (13 specimens; Fig. 81b-e)

Description: This entire group consists of basal fragments only and the blade forms cannot be determined. The lateral edges of the contracting stems vary from straight to gently concave; the bases expand slightly on those specimens which have concave lateral edges. The base is straight on one specimen while the remainder are slightly concave. Smoothing along the lateral edges varies from slight to moderate. The bases have been thinned by the removal of one (3 specimens) or more (10 specimens) flakes from each face. Parallel flaking is present on most of the specimens, although additional marginal retouch is visible on most of the examples. With the exception of three specimens which exhibit diagonal fractures, the blades were removed with horizontal snap fractures.

Dimensions:

<u>Sp.#</u>	<u>ML</u>	<u>MW</u>	<u>MT</u>	<u>NW</u>	<u>BW</u>	<u>HL</u>	<u>BD</u>	<u>BB</u>	<u>BS</u>	<u>EG</u>	<u>Ser.</u>
2	65*	21	6	21	16	29	0	-	-	Y	-
3	71*	23*	7	22	15	35	+1	-	-	Y	-
4	72*	27*	7	26	17	34	+1	-	-	Y	-
5	66*	24*	7	22	13	27	+2	-	-	Y	-
6	69*	26*	7	24	13	31	+1	-	-	Y	-
7	63*	23*	6	21	15	29	+2	-	-	Y	-
8	69*	24*	6	22	13	31	+1	-	-	Y	-
9	62*	23*	6	20	15	25	+2	-	-	Y	-
10	68*	25*	6	20	15	23	+1	-	-	Y	-
11	66*	23*	5	21*	13*	26*	0	-	-	Y	-
12	70*	27*	6	23*	14	30	+1	-	-	Y	-
13	67*	23*	6	19	14	24	+1	-	-	Y	-
14	64*	23*	6	19	14	21	+1	-	-	Y	-

Angostura, Group 2 (4 specimens; Fig. 81f-g)

Description: The morphology of this group is the same as was described for Group 1 except that the blades have been reworked into drills or punches. All lack the distal tips; each shaft is steeply beveled on the right edge of each face to form a parallelogram in cross section.

Dimensions:

<u>Sp.#</u>	<u>ML</u>	<u>MW</u>	<u>MT</u>	<u>NW</u>	<u>BW</u>	<u>HL</u>	<u>BD</u>	<u>BB</u>	<u>BS</u>	<u>EG</u>	<u>Ser.</u>
15	63*	12	8	17	13	33	+1	Y	-	Y	-
16	62*	13	6	19	14	24	+1	Y	-	Y	-
17	47*	10	7	18	12	22	0	Y	-	Y	-
18	59	12	7	23	19	22	+1	Y	-	Y	-

Angostura-like, Group 1 (10 specimens; Fig. 81h-k)

Description: These specimens are lanceolate in outline and are similar to those included in Angostura, Group 1. They differ, however, in that the lateral edges of the bases vary from straight to gently convex and parallel flaking is not prevalent. The blades of the six more-complete specimens are beveled on the right edge of each face; the lateral edges of the blades are gently convex. With one exception, these specimens lack their distal tips or substantial portions of the blades; five lack only the distal tip while one lacks the entire blade and two exhibit burinlike fractures which appear to have resulted from impact. One specimen exhibits a horizontal snap fracture from which burin blows have been struck from each lateral edge. All of these specimens have contracting stems and some degree of smoothing is present on the lateral edges of the stems.

Dimensions:

<u>Sp.#</u>	<u>ML</u>	<u>MW</u>	<u>MT</u>	<u>NW</u>	<u>BW</u>	<u>HL</u>	<u>BD</u>	<u>BB</u>	<u>BS</u>	<u>EG</u>	<u>Ser.</u>
19	55	18	7	18	15	23	+1	Y	-	Y	-
20	65*	22	7	22	15	30	+1	Y	-	Y	Y
21	59*	22	7	22	16	23	+1	Y	-	Y	Y
22	62*	22	7	22	14	22	+1	Y	-	Y	-
23	54*	24	8	24	15	19	0	Y	-	Y	-
24	54*	22	7	22	20	26	+2	Y	-	Y	-
25	71*	23*	8	23*	19*	20	0	-	-	Y	-
26	60*	17	8	17	12	27	0	-	-	Y	-
27	67*	25	8	23*	16	21	0	-	-	Y	-
28	72*	26*	9	24*	16*	25	+1	-	-	Y	-

Angostura-like, Group 2 (2 specimens; Fig. 81l-m)

Description: Both of these specimens are basal fragments. The lateral edges contract toward the bases then flare slightly to form small ears; the bases are concave. The blade of one specimen is beveled on the right edge of each face. The stem edges are smoothed.

Dimensions:

<u>Sp.#</u>	<u>ML</u>	<u>MW</u>	<u>MT</u>	<u>NW</u>	<u>BW</u>	<u>HL</u>	<u>BD</u>	<u>BB</u>	<u>BS</u>	<u>EG</u>	<u>Ser.</u>
29	83*	22	7	20	19	29	+2	Y	-	Y	-
30	60*	23*	7	23*	19	36	+3	-	-	Y	-

Angostura-like, Group 3 (2 specimens; Fig. 81n-o)

Description: These two basal fragments may represent manufacturing failures rather than completed tools. The straight to convex lateral edges are not smoothed and contract strongly to narrow bases which are gently concave. While one specimen is relatively well-flaked, the other exhibits a knot on one face which could not be removed.

Dimensions:

<u>Sp.#</u>	<u>ML</u>	<u>MW</u>	<u>MT</u>	<u>NW</u>	<u>BW</u>	<u>HL</u>	<u>BD</u>	<u>BB</u>	<u>BS</u>	<u>EG</u>	<u>Ser.</u>
31	85*	27	8	22	11	28	+2	-	-	-	-
32	96*	30*	9	24	11	29	+1	-	-	-	-

Baird (3 specimens; Fig. 82a-b)

Description: Each of these three stemless triangular specimens lacks the distal tip. The lateral edges are straight to slightly convex and are steeply beveled on the right edge of each face. The shoulders are slightly rounded; the bases are generally straight but vary slightly. Each of the specimens has been thinned at the base by the removal of one or more broad flakes on either one or both faces.

Dimensions:

<u>Sp.#</u>	<u>ML</u>	<u>MW</u>	<u>MT</u>	<u>NW</u>	<u>BW</u>	<u>HL</u>	<u>BD</u>	<u>BB</u>	<u>BS</u>	<u>EG</u>	<u>Ser.</u>
33	62*	29	8	29	29	0	-2	Y	Y	-	-
34	45*	28*	6	28*	28*	0	-2	Y	Y	-	-
35	48*	33*	9	33*	33*	0	-2	Y	Y	-	-

Bell (3 specimens; Fig. 82c-d)

Description: These three specimens lack their distal tips, and two lack portions of one or both barbs. The blades are triangular with straight lateral edges. The barbs are expanding and are formed by nearly vertical corner notches. The stems expand slightly with straight lateral edges and the bases are convex.

Dimensions:

<u>Sp.#</u>	<u>ML</u>	<u>MW</u>	<u>MT</u>	<u>NW</u>	<u>BW</u>	<u>HL</u>	<u>BD</u>	<u>BB</u>	<u>BS</u>	<u>EG</u>	<u>Ser.</u>
36	50*	36*	5	14	18	14	-5	-	-	-	-
37	49*	37*	6	18	21	14	-3	-	-	-	-
38	61*	44	8	17	17	11	-4	-	-	-	-

Golondrina (2 specimens; Fig. 82c-f)

Description: Composed of basal fragments only, these two specimens exhibit straight lateral edges which are smoothed. The lanceolate blades contract slightly toward the base, then flare slightly to form

short ears. The bases are concave and have been thinned by the removal of one or more short flakes from each face.

Dimensions:

<u>Sp.#</u>	<u>ML</u>	<u>MW</u>	<u>MT</u>	<u>NW</u>	<u>BW</u>	<u>HL</u>	<u>BD</u>	<u>BB</u>	<u>BS</u>	<u>EG</u>	<u>Ser.</u>
39	79*	27	7	27	26*	30	+7	-	-	Y	-
40	69*	27	6	27	27	24	+6	-	-	Y	-

Gower (2 specimens; Fig. 82g-h)

Description: The triangular blades of these three specimens have straight to gently concave lateral edges; one specimen is beveled on the right edge of each face. The shoulders vary from squared to moderately barbed. The stems are generally rectangular with straight parallel edges while the bases are strongly concave. The bases have been thinned by the removal of a single large flake from each face. The lateral edges are lightly smoothed, and two are beveled on the left edge of each face. Each specimen lacks the distal tip; the largest exhibits a burin blow on one lateral edge which originates from the transverse snap fracture.

Dimensions:

<u>Sp.#</u>	<u>ML</u>	<u>MW</u>	<u>MT</u>	<u>NW</u>	<u>BW</u>	<u>HL</u>	<u>BD</u>	<u>BB</u>	<u>BS</u>	<u>EG</u>	<u>Ser.</u>
41	69*	50*	8	17	19	17	+3	-	Y	Y	-
42	38*	30*	5	16	16	15	+4	Y	Y	Y	-
43	46*	46*	6	18	17*	16	+3	-	-	Y	-

Gower-like (1 specimen; Fig. 82i)

Description: This specimen is similar to the Gower points described above but differs substantially in the length of the stem. The distal tip is lacking, but the blade appears to have been triangular with gently convex lateral edges; the shoulders are distinct but not barbed. The stem is long and contracts gently with slightly concave lateral edges which are lightly smoothed. The base is concave and has been thinned by the removal of a single large short flake from each face.

Dimensions:

<u>Sp.#</u>	<u>ML</u>	<u>MW</u>	<u>MT</u>	<u>NW</u>	<u>BW</u>	<u>HL</u>	<u>BD</u>	<u>BB</u>	<u>BS</u>	<u>EG</u>	<u>Ser.</u>
44	62*	23	7	17	13	22	+3	-	-	Y	-

Hoxie (12 specimens; Fig. 81j-m)

Description: This group is characterized by long slender blades with straight to gently convex lateral edges which are beveled on the right side of each face. The shoulders are weakly defined. The stems are rectangular to slightly expanding with straight to gently convex

Figure 82. Artifact photographs

- a-b. Baird
- c-d. Bell
- e-f. Golondrina
- g-h. Gower
- i. Gower-like
- j-n. Hoxie
- o. Lerma
- p. Martindale
- q-s. Meserve

FIGURE 82



a



b



c



d



e



f



g



h



i



j



k



l



m



n



o



p



q



r



s

Figure 83. Artifact photographs

a-b. Meserve/Dalton

c. Milnesand

d-h. Plainview

i. Scottsbluff

j-m. Wells

n-o. Miscellaneous Group 1

p-r. Miscellaneous Group 2

s-v. Miscellaneous Group 3

FIGURE 83



Milnesand (1 specimen; Fig. 83c)

Description: The distal end of this lanceolate specimen is lacking and the blade characteristics cannot be determined. The nearly rectangular stem has straight lateral edges which contract very gently to a straight base. The edges are smoothed; the base has been thinned by the removal of multiple short longitudinal flakes from each face.

Dimensions:

<u>Sp.#</u>	<u>ML</u>	<u>MW</u>	<u>MT</u>	<u>NW</u>	<u>BW</u>	<u>HL</u>	<u>BD</u>	<u>BB</u>	<u>BS</u>	<u>EG</u>	<u>Ser.</u>
67	73*	25	7	25	22	26	0	-	-	Y	-

Plainview (5 specimens; Fig. 83d-h)

Description: The lanceolate specimens all lack the distal portions of the blade. The most complete specimen exhibits one straight and one gently recurved lateral edge. The stems have generally straight parallel lateral edges, and the bases are gently concave. Each has been smoothed on the lateral edges of the stems. The bases have been thinned by the removal of several short longitudinal flakes from each face.

Dimensions:

<u>Sp.#</u>	<u>ML</u>	<u>MW</u>	<u>MT</u>	<u>NW</u>	<u>BW</u>	<u>HL</u>	<u>BD</u>	<u>BB</u>	<u>BS</u>	<u>EG</u>	<u>Ser.</u>
68	61*	23	6	23	22	23	+3	-	-	Y	-
69	49*	20	6	20	20	19	+2	-	-	Y	-
70	60*	24	7	24	23	23	+5	-	-	Y	-
71	60*	19	5	19	21	25	+4	-	-	Y	-
72	63*	22	6	22	20	26	+1	-	-	Y	-

Scottsbluff (1 specimen; Fig. 82f)

Description: Although the distal tip of this broad specimen is lacking, the blade appears to have been long and triangular with gently convex lateral edges. The shoulders are weakly defined. The straight lateral edges of the rectangular stem have been smoothed. The gently concave base has been thinned by the removal of several short longitudinal flakes from each face. A burinlike blow has been struck from one edge of the snap fracture on the blade, and another has been removed from one corner of the base.

Dimensions:

<u>Sp.#</u>	<u>ML</u>	<u>MW</u>	<u>MT</u>	<u>NW</u>	<u>BW</u>	<u>HL</u>	<u>BD</u>	<u>BB</u>	<u>BS</u>	<u>EG</u>	<u>Ser.</u>
73	82*	31	9	31	31	24	+3	-	-	Y	-

Wells (4 specimens; Fig. 82j-m)

Description: One specimen is complete, one lacks the distal tip, and the remaining two lack nearly the entire blade. The blades appear to have been long and triangular with convex lateral edges. The shoulders vary from weakly defined to squared. The long contracting stems are lightly smoothed on the gently to strongly convex lateral edges. The base of the complete specimen is formed by an unmodified striking platform and the base of the nearly complete specimen is gently convex while the remaining two have nearly rounded bases.

Dimensions:

<u>Sp.#</u>	<u>ML</u>	<u>MW</u>	<u>MT</u>	<u>NW</u>	<u>BW</u>	<u>HL</u>	<u>BD</u>	<u>BB</u>	<u>BS</u>	<u>EG</u>	<u>Ser.</u>
74	53	20	9	18	12	21	-2	-	-	Y	-
75	79*	26	7	16	10	22	-2	-	-	Y	-
76	66*	22	8	15	15	22	-6	-	-	Y	-
77	88*	35	8	23	14	29	-5	-	-	Y	-

Miscellaneous Dart Points, Group 1 (2 specimens; Fig. 83n-o)

Description: Both specimens lack their distal tips; a burinlike blow has been struck along one lateral edge of one specimen and originates from the snap fracture. The blades appear to have been triangular with convex lateral edges, and the shoulders are squared. The stems expand slightly with straight to convex lateral edges which are lightly smoothed. The bases are slightly concave.

Dimensions:

<u>Sp.#</u>	<u>ML</u>	<u>MW</u>	<u>MT</u>	<u>NW</u>	<u>BW</u>	<u>HL</u>	<u>BD</u>	<u>BB</u>	<u>BS</u>	<u>EG</u>	<u>Ser.</u>
78	70*	30*	8	18	21	14	+1	-	-	Y	-
79	58*	23	9	20	23	13	+1	-	-	Y	-

Miscellaneous Dart Points, Group 2 (3 specimens; Fig. 83p-r)

Description: These three crudely chipped specimens have relatively long narrow blades with convex to irregular lateral edges. The shoulders are weakly defined and are formed by shallow corner notches. The expanding stems have convex lateral edges which are lightly smoothed. The bases vary from almost straight to concave. All three specimens lack their distal tip.

Dimensions:

<u>Sp.#</u>	<u>ML</u>	<u>MW</u>	<u>MT</u>	<u>NW</u>	<u>BW</u>	<u>HL</u>	<u>BD</u>	<u>BB</u>	<u>BS</u>	<u>EG</u>	<u>Ser.</u>
80	67*	22	8	18	22	15	+4	-	-	Y	-
81	55*	24	9	18	21	14	+4	-	-	Y	-
82	70*	23	10	17	22	11	-1	-	-	Y	-

Miscellaneous Dart Points, Group 3 (4 specimens; Fig. 83s-v)

Description: The blades of these four fragmentary specimens vary from relatively narrow to broad with convex lateral edges. All four are corner-notched, but only one has barbs (both lacking). The stems expand and the bases are nearly straight; no edge-grinding is present. All four lack the distal tip, and three lack portions of the base.

Dimensions:

<u>Sp.#</u>	<u>ML</u>	<u>MW</u>	<u>MT</u>	<u>NW</u>	<u>BW</u>	<u>HL</u>	<u>BD</u>	<u>BB</u>	<u>BS</u>	<u>EG</u>	<u>Ser.</u>
83	57*	38*	7	16	21	10	-1	-	-	-	-
84	49*	25	6	18	23*	8	+1	-	-	-	-
85	45*	24	8	25	25*	10	0	-	-	-	-
86	59*	23	9	17	20*	10	0	-	-	-	-

Miscellaneous Dart Points, Group 4 (2 specimens; Fig. 84a-b)

Description: Both specimens lack their distal tips. The triangular blade of one specimen has somewhat recurved lateral edges; the shoulders are weakly defined. The short stem contracts to a concave base. The second specimen has a triangular blade with straight to concave lateral edges which are beveled on the right edge of each face. The shoulders are rounded, and the stem contracts with concave lateral edges to a narrow concave base.

Dimensions:

<u>Sp.#</u>	<u>ML</u>	<u>MW</u>	<u>MT</u>	<u>NW</u>	<u>BW</u>	<u>HL</u>	<u>BD</u>	<u>BB</u>	<u>BS</u>	<u>EG</u>	<u>Ser.</u>
87	52*	24	7	17	13	9	+2	-	-	-	-
88	41*	24*	6	18	13*	12	+2	Y	-	-	-

Dart Point Fragments (14 specimens)

Description: Eight of these are distal tips or blades which lack the stems while six are medial sections which lack both the tips and the stems. Most of them exhibit parallel horizontal or oblique flake scars characteristic of many of the identified groups described above. Three of these specimens are beveled on the right edge of each face; one has a burinlike blow originating from a snap fracture.

Dimensions: The pieces in this group are too fragmentary for meaningful measurement.

Other Bifacial Tools

Burinated Bifaces (11 specimens; Fig. 84c-g)

Description: Two of these specimens have single burin bits formed by striking two intersecting burin blows while two others have single bits formed by striking a single burin blow along a bifacial edge. The

remaining seven specimens exhibit single burin blows struck from transverse snap fractures.

Dimensions:

<u>Sp. #</u>	<u>Bit Width</u>	<u>Spall Scar Length</u>
103	9	24/34
104	5	21/37
105	4	32
106	6	26
107	7	16
108	5	26
109	3	24
110	7	46
111	3	14
112	3	25
113	6	48

Burin Spall (1 specimen)

Description: This piece is a lateral edge of a biface which was apparently snapped, then a burin blow was struck from the platform created by the snap fracture.

Dimensions:

<u>Sp. #</u>	<u>Width at Bit</u>	<u>Length</u>
114	6	47

Clear Fork Gouges (5 specimens; Fig. 84h-j)

Description: Two specimens are fragmentary and consist of the bit end only while the remainder are complete. These artifacts are subtriangular in outline with rounded polls and convex lateral edges. The bits are steeply beveled and vary from concave (1 specimen) to convex. All are widest and thickest near the bit.

Dimensions:

<u>Sp. #</u>	<u>Max. L.</u>	<u>Max. Thick.</u>	<u>Bit Width</u>	<u>Bit Angle</u>
115	83	18	40	75°
116	75	18	47	70°
117	58	14	38	80°
118	42+	16	41	70°
119	24+	10	33	65°

Figure 84. Artifact photographs

a-b. Miscellaneous dart points, Group 4

c-g. Burinated bifaces

h-j. Clear Fork gouges

FIGURE 84



Pebble Biface (1 specimen; Fig. 85a)

Description: This slightly oval (nearly circular) thin pebble has been worked on both faces nearly completely around the circumference. Extensive patches of cortex remain on both faces.

Dimensions:

<u>Sp.#</u>	<u>Max. L.</u>	<u>Max. W.</u>	<u>Max. Thick.</u>
132	58	49	15

Drills (2 specimens; Fig. 85b-c)

Description: Both specimens lack the distal tip and one lacks a corner of the base. The shanks of the bits have gently convex lateral edges and are thick relative to the width. The bases expand into moderately flared corners, and the bases are concave.

Dimensions:

<u>Sp.#</u>	<u>Max. L.</u>	<u>Max. Shank W.</u>	<u>Base W.</u>	<u>Max. T.</u>	<u>Base Depth</u>
120	46*	10	15*	6	+2
121	55*	12	22	7	+4

Perforators (3 specimens; Fig. 85d-f)

Description: These three crudely chipped elongated specimens are similar to the drills described above except that the bits are short and somewhat blunted. The lateral edges of the pieces are gently convex; weak shoulders near the distal ends mark the beginning of the perforator bits. One specimen lacks the distal tip of the bit.

Dimensions:

<u>Sp.#</u>	<u>Max. L.</u>	<u>Max. W.</u>	<u>Max. Shank W.</u>	<u>Bit Length</u>	<u>Max. T.</u>
122	67	17	8	11	9
123	55	20	12	17	9
124	67*	20	14	21*	7

Unifacial Artifacts

Perforator (1 specimen; Fig. 85g)

Description: This specimen is fragmentary and consists of the distal end only. It is identical to the bifacial perforators described above except that it is unifacial.

Dimensions:

<u>Sp.#</u>	<u>Max. L.</u>	<u>Max. W.</u>	<u>Max. Shank W.</u>	<u>Bit Length</u>	<u>Max. T.</u>
125	40+	20	13	15	8

Modified Flake (1 specimen; Fig. 85h)

Description: This piece is a fragment of a thin flake which has evenly flaked retouch along one lateral edge.

Dimensions:

<u>Sp.#</u>	<u>Max. L.</u>	<u>Max. W.</u>	<u>Max.T.</u>	<u>Bit Length</u>	<u>Bit Angle</u>
126	31+	20	4	24+	65°

Scrapers (5 specimens; Fig. 85i-k)

Description: Two of these specimens are fragmentary while the other three appear to be complete. Four exhibit unifacial chipping along one lateral edge, and the remaining specimen (fragmentary) is chipped along one lateral edge and the end opposite the bulb of percussion.

Dimensions:

<u>Sp.#</u>	<u>Max. L.</u>	<u>Max. W.</u>	<u>Max.T.</u>	<u>Bit Length</u>	<u>Bit Angle</u>
127	39	36	17	36	70°
128	50	46	20	42	65°
129	41+	46	11	29+	60°
130	26+	21+	10	25+	70°
131	32+	25	7	24+/17	50°/55°

Manufacturing Debris

Partially Reduced Cores (7 specimens)

Description: These large pebbles exhibit chipping which indicates they were subjected to limited reduction, then were discarded as unsuitable for further reduction.

Expend Cores (22 specimens)

Description: These are remnants of large pebbles which have been reduced to the point that further reduction is not practical or desirable.

Figure 85. Artifact photographs

- a. Pebble biface
- b-c. Drills
- d-f. Bifacial perforators
- g. Unifacial perforator
- h. Modified flake
- i-k. Scrapers

FIGURE 85



a



b



c



d



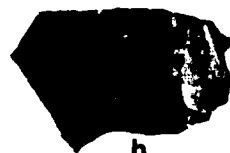
e



f



g



h



i



j



k

Biface Failures, Stage 1 (21 specimens)

Description: These pieces could possibly be classified as cores; however, they appear to represent the initial stages of biface reduction. In each case there is a lip, knot or flake failure which appears to have rendered the pieces unsuitable for continued reduction.

Biface Failures, Stage 2 (21 specimens)

Description: Each of these fragmentary specimens is bifacially chipped and could possibly be classified as crude bifaces. However, each appears to have been broken during the manufacturing process rather than through use. They are interpreted to represent the intermediate stages of reduction leading to projectile point or other bifacial tool manufacture.

Biface Failures, Stage 3 (21 specimens)

Description: The pieces in this group are all fragmentary. They appear to represent the residue from late in the manufacturing process where nearly completed bifaces were broken during the final reduction sequence.

Biface Failures, Stage 4 (11 specimens)

Description: These generally elongated subtriangular bifaces appear to represent pieces which were reduced to near final form before a step fracture or other internal flaw or knot developed which precluded continued reduction.

Flakes and Chips (35 specimens)

Description: These specimens represent a sample of the chipping debris observed at the site. All stages of lithic reduction appear to be represented and range from initial cortex flakes to interior flakes to biface thinning flakes. No detailed analysis is provided due to the lack of a controlled sampling of the materials.

INTERPRETATIONS

Although recovered from a surface context, the artifact assemblage described from the Tombstone Bluff Site appears to be restricted in temporal association and may provide some indications of activities carried out at the site. A listing of all the artifact groupings is included in Table 44; time-diagnostic artifacts are summarized by phase assignment in Table 45. It is clear from these tabulations that prehistoric use of the site began during the latter part of the Paleoindian Stage, then continued throughout the early segment of the Archaic Stage.

The recognizable Paleoindian materials are sparsely represented and constitute only 8 percent of the time-diagnostic artifacts in the collection. The artifacts assignable to the ensuing Circleville Phase of

TABLE 44
ARTIFACT ASSIGNMENTS BY PHASE

Artifact Type	Number
Undifferentiated Paleoindian Stage	
<u>Plainview</u>	5
<u>Milnesand</u>	1
Circleville Phase	
<u>Angostura</u> , Group 1	13
<u>Angostura</u> , Group 2	4
<u>Angostura</u> -like, Group 1	10
<u>Angostura</u> -like, Group 2	2
<u>Angostura</u> -like, Group 3	2
<u>Golondrina</u>	2
<u>Meserve</u>	5
<u>Meserve/Dalton</u>	2
<u>Scottsbluff</u>	1
San Geronimo Phase	
<u>Gower</u>	3
<u>Gower</u> -like	1
<u>Hoxie</u>	12
<u>Wells</u>	4
Jarrell Phase	
<u>Bell</u>	3
<u>Martindale</u>	2
Oakalla Phase	
<u>Baird</u>	3
Undifferentiated early Archaic	
<u>Almagre</u>	1
<u>Lerma</u>	1
Miscellaneous dart points, Group 1	2
Miscellaneous dart points, Group 2	3
Miscellaneous dart points, Group 3	4
Miscellaneous dart points, Group 4	2
Dart point fragments	14
Burinated bifaces	11
Burin spall	1

Table 44, continued

Artifact Type	Number
Clear Fork gouges	5
Pebble biface	1
Drills	2
Bifacial perforators	3
Unifacial perforator	1
Modified flake	1
Scrapers	5
Partially reduced cores	7
Expended cores	22
Biface failures, Stage 1	21
Biface failures, Stage 2	25
Biface failures, Stage 3	21
Biface failures, Stage 4	11
Flakes and chips	35
	<u>274</u>

TABLE 45
PERCENTAGES OF DIAGNOSTIC ARTIFACTS BY PHASE

Phase	Number	Percentage
Undifferentiated Paleoindian Stage	6	8.00%
Circleville	41	54.67%
San Geronimo	20	26.67%
Jarrell	5	6.67%
Oakalla	<u>3</u>	<u>4.00%</u>
	75	100.01%

the Archaic Stage suggest this period of occupation is the heaviest and constitutes nearly 55 percent of the recognized time-diagnostic artifacts. The intensity of occupation appears to have declined in the succeeding San Geronimo Phase; only a little over 26 percent of the time-diagnostic artifacts are attributable to this phase. Artifact percentages in the two succeeding phases, the Jarrell and Oakalla, drop sharply to a little less than 7 percent and to 4 percent respectively. There are no diagnostic materials which might indicate later use of the site during the Archaic Stage or the Neoarchaic Stage.

It appears, then, that there is little question regarding the general age of the materials recovered from the surface of the Tombstone Bluff Site. This is very nice in that the materials are easily classifiable; however, the age range spans over 4,000 years of occupation (8,500 to 4,600 years B.P.) and represents nearly half of the prehistoric sequence known in the region! Fortunately, the bulk of the materials fall within the 2,500-year span encompassed by the Circleville and San Geronimo phases, and the functional interpretations presented below have been formulated with this in mind.

The generalized activities which were carried out at the site are summarized in Table 46. It can readily be seen that projectile points dominate the general categories of artifacts and are most closely followed by biface manufacturing failures. These are followed in decreasing order by cores, wood(?)working tools (gouges and burins), and then other tools (including drills, scrapers and miscellaneous items). It seems that the site is probably specialized and represents very restricted activities.

TABLE 46
ARTIFACT PERCENTAGES, EXCLUDING FLAKES

Category	Number	Percentage
Projectile points and fragments	102	42.68%
Wood(?)working tools	17	7.11%
Other tools	13	5.44%
Cores	29	12.13%
Biface failures	78	32.64%
	239	100.00%

The heaviest orientation appears to be toward hunting as is evidenced by the projectile points. The physical location of the site on the upland boundary between the valley and the prairie seems ideal for a hunting camp since both major environments could be exploited from that

location. However, the presence of a substantial quantity of manufacturing debris suggests that the site was intentionally selected to take advantage of a localized deposit of Pliocene(?) gravels which serves as an excellent lithic procurement source. The remaining activities suggested by the tools present are oriented toward wood(?)working and hide-working; these are natural complements which are expectable in a site where the primary activities are directed toward hunting and lithic procurement/tool production.

Further, there is a noticeable lack of burned rocks on the site; the lack of mussel shells and animal bones may be due to preservation factors. However, the absence of burned rocks and the apparent lack of stone-lined hearth features strongly supports the specialized hunting and lithic manufacturing activities suggested above. It is significant that, in terms of environmental exploitation, this site is substantially different from the findings at the Loeve Site described earlier in this report. The differences in physical location within the environmental zones is reflected in the emphases of activities at the sites. Unquestionably, the Loeve Site represents a camp oriented toward riverine exploitation to include food gathering, cooking and lithic processing while the Tombstone Bluff Site is oriented toward hunting and lithic processing. It is significant to note, though, that at both sites the selection of a camping locality afforded direct access to the lithic resources. It might be postulated that, at least during the Circleville Phase, the presence of desirable lithic resources may have been a constant in terms of site selection whereas the specific variety of exploitable food resources may have been the primary variable.

In summary, the artifacts collected from the Tombstone Bluff Site indicate a long span of occupation, but the most intensive use of the site occurred during the early Archaic Circleville and San Geronimo phases. The primary activities which were carried out at the site include hunting and lithic manufacturing with little evidence of general camping or gathering activities. It is indeed unfortunate that intact subsurface deposits were not identifiable in the site since it could have potentially yielded substantially greater amounts of information regarding the early Archaic adaptations within the Granger Lake District.

THE CIRCLEVILLE PHASE

The character of the lithic materials collected from the Tombstone Bluff Site by Clarence Loeve first prompted the author to reassess the association of several projectile point styles within the Paleoindian Stage. There seemed to be a relatively consistent occurrence, albeit sparse, of Angostura, Golondrina, Meserve and (rarely) Scottsbluff type points throughout the Central Texas region which was felt to represent the final episode of occupation during which the Paleoindian lithic technology system was in use. Consequently, the Circleville Phase was proposed to place these tools within the regional framework (Prewitt n.d.; Patterson 1977). Traditionally, these styles of points have been considered as part of the generalized Paleoindian Stage, and in Texas

this tendency has prevailed in the absence of any critical evaluations of the adaptive system represented (for example, see Alexander 1963, Crawford 1965, and Sollberger and Hester 1972). Thus, the Circleville Phase was originally proposed as the regional expression of the late Paleoindian Stage comparable to other defined complexes in regions to the north and northwest of Central Texas.

In the interim since the Circleville Phase was first proposed, the author has reassessed the adaptive strategies which appear to be reflected by the materials present in those sites where the Circleville Phase is represented. This reassessment was brought to a head following the 1978 investigations at the Loeve and Tombstone Bluff sites. The findings at these two sites and a review of other similar age sites in Central Texas all indicate that Paleoindian lifeways are no longer practiced and that the adaptation represented is a basic Archaic Stage hunting and gathering (or food collecting) subsistence system wherein there is an emphasis on foraging, collecting and small game procurement. This led to the conclusion that, even though the lithic tool styles maintained a Paleoindian tradition, the Circleville Phase should be included as the earliest of the known Archaic cultural expressions in Central Texas.

As was pointed out in the concluding statement of the Loeve Site section of this report, there is considerable inertia in the existing literature to maintain the placement of this phase within the Paleoindian Stage, and it is expected that there will be substantial opposition to the idea that this does indeed represent an Archaic culture. There will be further arguments that the phase is too long in temporal duration to be regarded as a phase and that it is too inclusive in terms of the variety of diagnostic projectile points. Particularly, Hester (1981) has indicated that five radiocarbon assays have been obtained on "Golondrina Complex" sites which indicate an age of about 7,000 B.P. It should be pointed out that this "Golondrina Complex" is centered about the Lower Pecos Region, not Central Texas, and that Scottsbluff and Meserve points are not known in that region where Angostura points occur infrequently. However, the radiocarbon assays correlate very well with the 7,000 to 8,500 B.P. range suggested for the Circleville Phase and reinforces the present contention that in the Central Texas Region there is insufficient data at the present time to justify further segmenting of that phase. It is to be expected that future research will resolve some of these problems and that the Circleville Phase will indeed be refined into a series of more discrete temporal (and hopefully geographic) phases.

A summary description of the proposed Circleville Phase is presented below; this summary is adapted with minor modifications from an intensive review of the Central Texas regional chronology (Prewitt 1981). This description is intended to apply only in Central Texas.

Circleville Phase, Archaic Stage

Representative Components: Levi Rockshelter (41TV49), Loeve Site (41WM133), Tombstone Bluff Site (41WM165), Strohacker Site (41KR29), and Granite Beach Site (41LL2).

Site Types: Rockshelter, point bar, blufftop, and terrace.

Representative Artifacts: Angostura, Golondrina, Meserve and Scottsbluff projectile points; Clear Fork gouges; miscellaneous bifaces; drills, scrapers; gravers; hammerstones; grooved stones (?); grinding stones; bone awls; and carved bones.

Features: Large and medium basin-shaped, stone-lined fire hearths; burned clay and charcoal-filled pits; and mussel shell concentrations.

Mortuary Practices: No data.

Subsistence: Hunting and gathering with an emphasis on gathering; plant food processing indicated by grinding stones; freshwater mussels collected; deer and other small game hunted.

External Relations: This phase represents a regional expression of a widespread adaptation which occurred following the end of the Pleistocene and the disappearance of Paleoindian lifeways.

Estimated Age: Approximately 8,500 B.P. to 7,000 B.P.

Discussion: The Circleville Phase continues the Paleoindian style of lithic tool production in terms of chipping techniques and projectile point morphology. The subsistence base, however, is clearly Archaic in that it is a hunting and gathering adaptation, and for this reason the phase is considered to be the earliest of the Archaic expressions in Central Texas.

Selected references: Alexander 1963; Crawford 1965; Sollberger and Hester 1972; Eddy 1973; and Prewitt n.d. and 1981.

REFERENCES CITED

- Alexander, Herbert L.
1963 The Levi Site: A Paleo-Indian Campsite in Central Texas. American Antiquity 28(4):510-528.
- Binford, Lewis R., Sally R. Binford, Robert Whallon, Margaret Ann Hardin
1970 Archaeology at Hatchery West. Memoirs of the Society for American Archaeology 24.
- Blair, W. Frank
1950 The Biotic Provinces of Texas. Texas Journal of Science 2(1): 93-117.
- Bond, Clell L.
1978 Three Archaeological Sites at Hoxie Bridge, Williamson County, Texas. Texas A&M University, Anthropology Laboratory, Report 43. College Station.
- Butler, Barbara H.
1974 Appendix I: Human Skeletal Material from the Loeve-Fox Site: A Preliminary Report. In: Elton R. Prewitt, Archeological Investigations at the Loeve-Fox Site, Williamson County, Texas. Texas Archeological Survey Research Report 49, pp. 122-131.
- Crawford, Daymond D.
1965 The Granite Beach Site, Llano County, Texas. Bulletin of the Texas Archeological Society 36:71-97.
- Damon, P. E., C. W. Ferguson, A. Long and E. I. Wallick
1974 Dendrochronological Calibration of the Radiocarbon Time Scale. American Antiquity 39(4), Part 1:350-366.
- Dillehay, Tom D.
1974 Late Quaternary Bison Population Changes on the Southern Plains. Plains Anthropologist 19-65:180-196.
- Eddy, Frank W.
1973 Salvage Archeology in the Laneport Reservoir District, Central Texas. Report submitted to the National Park Service by the Texas Archeological Survey, The University of Texas at Austin.
- Fenneman, Nevin M.
1938 Physiography of Eastern United States. McGraw-Hill Book Co., Inc., New York.
- Fletcher, Alice C. and Francis La Flesche
1972 The Omaha Tribe, Vol 1. University of Nebraska Press, Lincoln.

- Fraser, Douglas
1968 Village Planning in the Primitive World. George Braziller, New York.
- Godfrey, Curtis L., Gordon S. McKee and Harvey Oakes
1973 General Soil Map of Texas. Texas Agricultural Experiment Station, Texas A&M University, in cooperation with the Soil Conservation Service, United States Department of Agriculture.
- Hester, Thomas R.
1980 Digging into South Texas Prehistory. Corona Publishing Company, San Antonio.
- Jelks, Edward B.
1962 The Kyle Site: A Stratified Central Texas Aspect Site in Hill County, Texas. Department of Anthropology, The University of Texas at Austin, Archeology Series 5.

1978 Diablo Range. In: Chronologies in New World Archaeology, R. E. Taylor and Clement W. Meighan, editors. Academic Press, New York, San Francisco, London.
- Johnson, LeRoy, Jr.
1967 Toward a Statistical Overview of the Archaic Cultures of Central and Southwestern Texas. Texas Memorial Museum Bulletin 12, The University of Texas at Austin.
- Johnson, LeRoy, Jr., Dee Ann Suhm and Curtis D. Tunnell
1962 Salvage Archeology of Canyon Reservoir: The Wunderlich, Footbridge and Oblate Sites. Texas Memorial Museum Bulletin 5, Austin.
- Kelley, J. Charles
1947a The Lehmann Rock Shelter: A Stratified Site of the Toyah, Uvalde and Round Rock Foci. Bulletin of the Texas Archeological and Paleontological Society 18:115-128.

1947b The Cultural Affiliations and Chronological Positions of the Clear Fork Focus. American Antiquity XIII(2):97-109.
- Kelly, Thomas C.
1961 The Crumley Site: A Stratified Burnt Rock Midden, Travis County, Texas. Bulletin of the Texas Archeological Society 31:239-272.
- Lowie, Robert H.
1963 Indians of the Plains. The Natural History Press, Garden City, New York.
- McKern, W. C.
1939 The Midwestern Taxonomic Method as an Aid to Archaeological Culture Study. American Antiquity 4:301-313.

- Nance, Linda A.
n.d. A Review of Central Texas Radiocarbon Chronologies: M.A. thesis in preparation for The University of Texas at Austin.
- Newell, H. Perry and Alex D. Krieger
1949 The George C. Davis Site, Cherokee County, Texas. Society for American Archaeology Memoirs 5.
- Patterson, Patience E.
1977 A Lithic Reduction Sequence: A Test Case in the North Fork Reservoir Area, Williamson County, Texas. Bulletin of the Texas Archeological Society 48:53-82.
- Pearce, J. E.
1932 The Present Status of Texas Archeology. Bulletin of the Texas Archeological and Paleontological Society 4:44-54.
- Prewitt, Elton R.
n.d. The Roger Springs Site: 1974 Investigations. Texas Archeological Survey Research Report 54, The University of Texas at Austin.
- 1974 Archeological Investigations at the Loeve-Fox Site, Williamson County, Texas. Texas Archeological Survey Research Report 49, The University of Texas at Austin.
- 1976 Late Archaic Occupations at the Loeve-Fox Site: The San Marcos and Twin Sisters Phases. In: The Texas Archaic: A Symposium, Thomas R. Hester, editor. Center for Archaeological Research Special Report 2:67-77. The University of Texas at San Antonio.
- 1981 Cultural Chronology in Central Texas. Bulletin of the Texas Archeological Society 52:65-89.
- Prewitt, Elton R. and Linda A. Nance
1980 Archeological Survey and Assessments on the McBryde Lease, Duval County, Texas. Prewitt and Associates, Inc. Reports of Investigations 7. Austin.
- Sayles, E. B.
1935 An Archeological Survey of Texas. Medallion Papers 17. Gila Pueblo, Globe, Arizona.
- Schuetz, Mardith K.
1957 A Report on Williamson County Mound Material. Bulletin of the Texas Archeological Society 28:135-168.
- Sellards, E. H., W. S. Adkins and F. B. Plummer
1932 The Geology of Texas: Volume I: Stratigraphy. The University of Texas Bulletin 3232.

- Shafer, Harry J.
1973 Lithic Technology at the George C. Davis Site, Cherokee County, Texas. Ph.D. dissertation, The University of Texas at Austin.
- Shafer, Harry J. and James E. Corbin
1965 An Appraisal of the Archeological Resources of North Fork, South Fork and Laneport Reservoirs, Williamson County, Texas. Report submitted to the National Park Service by the Texas Archeological Salvage Project, The University of Texas at Austin.
- Shafer, Harry J., Dee Ann Suhm and J. Dan Scurlock
1964 An Investigation and Appraisal of the Archeological Resources of Belton Reservoir, Bell and Coryell Counties, Texas: 1962. Texas Archeological Salvage Project Miscellaneous Papers 1, The University of Texas at Austin.
- Sollberger, J. B. and T. R. Hester
1972 The Strohacker Site: A Review of Pre-Archaic Manifestations in Texas. Plains Anthropologist 17(58):326-344.
- Sorrow, William M., Harry J. Shafer and Richard E. Ross
1967 Excavations at Stillhouse Hollow Reservoir. Papers of the Texas Archeological Salvage Project 11, The University of Texas at Austin.
- Story, Dee Ann and Harry J. Shafer
1965 1964 Excavations at Waco Reservoir, McLennan County, Texas: The Baylor and Britton Sites. Texas Archeological Salvage Project Miscellaneous Papers 6, The University of Texas at Austin.
- Story, Dee Ann and S. Valastro, Jr.
1977 Radiocarbon Dating and the George C. Davis Site, Texas. Journal of Field Archeology 4(1):63-89.
- Suhm, Dee Ann
1957 Excavations at the Smith Rockshelter, Travis County, Texas. Texas Journal of Science IX(1):26-58.
- Suhm, Dee Ann and Edward B. Jelks
1962 Handbook of Texas Archeology: Type Descriptions. Texas Archeological Society Special Publication 1 and Texas Memorial Museum Bulletin 4.
- Suhm, Dee Ann, Alex D. Krieger and Edward B. Jelks
1954 An Introductory Handbook of Texas Archeology. Bulletin of the Texas Archeological Society 25.

- Webb, Clarence H. and Monroe Dodd, Jr.
1939 Further Excavations of the Gahagan Mound; Connections with a Florida Culture. Bulletin of the Texas Archeological and Paleontological Society 11:90-128.
- Weir, Frank A.
1976a The Central Texas Archaic. Unpublished Ph.D. dissertation, Washington State University, Pullman.
1976b The Central Texas Archaic Reconsidered. In: The Texas Archaic: A Symposium, Thomas R. Hester, editor. Center for Archaeological Research Special Report 2:60-66. The University of Texas at San Antonio.
- Willey, Gordon B. and Philip Phillips
1958 Method and Theory in American Archaeology. The University of Chicago Press, Chicago.
- Wormington, Marie
1957 Early Man in North America. Denver Museum of Natural History Publication 4.

APPENDIX: Human Skeletal Material from the
Loeve-Fox Site (41WM230)

Barbara H. Butler

INTRODUCTION

The skeletal material reported here was excavated in the cemetery at the Loeve-Fox Site during the 1972-1973 field season as well as the more recent 1977-1978 excavations. A preliminary report of the 1973 materials which included 24 individual skeletons is in Archeological Excavations at the Loeve-Fox Site, Williamson County, Texas (Prewitt 1974). For this report all the material excavated including the individual skeletons, the unassociated individual elements, and the cremations from both sessions are described. Although 29 individual burial numbers were assigned, the noncremated sample actually consists of 27 individuals. The unassociated individual bones are most likely from these 27 individuals rather than representing additional ones. The only possible exception is that the unassociated infant bones may represent another individual. Ten cremations were recovered from this cemetery, although only two are described in this appendix. It is likely that other human cremations were present in the cemetery but they were apparently removed during excavations by Clarence Loeve. The isolated cremation associated with the San Marcos Phase is also deleted from consideration at this time.

The purposes of this report are to:

- (1) describe the nature of the skeletal remains from this cemetery;
- (2) present the metrical and morphological characteristics of these skeletons;
- (3) present the morphological characteristics of the teeth; and
- (4) present a brief description of the skeletal and dental pathology.

The condition of the bone is generally good. Rodent gnawings were the most frequently observed disturbance of the bone which obliterated some external features. Preservation is good and in many cases restoration of broken elements was possible. Only a few of the crania had become warped frustrating attempts at reconstruction. The bones associated with immature individuals were very fragmented and fragile, and reconstruction of either long bones or crania was impossible. The bones were cleaned with water and/or soap and water. No preservative was used in the laboratory as it was not considered necessary. The most unfortunate aspect of the condition of the skeletons is the mixing of elements of one individual with another and the disassociation of many elements from the individual to which they belong. This primarily was caused by the intersection of the graves and rodent activities. In addition to the disassociation of the osteological elements, many of the teeth were lost post-mortem and because of their extreme wear, relocation in the proper jaw was not possible. A great deal of information regarding attrition patterns and dental health has been lost as a result of this.

The skeletons were prepared for analysis by washing and other mechanical cleaning in the field, in the laboratory of the Texas Archeological Survey of The University of Texas at Austin, and the Osteology Laboratory at North Texas State University. All the analyses took place at NTSU. For the preliminary report, the skeletons were cursorily examined and notes were taken of the characteristics of each one. An age and sex determination was made and these results were presented in the preliminary report.

For this final report, not only were the original skeletons re-examined and the new material analyzed, but a major attempt was made to reassociate the isolated elements; we were able to locate about one quarter of them. The original age and sex determinations were reviewed, and then standardized forms were used to collect metrical, morphological and pathological data of the bones and morphological and pathological data of the teeth. These data forms and the skeletons are currently housed in the Osteology Laboratory of the Institute of Applied Sciences at North Texas State University.

This group of individuals has been treated as one cultural unit, and as such can be considered representative of one cultural group. The analyses that follow are based on that assumption.

DESCRIPTION OF INDIVIDUALS

A brief description, including salient characteristics, of each excavated skeleton is included here along with an inventory of the unassociated human skeletal parts. Also, a brief description of the cremation features follow.

- I-1 This relatively complete skeleton represents an advanced middle-aged robust male. The dental wear is advanced. There are numerous abscesses in the maxilla. Both arthritic lipping in the centra of the lumbar vertebrae, and osteological involvement from an infectious disease were observed in the long bones.
- I-2 A middle-aged robust male is represented by these relatively complete remains. An arrow point was imbedded in a thoracic vertebra. The mandible is absent, but from the maxillary teeth, the wear, although not as marked as others in this group, shows evidence of hard use.
- I-3 This relatively complete skeleton represents a middle-aged female. The dental wear is flat and there are many abscesses that resulted from severe attrition. There is slight arthritic involvement of the right mandibular fossa and the corresponding condyle. Severe lipping of the lumbar vertebrae and sacrum were noted.

- I-4 These are the partial remains of another middle-aged(+) adult male. Only a few maxillary teeth were recovered so dental patterns cannot be observed. There is a moderate amount of arthritic lipping present at the sacroiliac joint and the bodies of lumbar vertebrae. Several of the bones associated with this individual are blackened (charred).
- I-5 This is a relatively complete skeleton of a short, moderately robust young (teenage?) male. The epiphyses of the long bones had not completely fused in this individual, but the third molars had fully erupted by the time of death. Dental wear was slight. There are few signs of dental pathology; however, there are signs of severe osteological disease, probably an infectious one (Fig. 86).
- I-6 These are the fragmentary remains of one of the youngest infants recovered. It was probably between 1 and 4 months old at death. The mid-shaft areas of the long bones exhibit very mild infectious pathological characteristics.
- I-7 An advanced middle-aged moderately robust male is represented by this relatively complete skeleton. Though the teeth were worn flat, the wear had been rapid as there are a number of abscesses associated with open pulp chambers. There are indications of arthritis on the proximal end of the right femur and on the lumbar vertebrae. In addition, both lower legs exhibit characteristics of an infectious disease. An arrow point was recovered from the mouth of this individual.
- I-8 These are the relatively complete, though very fragmentary remains of an infant between 1 and 2 years of age at death. No dental elements were recovered. The skeletal pathology of this individual is extreme. Most of the long bones, particularly the lower parts of each limb, are grossly oversized by a layer of irregular, porous bone. The skull does not seem to be affected.
- I-9 This individual was a middle-aged female and the largest female represented in this sample. The first two phalanges of the left great toe had fused, but it does not appear to be the result of a pathological or traumatic condition. The cranial bone is unusually thick. The teeth exhibit extreme wear and numerous abscesses are present.
- I-10 These very fragmentary remains represent another infant close in age (between 6 months and 2 years at death) to individuals #8 and #14. The few long bones present show the same grossly pathological bone as individual #8.

- I-11 This is an almost complete skeleton of an old adult male of moderate stature. There is evidence of an old fracture in the lower part of the right arm, and, although the right arm appears bigger than the left, both are considerably smaller than the arms of other males in this group (Fig. 87). There is severe arthritic lipping at the sacroiliac joint and the lumbar vertebrae. The teeth were severely worn during life; many were worn below the cemento-enamel junction and this caused numerous abscesses.
- I-12 This skeleton is one of the more delicate females, and she was in advanced middle age at death. This is the only example of a female with an arrow point found in association; it was located between the 6th and 7th thoracic vertebrae according to the field notes. There is severe arthritic involvement in the centra of the cervical vertebrae and on the anterior surface of the sacrum. The dental wear patterns are extreme and irregular.
- I-13 This mature, middle-aged male suffered with arthritis in several of his joints: knees, right ankle, and his vertebral column. His dental wear was extreme; the pattern is generally flat, but there is some oblique wear in the molar area. An arrow point was found near this individual.
- I-14 These are the partial and fragile remains of an infant who was about 1-1/2 years old at death. This child was very close in age at death to both #8 and #10 and all three were buried in close proximity. This one might have been just a little older than the other two. Most of the long bones present exhibit the same pathological characteristics as the other two.
- I-15 A middle-aged female is represented by this skeleton. There are signs of both an infectious disease as well as arthritis in the thoracic and cervical areas of the vertebral column. The dental wear is moderate though unusual in the sense that the mandibular teeth are worn to a lesser degree than are the maxillary teeth. In addition, the mandibular teeth are flat whereas the maxillary teeth are worn obliquely. Field photographs confirm the correct association of this mandible and cranium.
- I-16 This torso and cranium recovered in association in the field represent a very young adult female. Her humeri are extremely gracile. This individual had been disturbed prior to excavation, and during the laboratory analysis it was confirmed that the lower limbs thought to be associated with this individual were, in fact, of the same skeleton. There are no signs of skeletal pathology or gross dental pathology.
- I-17 These almost complete remains represent a very robust middle-aged adult male. Considering his age and the extreme dental attrition characteristic of this population, the mild attrition of his teeth stands in stark contrast. Supernumerary



Fig. 86. Burial #5 ventral view of eye sockets showing evidence of osteological disease (pitting).

- teeth are present bilaterally and distro-lingual to the mandibular first premolars. There are no major dental diseases noted, but there are severe arthritic lesions involving both ankle joints (the distal tibia, fibula, and talus).
- I-18 This gracile young adult female was the shortest of the adults excavated. She was about the same age as #16 at death. The wear patterns on her teeth are flat and the degree of wear is light to moderate. There are signs of a healed fracture on the distal portion of her right humerus.
- I-19 This tall, robust skeleton represents a middle-aged adult male. The left humerus shaft exhibits a healed fracture callus as does one of the first phalange from a finger. There is some arthritic involvement at the distal end of the right radius and ulna as well as the lower thoracic and lumbar vertebrae. Few teeth are present and their attrition varies from moderate to severe. The field notes indicate that an arrow point was found adjacent to the vertebrae.
- I-20 Because these remains are so fragmentary, it is suggested with reservation that a middle- or old-aged adult male is represented. Arthritic involvement was noted in the left ankle area and left knee. Only a few worn loose teeth were found in association with this individual.
- I-21 This is a skeleton of a moderate-sized, middle-aged adult male. The dental attrition is mild and he is congenitally missing a right mandibular third molar. A mild expression of arthritis was noted in the lumbar vertebrae and the left knee joint. A very small infectious area was noted on the lower left leg.
- I-22 This is another moderately sized middle-aged adult male who is congenitally missing a right mandibular third molar. The wear on his teeth is flat and moderate in degree, and the anterior mandibular teeth are malaligned. His skeleton exhibits signs of arthritis, infectious disease, and a healed fracture.
- I-23 These are fragmentary remains of a middle-aged adult female (?). Dental wear is irregular and extreme in some areas which caused the opening of the pulp chambers and abscesses. Arthritis is present in the thoracic and lumbar areas and is quite advanced in the tarsals of the right foot.
- I-24 Only part of this individual was found; the remains include a fragmentary cranium, a mandible, and a left humerus. They appear to represent a middle-aged male. The wear of the teeth is moderate and there are no observable dental or skeletal pathological conditions.



Fig. 87. Burial #11 healed fracture of right forearm.

I-25 This is the skeleton of a young (?) adult male who, according to the field notes, had an arrow point adjacent to the thoracic vertebrae. He exhibits two dental anomalies: (1) a mesiodens is present on the left half of the maxilla (the enamel shows through to the nasal cavity) (Fig. 88); (2) he is congenitally missing three of his third molars. The dental wear patterns are flat and the degree of wear is moderate. Arthritis bothered him only in his left great toe.

I-26 This is a very fragmentary infant skeleton probably the youngest infant discovered at the site. There are about 30 pieces and the only age indicator is an unfused vertebral arch of what is probably a cervical vertebrae. This suggests a very young child, either a newborn or one a few months old.

I-27 This skeleton is another young individual about 3 years old at death. It exhibits a fused left central and lateral deciduous incisor. The wear on the teeth was enough to expose the dentin, thus it appears to be the oldest of the six children recovered. No signs of pathology were observed.

Two of the ten features that were identified as human cremations are described below:

C-5 This is a cremation of an adult individual. There are few identifiable fragments and none on which to base a sex determination. The coloring of the bone (gray, blue and white) indicates that these bones were burned in a very hot fire. Very few of the bones were only charred black. Some cranial elements are present; fragments of the sagittal suture were identified. This suture appears almost closed on the interior surface indicating an older rather than younger individual.

C-9 Several of the elements recovered from this cremation were identifiable and indicated that this too was an adult skeleton. No determination of sex was possible. The elements presented included several cranial elements, cervical and thoracic vertebrae fragments, part of a mandible, a head of a humerus, an ulna shaft and both right and left radial fragments. They also exhibited the gray, blue and white coloration; only a few were black.

Due to many factors, including previous nonprofessional excavations at the site, dislocation caused by flooding, rodent disturbance, and other factors which cause bones in an excavation such as this to lose their association, a number of isolated elements were presented for analysis. Working with the field and laboratory notes, every attempt was made to associate the parts with the individual from whom they had originally come. We were partially successful in this effort and restored a number of elements to the proper individual, but in many cases we could not determine the association. The following is a description of these extra parts along with some observations:



Fig. 88. Burial #25 left portion of maxilla with mesiodens enamel in nasal cavity.

Crania: Some small fragments of cranium were recovered. They are most likely broken pieces from the skulls present. Nothing unusual was noted about any of them.

Mandible and teeth: One left section of a mandible with extremely worn teeth is unassociated. Otherwise, there are a number of single and in some cases unidentifiable teeth. It is most likely that the majority of these represent both post-mortem loss prior to excavation and those that were lost during some of the excavation disturbances. Unfortunately, we were not able to take the time necessary to relocate these teeth into their proper sockets.

Ribs: Many pieces of rib fragments were present in this group. In that ribs do not yield pertinent information unless there is an obvious anomaly or pathological lesion, no effort was spent in making individual associations.

Vertebrae: A number of vertebral pieces were recovered. Only a minimal effort was spent in trying to match these pieces with the skeletons.

Clavicles: Only four pieces of this type of bone were found. None exhibit any pathological condition.

Scapulae: Since the scapula is such a fragile bone, it is not surprising that a number of pieces were found. They are small, generally unidentifiable pieces, and none exhibits any pathological characteristics.

Humeri: Four unassociated humeri were recovered. One is a complete right humerus possibly representing a male as it is quite large. Another is an almost complete left humerus possibly from a female; it is smaller than the first one. The others are small fragments of two left distal ends. A sex determination of these two was not attempted because the fragments are too small. None exhibits any pathological characteristics or anomalies.

Ulnae: Three ulnae could not be matched with any skeletons; one is from the right side and is complete except for the olecranon process which had been broken post-mortem; one is a left olecranon process area; and the other is a fragmentary distal ulna end.

Radii: One left distal end of a radius could not be associated with any individual. It exhibits a mild expression of arthritic lip-ping.

Carpals and phalanges: A number of carpals and phalanges were unassociated and therefore included in this miscellaneous group. Once again, the decision was made that the information gained from the sorting and attempted associations was not worth the time required to sort through these items.

Innominate bones: Both adult and subadult innominate bones were found. The ilium, like the scapula, has such thin areas that reconstruction of these parts was not attempted. Only a few other pelvic sections were found. There were two innominate (ilia) fragments of subadults; one appears to be about the same size and age as individual #29 (the child about 3 years old). The other one is from a younger child; it is somewhat smaller than the ilium from individual #10. It is possible that there were a few more very young children buried at this site but they had been disturbed by rodents and other factors, and thus were not identified as obvious individuals.

Femora: Four complete femora were recovered. Two are large and probably represent a male; two are smaller and are probably from a female. Nothing unusual was noted.

Tibia: Two complete tibia and two distal fragments are present in this group of unassociated bones. In both cases a right and left are present. The two complete tibia are large and the left one exhibits a slight amount of osteological infection in the mid-shaft area. The relative size of the distal pieces cannot be reliably estimated.

Fibulae: Four pieces of fibulae were found: two are shaft sections and one of these pieces exhibits osteomyelitis. The other two are distal sections and represent both the right and left sides. They are not of the same individual, however, because one is considerably larger than the other.

Calcanea: Eleven unassociated calcanea were recovered; six are from a right foot and five from a left. Two of them are definitely from the same individual. Four are smaller than the others and most likely represent females. One is moderate in size and could be either a large female or small male. Six are somewhat larger than the others and most likely represent males. Of the 21 adults represented in this sample, 11 of them were recovered with both calcanea. Seven individuals (four males and three females) are missing both and three skeletons (one male and two female) are missing only the left calcanea. None are missing only the right one. Since seven of the expected 21 right calcanea and 11 of the expected 21 left calcanea are missing, there is no suggestion that these unassociated parts necessarily indicate the presence of additional individuals. Therefore, it is most probable that these calcanea could be associated with the individuals present if the necessary corresponding bones were present. The individuals for whom there are neither one or both calcanea are individuals 1 through 9, 15 and 16.

Two of them are poorly preserved, and thus no other observations were possible. Six of them (two left and four right) exhibit no pathological lesions; two of them (right and left) have a moderate amount of arthritic lipping on the superior articular surface. One left one is grossly arthritic; the entire articular area is flattened and shows signs of severe bone growth on the margins and eburnation.

Tali: Only six tali (four left and two right) are present in this unassociated group. Four are large (three left and one right) and two are small (left and right). Only one large right talus shows signs of arthritic involvement.

DEMOGRAPHY

Sex determination is based on traditional criteria as presented in Anderson (1962), Brothwell (1963) and Bass (1971). In addition, the osteological measurements permitted the use of the discriminant function analysis for sex determination of Giles and Elliot (1963, 1964). Each skeleton was re-examined during this second analysis and another determination of sex was done before the previous determination was noted; the two results were compared. If there were discrepancies, each criteria was examined more carefully until a new conclusion was reached. The skeletons most difficult to sex with confidence were the juveniles and one relatively fragmentary individual (#23). Sex determination of the immature skeletons was not attempted.

Of the adults, eleven skeletons (numbers 3, 7, 9, 11, 13, 15, 17, 18, 21, 22, 24) were complete enough to measure to some degree and thus to provide figures which could be used in at least one of the coefficient sets of the Giles and Elliot (1963, 1964) discriminant function analysis. All scores confirmed the sex determination based on morphological characteristics except in one. However, in another case (#24), only the mandible was complete enough to provide the measurements and the score was just slightly above the sectioning point (the male side of the sectioning point). A determination of male had been made based on observed characteristics of this skeleton, and although a male determination was made using both methods, the score for this individual was least discriminating. In the case of individual #18, a score was determined for both the cranium and mandible and the results were different for the two. Originally, a sex determination of female was made after examining the pelvis and cranium. Based on the cranium, the score calculated was just above the sectioning point (that being on the larger side of the scale). However, the mandible is quite small, the score for it being one point below the female .05 level. Although there is conflicting evidence in this case, the sex determination of female was retained.

Age determination is based on criteria as presented in Anderson (1962), Bass (1971), Ubelaker (1978), and McKern and Steward (1957). A combination of dental eruption stages and the diaphyseal length of long bones as presented in Ubelaker (1978) were the criteria used to determine the age of the very young individuals. Measurable diaphyses of long bones are present for all immature skeletons except #26 and so the greatest dependence is placed on this method of aging. Teeth are present for only two of the infants (#14 and 27). Although all the infants appear to have been three years old or less at the time of death, it is possible to suggest the relative ages of these five children. From youngest to eldest their ranking is #26, #6, #10, #14 and #27.

Age determination of the one individual thought to be in his late teens at death is tentative because the patterns of epiphyseal closure and dental eruption times do not follow modern patterns. The third molars were already erupted at the time of death whereas none of the epiphyses, which are generally thought to close between the 18th and 29th years, were. The dental system is thus more accelerated in its development than the skeletal system.

Results of the various criteria for the adults were combined and a general age category was determined. These are presented in Table 47. In that same table, the relative degrees of attrition for each individual can be compared to his/her rank in age. It appears that rapid wear of the teeth is one characteristic of the females in this population.

TABLE 47
RANK ORDER AND CLUSTERS FROM YOUNGEST TO OLDEST
ADULTS BY SEX FOR COMBINED AGING CRITERIA AS
COMPARED WITH DEGREES OF DENTAL WEAR

<u>Combined Characteristics</u>		
<u>Age</u>	<u>Female</u>	<u>Male</u>
Young Adult	#16, 18	#5, 25
Middle-aged	3, 9, 15, 23	2, 17, 18, 21, 22, 24
Late Middle-aged	12	1, 4, 7, 13
Old Adult		11, 20
<u>Attrition</u>		
<u>Average Stage</u>	<u>Female</u>	<u>Male</u>
Stage 2	#18	#5, 25
Stage 2+	15	22, 17, 21, 2, 19
Stage 3	16, 23, 9	1, 7
Stage 3+	12, 3	13, 11

The age and sex distribution of the individuals contributing to this sample of the Loeve-Fox Site are presented in Table 48.

Since so few additional skeletons were recovered during the second excavation period, no new or different interpretations than those in the preliminary report (Butler 1974) can be offered regarding the age and sex distribution of this sample. There are still more males (66 percent) than females in the adult population; this in itself is not surprising, but it is notable that there are twice as many males as females in the middle-aged category.

TABLE 48
AGE AND SEX DISTRIBUTION AT THE LOEVE-FOX SITE

	Subadults				Adults			Total
	0-2	3-5	6-12	13-18	Young	Middle-aged	Old	
Sex?	5	1						6
Male				1	1	10	2	14
Female					2	5		7
TOTAL	5	1	0	1	3	15	2	27

The unusual age distribution as previously noted does not change with the addition of the few more skeletons. Only 22 percent (6 of 27) of this sample were subadults, and this is an unusually low number for what would be expected in a normal population. Further, there are only two children in the 3 year old to 17 year old range and more would be expected in a normal distribution. The highest incidence of adult female mortality is generally during the childbearing years or young adulthood; however, in this population, there are more middle-aged adult females than young adult females. There are also more middle-aged adult males than young adult males. Five adult males were found with projectile points in association; four were in their middle adult age at death and one was a young adult. The sixth projectile was recovered from a middle-aged female. Both disease and hostility were important factors causing the death of these individuals. An infectious disease was the most common cause of death for the children. Only 7 percent (2 of 27) of those buried in this cemetery survived to old age, and both of these individuals were males (Table 49). This is a lower number of people dying in old age than is expected in a normal nonliterate population.

METRICAL OBSERVATIONS

A total of 58 measurements (36 cranial and 22 post-cranial) were attempted for each skeleton. Broken and missing elements prohibited some skeletons from being measured completely. Further, measures of the infant skeletons were not made except for the diaphyseal length and leg proportions. All the standardized measurements were made using an osteometric board and calipers, and the results recorded on the data sheets. The results are presented in Table 50, and the ranges and means of these measures are presented in Tables 51 and 52. Since the sample is small, estimated measures (mainly those taken from repaired bones) are included but in each case it is noted.

As can be noted in Table 51, there is sexual dimorphism in this population; the mean female measures are consistently lower than the corresponding means for males. However, the cranial indices are similar

TABLE 49
LIFE TABLE*

Age Interval (x)	Number of Deaths (Dx)	Percent of Deaths (dx)	Percent of Survivors Entering Following Age Group (lx)	Probability of Death (qx)	Total Years Lived Between x and x+i (lx)	Total Years Lived After Lifetime (tx)	Life Expectancy (e ⁰ x)
0-10	6	22.0	100.0	.220	890.0	3238.0	32.38
11-20	1	3.7	78.0	.047	761.5	2348.3	30.11
21-35	3	11.1	74.3	.149	1066.3	1586.4	21.05
36-50	15	55.6	63.2	.880	520.1	520.1	8.23
50+	2	7.4	7.4	1.000	0	0	0.00

*for formulae, see Ubelaker (1978:95)

TABLE 50
SUMMARY OF CRANIAL AND INFRACRANIAL MEASURES
(all measures in mm)

Indiv. No.	CRANIUM		Max. Breadth	Basion- Bregma	Basion- Nasion	Basion- Prosthion	Minimum Frontal	Frontal Arc	Parietal Arc	Occipital Arc
	Max. Length									
1	185.5	130.5	-	-	-	-	89.0	115.0	125.0	-
2	195.0	132.0	143.0	108.0	-	-	96.0	131.0	130.0	133.5
3	184.0*	123.0	140.0*	97.5*	-	-	90.0	132.5	129.0	115.0
4	176.5	130.0	-	-	-	-	91.0	123.5	129.0	105.0
5	184.0	135.0	-	-	-	-	90.5	132.0	113.0	-
6**	-	-	-	-	-	-	-	-	-	-
7	190.5	123.0	-	-	-	-	87.5	125.0	130.0	-
8**	-	-	-	-	-	-	-	-	-	-
9	183.5	121.5	131.0	-	-	-	-	-	129.0	118.0
10**	-	-	-	-	-	-	-	-	-	-
11	185.0	132.0	-	-	-	-	94.0	125.0	119.0	131.0*
12	181.0	125.0	-	-	-	-	-	125.0	130.0	-
13	188.5	126.5	138.0	104.0	70.0*	-	91.5	125.0	132.0	125.0
14**	-	-	-	-	-	-	-	-	-	-
15	179.0	128.0	130.0	100.0	-	-	85.5	115.0	125.0	115.5
16	179.0	110.0	-	-	-	-	-	119.0	115.0	121.0
17	192.0	125.5	140.0	111.0	108.0	-	92.0	124.0	132.0	118.0
18	177.0	128.5	133.0	100.5	102.0	-	84.0	116.0	123.0*	120.0
19	-	131.0	-	-	-	-	-	-	142.0	-
20	191.0*	-	-	-	-	-	-	120.0*	132.0*	110.0*
21	186.0*	130.0*	-	-	-	-	90.0	128.0	135.0*	123.0*
22	-	-	-	-	-	-	-	129.0	-	128.0
23	189.0	125.5	130.0	105.5	-	-	90.0	118.5	120.0	122.0
24	194.0	127.0	-	-	-	-	-	-	134.0	-
25	-	-	-	-	-	-	87.0*	-	130.0	-
26**	-	-	-	-	-	-	-	-	-	-
27**	-	-	-	-	-	-	-	-	-	-

* = estimated measure; * = infant

Table 50, continued

Indiv. No.	CRANIUM, continued					Chords Parietal	Occipital	Mastoid Length	Opisthion- forehead	Bizygo Breath
	Transverse Arc	Frontal								
1	298.0	106.0	113.0	-	24.5	157.0	-	-	-	
2	321.0	115.0	117.0	107.5	29.0	161.0	-	-	-	
3	300.0	115.5	115.0	95.0	19.0*	157.0	-	-	-	
4	-	109.5	113.5	92.0	-	-	-	-	-	
5	-	116.0	103.5	-	-	-	-	-	-	
6**	-	-	-	-	-	-	-	-	-	
7	299.0	112.0	115.0	-	25.5	164.0	130.0*	-	-	
8**	-	-	-	-	-	-	-	-	-	
9	276.0	-	114.0	94.5	19.0	150.0	-	-	-	
10**	-	-	-	-	-	-	-	-	-	
11	304.0	114.0	107.0	106.0	28.0*	160.0*	139.0	-	-	
12	283.0	110.0	115.5	-	23.5*	-	-	-	-	
13	298.0	115.5	119.0	101.0	31.5	158.0	134.0	-	-	
14**	-	-	-	-	-	-	-	-	-	
15	295.0	105.0	113.0	91.5	24.0	146.0	-	-	-	
16	285.0	103.0	104.0	96.5	23.0*	-	-	-	-	
17	285.0	112.0	118.5	94.0	24.0	159.0	140.0	-	-	
18	297.0*	104.0	112.5	103.0	23.5	154.0	125.5*	-	-	
19	310.0	-	-	-	-	-	-	-	-	
20	-	108.5*	114.5*	91.0	25.5*	-	-	-	-	
21	300.0*	113.5	118.5*	95.5*	24.5*	-	-	-	-	
22	-	114.0	-	106.0	-	-	-	-	-	
23	283.0	104.0	109.0	97.0	24.0	-	-	-	-	
24	312.0	-	119.5	-	-	-	-	-	-	
25	-	-	118.0	-	27.5	-	-	-	-	
26**	-	-	-	-	-	-	-	-	-	
27**	-	-	-	-	-	-	-	-	-	

Table 50, continued

Indiv. No.	FACE		NOSE		ORBIT		MAXILLA	
	Upper Face Height	Total Face Height	Height	Breadth	Height	Breadth	I-OB	Length
1	-	-	-	-	-	-	-	-
2	-	-	-	29.0*	-	66.5*	-	53.5*
3	-	-	-	-	-	-	-	-
4	-	-	-	-	-	-	-	-
5	-	-	-	25.0	-	68.0*	-	54.0*
6**	-	-	-	-	-	-	-	-
7	66.0	106.0*	51.0	22.5*	33.5*	71.0*	21.5	50.0*
8**	-	-	-	-	-	-	-	-
9	-	-	-	-	-	-	-	-
10**	-	-	-	-	-	-	-	-
11	69.5	114.0	47.0	-	38.5	62.0	25.5	54.0
12	-	-	-	-	-	-	-	-
13	70.0	113.0	50.5	26.0	35.0	65.0	21.5	53.0
14**	-	-	-	-	-	-	-	-
15	-	-	-	-	32.0	-	24.0	-
16	-	-	-	-	-	-	-	-
17	68.0	120.0	52.5	25.5	34.0	68.0	24.5	54.0
18	65.0	106.0*	47.5	24.5	33.0	61.0	24.5*	55.0
19	-	-	-	-	-	-	-	-
20	-	-	-	-	-	-	-	-
21	-	-	-	26.0	-	62.0	-	50.5
22	-	-	-	-	-	-	-	-
23	-	-	-	-	-	-	-	-
24	-	-	-	-	-	-	-	-
25	-	-	-	-	-	-	-	-
26**	-	-	-	-	-	-	-	-
27**	-	-	-	-	-	-	-	-

Table 50, continued

Indiv. No.	MANDIBLE				FEMUR							
	H ₁	ML	GoGo	W ₁	CrH	RB'	RB	ZZ	Bd Ht	Bd Thick	Length	Bicond Length
1	-	-	105.5	-	61.0*	32.0	43.5*	44.0	29.0	15.5	-	-
2	-	-	-	-	-	-	-	-	-	-	464.5	457.0
3	25.5	-	88.5*	-	49.5*	31.5*	41.0	46.5	29.5	15.0	439.5	430.0
4	-	-	-	-	-	-	-	-	-	-	424.0	421.0
5	-	-	-	-	57.0*	36.0	45.0	45.5*	-	-	448.0	439.0
6**	-	-	-	-	-	-	-	-	-	-	79.0	-
7	30.5	99.0	99.5	119.5	70.0	36.5	45.0	47.5*	29.0	16.0	447.5*	-
8**	-	-	-	-	-	-	-	-	-	-	-	-
9	35.0*	106.5	92.5	113.0	47.5	26.0	38.5	41.0	25.5	16.0	444.0	438.5
10**	-	-	-	-	-	-	-	-	-	-	-	-
11	33.5	-	97.0	-	-	31.0	-	47.5	28.0	16.0	439.0	434.5
12	29.5	-	-	-	56.0*	31.0*	41.5	45.0	28.5	12.0	-	-
13	35.0	109.0*	101.5	119.0*	71.0	33.0	43.0	46.5	35.0	16.0	446.0*	442.5*
14**	-	-	-	-	-	-	-	-	-	-	-	-
15	32.5	100.0	94.0	115.0	53.0	30.5	39.0	45.5	26.5	15.0	436.0	423.5
16	-	101.0*	98.0*	-	53.0*	30.5	40.0	45.5*	28.0*	14.0*	435.0	430.0
17	35.5	-	105.0	-	-	35.0	-	50.0	29.0	16.5	456.0	450.0
18	30.0*	104.5	91.0	107.0	54.0	31.5	43.0	45.5	28.0	14.0	413.5	406.0
19	-	-	-	-	-	-	-	-	29.0	13.0	488.5	477.0
20	-	-	-	-	-	-	-	-	-	-	45.0	444.0
21	34.5	104.0	95.5	120.5	64.0	34.5	44.5	45.5	30.0	15.5	455.0	449.0
22	32.0	112.0	92.0	117.0	68.0	36.5	48.0	45.5	32.0	15.0	464.5	455.5
23	-	-	-	-	-	34.5	-	46.0	31.0	15.5	-	-
24	35.0	-	96.0	-	63.0	31.5	46.0	49.5	29.5	16.0	-	-
25	-	-	-	-	59.5	32.0	45.0	-	28.0	14.0	451.0	444.0
26**	-	-	-	-	-	-	-	-	-	-	-	-
27**	-	-	-	-	-	-	-	-	-	-	-	-

Table 50, continued

Indiv. No.	FEMUR, continued				TIBIA		Nut.F.		FIBULA		CLAVICLE	
	Max Hd Dia	Sub-t A-P	Sub t M-L	Mid-S A-P	Mid-S M-L	Length	A-P	M-L	Length		Length	
1	47.0*	31.0	27.0	28.0	24.5	-	38.0	24.0	-	-	-	-
2	46.0	25.0	30.0	33.0	26.5	-	40.0	29.0	-	-	159.0	-
3	41.5	29.5	26.0	25.5	24.0	368.0*	30.5	27.5	363.0*	-	-	-
4	43.0	28.0	28.0	28.0	25.0	361.0	37.5	22.0	-	-	140.0*	-
5	43.0	27.5	24.5	28.0	21.0	384.0*	33.0	29.0	-	-	-	-
6**	-	8.5	8.5	7.5	6.5	67.0	7.5	7.0	65.5	-	44.5	-
7	45.5	30.0	25.5	30.5	25.0	-	-	-	-	-	156.0*	-
8**	-	10.5	12.5	-	-	106.5	13.0*	14.0*	-	-	54.5	-
9	42.0	30.0	28.0	25.0	26.0	378.0	31.0	18.0	-	-	-	-
10**	-	-	-	-	-	-	16.0	13.5	-	-	-	-
11	45.0	28.0	27.0	30.0	23.0	385.5	36.5	24.0	376.5	-	-	-
12	41.0	-	-	-	-	341.0	32.0	21.0	-	-	134.0	-
13	-	30.0	30.0	28.0	30.0	380.0	37.0	25.5	-	-	-	-
14**	-	13.5	12.5	-	-	-	10.5	14.5	-	-	-	-
15	40.5	28.0	25.5	25.0	22.0	-	32.5	20.0	-	-	-	-
16	41.0	23.5	25.0	25.5	23.5	367.0	31.0	20.0	-	-	136.0	-
17	46.5	30.0	26.5	29.0	23.0	381.0*	35.0	24.0	-	-	152.0	-
18	38.5	27.0	23.0	23.0	22.0	359.0	31.0*	23.0*	339.0	-	-	-
19	48.0	30.0	30.0	30.0	27.5	423.5	43.0	22.0	405.0	-	152.0	-
20	46.5	24.0	33.0	27.0	28.5	384.0	36.0	22.5	368.5	-	-	-
21	45.0	27.0	29.0	30.0	24.0	388.0	39.5	22.0	376.0	-	151.0	-
22	43.5	26.0	30.0	29.5	25.5	397.0	36.0	25.5	387.0	-	158.0	-
23	-	23.0	34.0	-	-	-	34.0	24.0	-	-	-	-
24	-	-	-	-	-	-	-	-	-	-	-	-
25	43.0	27.0	27.0	31.5	24.5	384.0	37.0	22.5	370.0	-	147.5	-
26**	-	-	-	-	-	-	-	-	-	-	-	-
27**	-	-	-	-	-	-	-	-	-	-	-	-

Table 50, continued

Indiv. No.	HUMERUS		Max.Hd. Dia.	Max.Mds. Dia.	Min.Mds. Dia.	Epicond Width	ULNA Length	RADIUS		Max.Hd. Dia.	PELVIS	
	Length							Length	Length		Pub Length	Isch Length
1	-		-	23.0	16.0	64.5	-	257.0*		24.5	-	-
2	340.5		45.5	22.0	15.0	61.4	288.0	266.5		23.0	-	81.0*
3	316.0		40.5	18.5	12.5	53.5	-	-		19.0	-	-
4	309.0		46.0	22.0	16.5	60.0	-	-		23.5	-	-
5	-		43.0	19.5*	17.0*	60.5	267.0*	-		21.5	-	77.5
6**	66.0		-	7.0	5.0	16.0	62.0	54.0		6.0	-	-
7	330.0*		46.0*	21.5*	17.0*	62.5	282.0	259.0		23.5	-	84.5*
8**	99.0		-	9.5	7.5	24.5	90.0	78.5		8.0	-	-
9	319.5*		39.5	20.0	13.0	53.0	270.5*	254.5*		23.5	-	-
10**	-		-	-	-	-	89.0	-		-	-	-
11	313.5		41.5*	19.0	15.0	60.0	273.0	255.0		25.0	-	-
12	294.0		38.0	19.0	14.0	52.0	231.0	214.5		20.0	-	-
13	321.5		47.5	24.5	18.5	64.0	-	-		24.0	-	-
14**	104.5		-	10.5	8.6	25.5	92.0	81.0		8.0	-	-
15	299.0		39.0	20.5	13.5	54.0	249.0	228.5		20.5	-	-
16	316.5		37.0	16.5	13.5	51.0	254.0	237.0		20.5	88.0*	87.0*
17	324.0		46.0	23.0	17.0	61.0	281.0	255.0		23.0	84.0*	90.0
18	291.0		39.0	19.0	14.5	53.0	244.5	233.0		20.0	-	-
19	329.5		46.5	22.5	15.5	65.0	289.5	271.0		24.0	-	-
20	-		-	21.0*	16.0*	60.0	254.0	-		-	-	-
21	320.0		45.0	22.0	16.0	61.0	-	260.0		23.0	71.0*	85.0*
22	331.0		44.0	22.0	16.0	60.0	280.0	258.0		24.0	87.0	85.0
23	-		-	-	-	-	-	230.0*		21.0	-	-
24	341.0*		49.5	24.5	17.5	-	-	-		-	-	-
25	316.0		44.0	21.0	16.0	61.0	270.0	247.0		22.0	91.5*	85.0*
26**	-		-	-	-	-	-	-		-	-	-
27**	-		-	-	-	-	-	-		-	-	-

TABLE 51
NUMBER RANGE AND MEAN OF CRANIAL AND INFRACRANIAL
MEASURES AND INDICES BY SEX

	MALE			FEMALE		
	N	Range	Mean	N	Range	Mean
<u>Crania</u>						
Maximum length	11	176.5-195.0	188.0	7	117.0-189.0	181.8
Maximum breadth	11	125.5-135.0	129.3	7	119.0-128.5	124.4
Basion-Bregma	3	138.0-143.5	140.5	5	130.0-140.0	132.8
Basion-Nasion	3	104.0-111.0	107.7	4	97.5-105.5	100.9
Basion-Prosthion						
Min. Frontal	10	87.0-96.0	90.8	4	84.0-90.0	87.4
ARC: Frontal	11	115.0-132.0	125.2	6	115.0-132.5	121.0
Parietal	13	113.0-135.0	129.5	7	115.0-130.0	134.4
Occipital	8	105.0-133.5	121.7	6	115.0-122.0	118.6
Transverse	9	285.0-321.0	303.0	7	276.0-300.0	288.4
CHORDS: Frontal	11	108.5-116.0	112.0	6	103.0-115.0	106.9
Parietal	13	103.5-128.0	115.8	7	104.0-115.0	111.8
Occipital	8	91.0-107.5	99.1	6	91.5-103.0	96.3
Mastoid Length	9	24.5-31.5	26.7	7	19.0-24.0	22.3
Opis-Forehead	6	157.0-164.0	159.8	4	146.0-157.0	151.8
Bizygo Breadth	4	130.0-140.0	135.8	-	-	-
Face: Upper Face Height	4	66.0-70.0	68.4	-	-	-
Total Face Height	4	106.0-120.0	113.3	-	-	-
Nose: Height	4	47.0-52.5	50.3	-	-	-
Breadth	6	22.5-29.0	25.7	-	-	-

Table 51, continued

	MALE		FEMALE	
	N	Range	N	Range
Orbit: Height	4	33.5- 38.5	-	
Breadth	4	37.0- 47.5	-	
I-O	4	21.5- 25.0	-	
Maxillary: Breadth	7	62.0- 71.0	-	
Length	7	50.0- 54.0	-	
Mandible: H ₁	7	30.5- 35.5	5	25.5- 35.0
ML	4	99.0-112.0	4	100.0-106.5
GoGo	8	92.0-105.5	5	88.5- 98.0
W ₁	4	117.0-120.5	3	107.0-115.0
CrH	8	57.0- 70.0	7	47.5- 56.0
RB'	11	31.0- 36.5	7	26.0- 34.5
RB	8	43.0- 48.0	6	38.5- 43.0
ZZ	9	44.0- 50.0	7	41.0- 46.5
Bd Ht	10	28.0- 35.0	7	25.5- 31.0
Bd Th	10	13.0- 16.5	8	12.0- 16.0
<u>Infracrania</u>				
Clavicle: Length	8	140.0-159.0	-	
Humerus: Length	11	309.0-341.0	6	291.0-319.5
Max Hd Dia	12	41.5- 49.5	6	37.0- 40.5
Max Md Shaft	14	19.0- 24.5	6	16.5- 20.5
Min Md Shaft	14	15.0- 18.5	6	12.5- 14.5
Epi Width	13	60.0- 65.0	6	51.0- 54.0
Ulna: Length	9	254.0-289.5	5	231.0-170.5
				276.1
				276.5
				306.0
				38.8
				18.9
				13.5
				52.8
				249.7

Table 51, continued

Table 51, Continued						
	MALE			FEMALE		
	N	Range	Mean	N	Range	Mean
Radius: Width	9	247.0-271.0	258.7	5	214.5-254.5	233.5
Max Hd Dia	12	21.5- 25.0	23.4	6	19.0- 23.5	20.6
Pelvis: Pub Length	4	71.0- 91.5	83.4	-		
Isch Length	7	77.5- 90.0	84.0	-		
Femur: Length	12	424.0-488.5	452.9	5	413.5-444.0	433.6
Bicond Length	11	421.0-477.0	446.7	5	406.0-438.0	425.6
Max Hd Dia	12	43.0- 48.0	45.2	6	38.5- 42.0	40.8
Sub-t A-P	14	23.0- 45.0	28.7	6	23.0- 30.0	26.8
Sub-t M-L	14	24.5- 33.0	28.5	6	23.0- 34.0	26.9
Mid Shaft A-P	13	27.0- 33.0	29.4	5	25.0- 30.0	26.2
Mid Shaft M-L	13	21.0- 30.0	25.2	5	22.0- 26.0	23.5
Tibia: Length	10	361.0-423.5	386.8	5	341.0-386.0	366.2
Nut. F. A-P	13	33.0- 40.0	37.1	7	30.5- 24.0	31.7
Nut. F. M-L	12	22.0- 29.0	24.3	7	18.0- 27.5	21.8
Fibula: Length	6	368.0-405.0	380.5	-		
Indices						
Cranial Module	3	151.0-157.1	153.5	5	145.0-149.3	146.8
Cranial Index	10	64.7- 73.6	68.9	6	66.2- 71.5	67.8
Length-Height	3	72.9- 73.2	73.1	5	68.8- 76.1	72.9
Breadth-Height	3	108.7-111.5	109.8	5	101.5-112.9	106.0
Total Face	3	82.0- 85.7	84.0	-		
Upper Face	3	48.6- 52.2	50.3			

Table 51, continued

	N	MALE Range	Mean	N	FEMALE Range	Mean
Nasal	3	44.1- 51.5	48.1	-		
Orbit	4	79.1- 90.6	87.2	-		
Max-Alveolar	7	114.0-142.0	125.3	-		
Bracid I	8	77.9- 82.2	79.5	4	72.9- 80.1	77.3
Platyme	13	72.7-120.0	100.6	6	67.6-117.4	101.6
Platyc	12	51.5- 87.8	65.6	8	58.0- 90.5	69.9
Stature	14 W	166.3-180.2	172.19	7 W	160.4-167.5	163.7
	M	166.4-179.3	171.61	M	163.0-169.7	166.6

TABLE 52
SUMMARY OF CRANIAL AND INFRACRANIAL INDICES

Indiv. No.	CM	CI	LH	BH	TF	UF	Na	Or
1	-	70.4	-	-	-	-	-	-
2	157.1	67.3	73.2	108.7	-	-	-	-
3	149.3	67.1	76.1	112.9	-	-	-	-
4	-	73.6	-	-	-	-	-	-
5	-	73.3	-	-	-	-	-	-
6**	-	-	-	-	-	-	-	-
7	-	64.7	-	-	-	-	44.1*	89.3
8**	-	-	-	-	-	-	-	-
9	145.0	66.2	71.9	108.6	-	-	-	-
10**	-	-	-	-	-	-	-	-
11	-	71.3	-	-	82.0	50.0	-	90.6
12	-	69.1	-	-	-	-	-	-
13	151.0	67.1	73.2	109.1	84.3	52.2	51.5	89.7
14**	-	-	-	-	-	-	-	-
15	145.6	71.5	72.6	101.5	-	-	-	64.6
16	-	66.5	-	-	-	-	-	-
17	152.5	65.5	72.9	111.5	85.7	48.6	48.6	79.1
18	146.2	72.6	75.1	103.5	84.5	51.8	51.6	89.2
19	-	-	-	-	-	-	-	-
20	-	-	-	-	-	-	-	-
21	-	69.0*	-	-	-	-	-	-
22	-	-	-	-	-	-	-	-
23	148.1	66.4	68.8	103.6	-	-	-	-
24	-	65.5	-	-	-	-	-	-
25	-	-	-	-	-	-	-	-
26**	-	-	-	-	-	-	-	-
27**	-	-	-	-	-	-	-	-

Table 52, continued

Indiv. No.	M-A	Gn	Fl	Br	Pltym	Pltyc	Stature
1	-	-	-	-	114.9	63.1	176.82
2	124.2	-	-	78.3	83.3	72.5	173.41
3	-	-	-	-	113.5	90.5	165.40
4	-	-	-	-	107.7	58.5	166.25
5	125.9	-	-	-	112.2	87.8	169.40
6**	-	-	-	81.8	100.0	93.3	-
7	142.0	-	-	78.4	120.0	-	169.35
8**	-	-	-	79.3	84.0	107.7	-
9	-	-	-	79.6*	107.1	58.0	167.46
10**	-	-	-	-	-	84.4	-
11	114.8	-	-	81.3	103.7	65.7	169.94
12	-	-	-	72.9	-	65.6	160.42
13	122.6*	148.6	67.3	-	100.0	68.9	169.00
14**	-	-	-	77.5	108.0	138.0	-
15	-	-	-	76.4	109.8	61.5	161.79
16	-	-	-	79.9	94.0	64.5	166.37
17	125.9	102.7	97.3	78.7	113.2	68.6	172.55
18	110.9	98.5	101.5	80.1	117.4	74.2	160.58
19	-	-	-	82.2	100.0	51.5	180.16
20	-	-	-	-	72.7	62.5	164.85
21	122.8	-	-	81.3	93.1	55.7	171.91
22	-	-	-	77.9	86.6	70.8	174.66
23	-	-	-	-	67.6	79.9	163.95
24	-	-	-	-	-	-	176.65
25	-	-	-	78.1	100.0	60.8	170.60
26**	-	-	-	-	-	-	-
27**	-	-	-	-	-	-	-

(in those three instances when male and female indices could be calculated). Both males and females of this population are dolichocephalic (long-headed) and the crania are of medium height (orthocranic) in the relationship of the length to the height. It can be noted that the range for males is very limited and the female range is much greater. The skulls are very high (acrocranic) in the relation of the height to the width and, again, the male range is more limited. However, this may have to do with sample size. The remainder of the indices are based on the means of males, in that there are no indices from the female sample. The faces are broad (euryproscopic), the nasal aperture is moderate (mesorrhine) in its breadth and the orbits are also moderate (mesoconchic) in the relationship of their height to width. The external maxilloalveolar index indicates a very broad (brachyuranic) palate. The cranial module, which is figured by adding together the measures of the length, height and breadth of a crania and dividing by 3, gives a rough indication of size; here the sexual dimorphism is clearly seen; there is no overlap in the range of indices of males and females (Table 52).

Only a few post-cranial indices were calculated and they are presented in Tables 50, 51 and 52. There are several that give some indication of the overall body and limb proportions. There is little sexual dimorphism in the limb proportions but, as noted, the sample size, especially for the females, is small. It does appear that there is a basic genetic homogeneity of this population. The mean ratio of the upper limb length to the lower limb length for males is 68.1 and for females 68.9. This is a moderate index and indicates that the legs are not especially long in relationship to the arms.

Two other body proportions are (1) the ratio of the upper arm to the lower arm and (2) the upper leg to the lower leg. In the first instance, the mean ratio for males is 79.5 and females 77.3. The ratio is somewhat high indicating that the radius (forearm) is relatively long compared to the humerus (upper arm). The upper leg/lower leg ratios are remarkably similar; the mean ratio for males is 85.7 and 85.5. This indicates that these people had a proportionately short femur (upper leg) compared to the tibia (lower leg).

Two ratios were calculated that quantify the shape of the two leg bones. These are the Platymetric Index which is derived from measures taken on the shaft of the femur just below the lesser trochanter, and the Platycnemic Index which is derived from measures taken at the site of the nutrient foramen on the shaft of the tibia. As observed in Table 52, the mean Platymetric indices for males and females is quite similar and there is considerable overlap in the two series of scores. The majority (11/16 or 69%) of the femora tend toward being round rather than flat in shape. Four individuals (three males and one female) have femora that are considered flat or platymetric which is indicated by their index of less than 84.9. Another four (again, three males and one female) have indices in the eurymeric category meaning that they are less flat than the others.

The lack of flatness is also characteristic of the tibia. The mean indices for females is 69.9 and for males 65.6. Both of these are within the mesocnemic range indicating that the tibia is not unusually flattened. The range of each is wide, however, and with a larger sample size, a more distinct pattern might emerge. As it is, two males have very flat (hyperplatycnemic) tibiae, three males and two females have flat (platycnemic) tibiae, six individuals (four males and two females) have mesocnemic tibiae and three males and four females have eurocnemic or broad tibiae.

Stature was calculated using the Trotter and Glester formulae for both Mongoloids (as reprinted in Ubelaker 1978) and Whites (as reprinted in Brothwell 1963). Ubelaker (178:45) suggests that the use of "Trotter and Glester's formulae may give more reliable results for skeletons from northern North America, especially for males." There is only one set of regression equations in the Mongoloid groups whereas there is one set for males and another for females in the White group. In 11 of 14 males, less than 1 centimeter difference in calculated stature was observed when the results of the two formulae were compared. The differences observed between the two different formulae used for the estimation of the stature of the seven female skeletons, however, was quite different. Six of the seven stature estimations were between 2.5 and 4.5 centimeters greater when the Mongoloid formula was used than when the White formula was used. Only one individual's stature was figured about the same with both formulae. Thus, the use of the White formula accentuates the sexual dimorphism in stature. As observed in Table 51, the range in estimated stature (White formula) for the males is 166.3 to 180.2 centimeters or 5.4 to 5.8 feet. The range in estimated stature (White formula) for the females is 160.4 to 167.5 centimeters or 5.2 to 5.5 feet. The average male height is 172.2 centimeters (5.6 feet) and the average female height is 163.7 centimeters (5.3 feet).

MORPHOLOGICAL CHARACTERISTICS

The skeletal and dental morphological or nonmetric traits studied and noted here include both the epigenetic, discontinuous or "discrete" traits that are scored as present or absent when the area of the skeleton is observed, and the more subjective continuous for nonmeasurable cranial shape and size traits such as chin shape, orbit shape, size of depressions or tuberosities which are described according to accepted standards (Anderson 1963; Brothwell 1963; Berry and Anderson 1963; Berry 1967; Grant 1958). The standards of Dahlberg (n.d., 1949) and Greene (1967) generally have been used for the dental morphological traits. Investigators agreed for a number of years that these traits are very important in understanding the genetic relationships of human population (Corruccini 1974; Rightmire 1970); Wilkinson (1970) being one of the very few dissenters. In more recent years, the question of sampling procedures has been the focus of the discussion (Korey 1980; Ossenberg 1981; Green, Suchey and Gokhale 1979; Buikstra 1976). The basic question is whether features should be sampled or scored based on individuals or on the total number of sides examined. Additional concerns one

has in the interpretation and use of nonmetric data are possible associations with sex and age variables, associations with other traits, associations with cranial deformation, and scoring reliability due to the nature of the skeletal material.

Because of these factors and the fact that one group of people is being considered, the following description of the cranial, post-cranial and dental morphological characteristics are intended to the statements of the general nature of this population. The object of this report is to describe the characteristics of the people in this cemetery. It could be the subject of another report to compare in detail this specific information regarding the individuals in this population to other populations of Central Texas indians or other American indians. In order for this to be done, parallel information of other populations would have to be collected. One would then need to determine the sampling strategy and association factors to fit the stated goals. The method in which these data were collected will easily permit an investigator to select the information to fit the desired analytical technique.

CRANIUM

Vault

This group of people is characterized by both uncomplicated sutural connections and by a lack of sutural bones. Although the observations for these characteristics could only be made in the crania of younger individuals, it was obvious in those that wormian bones were not common among this group, especially in the coronal (N = 14) and sagittal (N = 8) sutures. Fifteen skulls have the lambdoid area intact and of those, ten (67%) have one of two wormian bones present.

This lack of extrasutural bones is characteristic of the fontanellic bones as well. There is one bilateral expression of an asterionic bone (#18) and the bone on the right side is very large, extending from asterion into the parietal notch area of the temporal/parietal bones. Lambda was the only site at which there are a fontanellic bone, but the frequency is very low.

Of the 15 skulls observed, only two (15%) exhibited a lambdoid bone. One of these is quite large. None of the skulls has an inca bone and none has a metopic suture.

The posterior region is present in only two individuals and in both cases the sutural pattern is H-shaped. This is the most common pattern and is defined as a common contact between the parietal and sphenoid bone.

Observations for the parietal foramina could be made in 14 of the 21 adult crania. Of these 14, both sides are present in 13 crania. Absence on both sides is the most frequent expression of the trait (7/13 or 53.8%). Four others (30.7%) have a foramen on the left side and are missing one on the right. Only one individual each (7.7%) has (a) a

foramen present on the right side and missing on the left, and (b) has a foramen present on both sides.

The area of flexure of the superior sagittal sinus on the interior of the occipital bone could be observed in almost all of the adult crania (20 of 21) and one child's crania (1 of 6). In these 21 individuals, flexure to the right occurs 81 percent of the time.

Base of Skull

The base of each skull was examined for the variations in the expressions of the foramen of Vesalius, foramen ovale, foramen spinosum, the anterior condylar foramen (hypoglossal foramen), the posterior condylar foramen, and the pterygoid spinous foramen. The morphology of the occipital condyles, the paramastoid and the precondylar area were also examined. Only minor variability is observed in some of the features. Table 53 summarizes the variability noted in the foramina.

As can be noted in the table, the majority of the individuals (84.6%) do not have a foramen Vesalius. Only one individual has a bridged foramen ovale, otherwise they are all singular and present. The presence of the foramen spinosum is also quite regular with all individuals having one present. There is only one partial bridge in the pterygoid spinous area. The greatest variability was seen in the posterior and anterior condylar foramina expressions. The expression of the posterior condylar foramen is symmetrical in five of seven individuals, and of those five, it is present in all but one cranium. Two individuals are missing the foramen on one side while it is present on the other. The foramen was present in all nine individuals where only one side could be examined. The most common expression of the anterior condylar foramen is as a present and singular foramen and in 10 of 14 crania the expression is bilateral. Only one individual is missing one of the two. Three other individuals all have both foramina present but each has a bridge over only one of the foramen.

The occipital condyles are quite regular in their shape in that all individuals have single condyles which do not vary from the usual form. There are no enlargements in the paramastoid areas but there are some differences in the morphology of the precondylar area. No pharyngeal tubercles were observed, but three of fourteen (21.4%) individuals have a small depression or a fossa pharyngea.

Temporal Region

The morphology of the posterior aspect superior margin of the temporal bones is present for examination in 16 individuals; only three of those are missing one side. A notch in this area is the most common form present; ten individuals (62.5%) have a notch present. Four, or 25%, do not have any indentation in this area. The other variant is to have an extra bone in the notch, and one individual expressed this variability bilaterally. Another individual is asymmetrical having a notch on one side and a parietal bone on the other.

The tympanic plate is relatively free of disturbances or anomalies. No exostases were observed and none are unusually thickened. Dehiscences were the only tympanic plate variability observed. Nineteen individual skulls have the temporal area present and, of these, eleven have both temporal bones present. The expression of the dehiscences is observed bilaterally in all but one of these eleven individuals. It is absent in seven, present in three, and asymmetrically expressed (right absent/left present) in one individual. In the eight skulls with only one bone present, a dehiscence is present in four and absent in four. The size of the dehiscence ranges from quite small to large and they are present in both male and female skulls. Two of the individuals with dehiscences are young adults and the rest are middle-aged.

Frontal Region

The characteristics observed in this area include the expression of the trait in the area of the supraorbital foramen, the presence of frontal foramina, the presence of grooves in the frontal bone, and the shape of the browridge. As mentioned previously, none of the skulls exhibits a metopic suture.

The expression of the supraorbital region is quite variable in this population. Observations could be made of 17 of the individual skulls, and of those, 14 individuals have both sides available. The trait is bilaterally expressed in nine of them; two have notches, three have grooves, two have a foramen and a groove, one has a notch and groove and only one individual has a foramen. The other five have asymmetrical expressions exhibiting this same broad range. Of the three individuals with only one frontal bone present, two have grooves and one has a foramen in this area.

The presence of the frontal foramen is less variable than the supraorbital foramen. The observation is made in 16 individuals and of those, only one has only one side available. The expression is bilateral in 13 of the 15 individuals; six (46.2%) have frontal foramina and seven do not. Two individuals exhibit the trait asymmetrically present on the right side and absent on the left.

As a whole, frontal grooves are not characteristic of this population. Only three of the nineteen individuals observed have any kind of frontal grooves. These are generally observed on only one side of the frontal bone and they are weak in the depth of the groove.

The browridges are quite uniform in their shape; they are generally small and separated at the glabellar area. The enlarged area extends laterally over the superior margin of the orbit and about one-half the total breadth of the orbit.

Facial Region

In that the facial area is composed of more delicate bones, few complete faces were recovered. In spite of the fact that observations

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TABLE 53
BASILAR FORAMINA VARIABILITY
(N = Individuals)

	Symmetrical Expression of Trait		Asymmetrical Expression of Trait		One side present		TOT N
	Absent	Present/ Singular	Bridged	Absent/ Present	Present/ Bridged	Absent	
F. Vesalius	6	1				5	13
F. ovale		8	1				15
F. spinosum		8					15
Post Condylar F	1	4		2			16
PSF	9					4	14
ACF		9	1	1	3		18

were not possible to confirm the symmetry of the various trait expressions, it is still possible to offer some generalizations regarding these traits expressions in this population. Not one of the japonicum was observed in the ten individuals having at least one malar bone present. The infraorbital foramina are singular and without bridging in all 14 individuals with at least one of the maxillary areas present. Variability was observed in the expression of the infraorbital suture; however, the maxillary areas of 13 individuals were examined and five of these (38.5%) have an infraorbital suture present bilaterally. Only one individual with both sides present has the asymmetrical expression of the foramen present on one side and absent on the other. All of the individuals with an infraorbital suture present are middle-aged adults.

The facial and orbital sides of the malar bone were examined for the number of zygomatico-facial foramen. As observed in Table 54, a single foramen is the most frequent expression for both the orbital and facial side and generally the expression is bilateral. Further, the orbital side generally has only one foramen.

TABLE 54
EXPRESSION OF THE ZYGOMATICO-FACIAL FORAMINA
(N = number of individuals)

	Both Sides Present		One Side Present
	Symmetrical Expression of the Trait	Asymmetrical Expression of the Trait	
FACE			
1 foramen present	4		4
2 foramina present	1		4
3 foramina present	1		
1/2 foramina present		1	
2/3 foramina present		1	
ORBIT			
1 foramen present	1		8
1/2 foramina present		3	

The size of three tuberosities were examined: the zygo-maxillary tuberosity, the malar tuberosity, and the marginal tubercle on the lateral border of the malar bone which forms the rim of the orbit. The expressions of the zygo-maxillary tuberosities and malar tuberosities tend to be bilaterally symmetrical; and from the small sample available, it appears that size is related to sex. Seventy-five percent (six of the eight) of large tubercles are associated with male skeletons. Four

males and two females have small tuberosities, and only one female was observed to be lacking a tuberosity in the area. The one individual with the asymmetrical expression is a female skull with a large tuberosity on one side and a small one on the other side.

The malar tuberosity is more regular and delicate in its expression. In all cases where both sides of the malar bone are present, the trait is expressed the same on both. Eighteen skulls were observed for the trait and of these eight (44.4%), each either has the trait absent or only slight in its expression. Only two males have a large malar tuberosity. Only six females were observed, and four of them are lacking this tuberosity, so once again the positive expression of the trait seems to be more characteristic of the male skeletons.

Greater variability was observed in the expression of the marginal tubercle. Not only is it expressed in all its forms (absent, small and large), it does not share the consistent bilaterally symmetrical expression of the other two tuberosities. The distribution is too diverse to see any relationship between sex and size (Table 55).

TABLE 55
EXPRESSION OF THE MARGINAL TUBERCLE

	Both sides present		One side present
	Symmetrical Expression of the Trait	Asymmetrical Expression of the Trait	
Absent	2		1
Small	4		1
Large	1		3
Absent/small		2	
Small/large		3	

The delicate palatal area was observed, but the preservation of this area of the skull is relatively poor. The palatal suture was observed in only two individuals; one has a posteriorly directed suture course and the other has an irregular suture line. The premaxillary suture area was examined, and a suture was observed in five of the individuals. The surface of the hard palate was examined for a palatine torus, and only one in the eleven crania has a torus, but its expression is weak.

There is remarkable homogeneity in the expression of the inferior border of the nasal margin. Seventeen crania had this area intact for observation, and all but one have a blurred margin. This one, a cranium of a female, is slightly different in that the ridge is somewhat stronger along the inferior border tending toward a sill-like expression.

Mandible

Three observations each were made for continuous and discontinuous morphological characteristics of the mandible. The three subjectively scored traits are the extent of gonial eversion, the presence and size of the mandibular torus, and the shape of the chin. This group of people is characterized by a very weak flaring, if any, of the gonial angle. Of the seventeen mandibles observed, there was no flaring observed in eight (47.1%) and there was very weak eversion in another eight individuals. Only one male has a slightly stronger gonial eversion than those other eight. None of the mandibles has a palatine torus of any size. Eighteen mandibles were examined for chin shape, and as expected, shape is associated with the sex of the individual. All 11 male mandibles have a bilateral chin shape. Four of the female mandibles have a median shape and three other females have a median-bilateral shape.

The discontinuous traits of the mandible include the nature of the mandibular foramina on the medial aspect of the ascending ramus, the presence of bridges or arches over the mylohyoid grooves, and the nature of the mental foramina on the anterior part of the mandible.

Relatively little variation was observed in all three of these traits. Of the 18 mandibles observed, only one, a young adult, exhibits a variation of the usual single mandibular foramen observed; he has a single foramen on the right side and a double one on the left side. Eighteen mandibles were also observed for the presence of an arch over the mylohyoid groove. There are none in 14 (77.8%) of the mandibles and only one bilateral expression of an arch was observed. Three other individuals have a unilateral expression of the arch. The same consistency of expression is noted in the number of mental foramina present. The observation could be made in 18 mandibles, and of these, 16 (88.9%) have a single foramen present. Two males deviate from that conservation expression; one has a divided mental foramen on one side and a single one on the other, and another male has multiple foramina on one side and a single foramen on the other.

INFRACRANIAL SKELETON

Torso and Arms

One qualitative observation made was that in five (Nos. 1, 5, 13, 22, 25) of the fourteen males represented in this population, the right humeri were noticeably larger and more robust with stronger muscle markings than were the left complementary bones. Individual No. 17 is very robust, and the muscle markings in the deltoid area especially are much larger on the right arm than the left. In one other individual (No. 11), it was striking that the bones of the arm, particularly the radius and ulna, are delicate for a male. In general, the robusticity and expression of the muscle attachments is moderate. As expected, males are generally larger and more robust than females.

Observation for discrete, discontinuous traits were also made, but little variability was observed within this population. A supratrochlear spur, which is sometimes found on the distal, lateral shaft of the humerus, is absent in this population. Not one of the 33 humeri observed exhibited this trait. Septal apertures were noted in several of the distal humeri. This trait is considered sex linked, and in this group it does appear in female skeletons more frequently than males. A septal aperture is present in all the female skeletons, and it is expressed bilaterally when both bones are present for observation. A much greater variability occurs in the expression of this trait among the male skeletons. Nine males had both humeri present, and of these, one has a septal aperture present in both, four are missing the trait in both, and the aperture is expressed asymmetrically (present in one and missing in the other) in the other four. Three males have only one humerus present, and of these, two have the aperture and one lacks it. In several instances, the size of the aperture in the humeri of males is very small.

The sternum is another bone that can have an aperture as a variation of its more usual solid morphology; however, in this group, none was observed. The sternum, being a porous, fragile bone, was recovered less frequently than other elements; only six were available for examination.

Pelvis and Legs

The size, robustness and ruggedness of muscle markings of the lower limb bones show an expected sexual dimorphism and are of a moderate size. Several observations of discontinuous and nonmetrical continuous traits were observed and, as noted in the discussion of the arms, the range of variability of these traits is limited.

The innominate bones were examined for the presence of a notch, pit, or groove in the center of the acetabulum. Since the innominate bones have delicate areas, it was recovered less frequently than the other, more robust bones. Only ten observations for this trait could be made, and in one-half of the cases the trait was missing. Three individuals have the trait expressed as a pit; two have it expressed as a notch. Eight of the individuals had both sides of the pelvis present, and in all cases the trait was bilaterally symmetrical.

Three traits were observed on the femora: shape of the fovea capita, presence of a third trochanter, and the presence of the Fossa of Allen. The heads of 16 femora were examined for the shape of the scar (fovea capita) where the ligament attaches. Ten, or 62.5%, are oriented in an anterior/posterior direction, and five of them are round. One has an irregular shape which is neither round nor oblong. Four of the sixteen individuals examined had only one femur present, and in all but one of the twelve with both present, the trait is expressed the same on both sides.

Third trochanters are not characteristic of this population. The femora of eighteen individuals, twelve of whom have both the right and left femora present, were examined, and eight individuals are lacking any trace of a developed ridge or extra trochanter at this site. Another eight do have a developed ridge but not large enough to be called a trochanter. Two individuals have small but well-developed third trochanters. In all cases where the trait was observed on right and left pairs, it is expressed the same on both.

The third area of the femur examined was the neck on the anterior surface for the trait termed Fossa of Allen which has a range of expression. This area could be observed on the femora of 16 individuals, 12 of whom have both present. Ten (62.5%) of them do not have any disturbance in this area. The disturbance can have a mild expression which is termed porous, or a moderate expression called an ulcer, or an extreme form which is the fossa. Three of these samples were identified as porous; one was identified as an ulcer; and the third individual with the right and left femora present has an asymmetrical expression, one side with an ulcer and the other side porous; one other individual also has an asymmetrical expression, one side is porous and the other does not have any disturbance.

The patella were examined for the presence of a vastus notch. Seventeen individuals have patella present and thirteen of them are paired. The trait is absent in all but one individual, an old-age male.

Tibiae were examined for the presence of a squatting facet on the distal proximal end. Thirteen individuals have tibia associated, eleven of them are paired. Almost one-half of the individuals (6, or 46.2%) do not have a facet present in this area; five of them have a median facet; and two of them with both tibia present have a facet on one and not on the other. The calcanea were also examined for the morphology of the sustentaculum tali or the facet which supports the head of the talus. There are three basic shapes that are considered within the normal range of variation: (1) the single oblong facet; (2) a facet with an hourglass shape; and (3) complete separation at the middle forming two distinct facets. A single facet is the most commonly observed variant. Thirteen individuals have calcanea present; eleven of them are paired, although not all of them are bilaterally symmetrical. Seven of the thirteen individuals (53.9%) have double facets on the calcaneum which is a rather high proportion of a group. Two individuals have the more typical single facet. Another three individuals, who have both calcanea present, have the trait expressed differently; two of these have two facets on one calcaneum and an hourglass shape on the other. The other individual has two facets on one side and one facet on the other.

Dental Morphology

Unfortunately, very little can be said regarding the morphological characteristics of the teeth. Attrition, caries and post-mortem loss contributed substantially to the loss of the enamel patterns of this entire group of people. Observations were attempted for the following

characteristics: shoveling of the incisors, cusp number of the maxillary molars, expression of the Carabelli's trait, cusp number and fissure pattern of the mandibular molars, and protostylids. Observations of other traits, generally termed anomalies, were also made and this will be discussed as well.

All adult skeletons have some dental elements present; in only a few instances are complete areas missing. Individuals 23 and 24 do not have maxillary teeth or jaws present, and Individuals 2, 20 and 26 are without mandibles and mandibular teeth. However, only two of the juveniles (4 and 14) have teeth present. A total of 396 teeth were studied which represent the 21 adults (14 males and 7 females) recovered (Table 56). For the combined adult samples, this is 73.5% of the number of teeth expected based on the total number of available tooth sockets recovered ($N = 539$), and it is 58.9% of the total number of expected teeth ($N = 672$) based on the number of individuals present. The percentage of recovery was higher for the male skeletons (77.3%) than the female skeletons (67.0%).

TABLE 56
SUMMARY OF ADULT TOOTH SAMPLE BY SEX AND JAW ($N = 21$)

	Maxilla			Mandible			TOTAL
	Male	Female	Total	Male	Female	Total	
N Sockets	174	92	266	165	108	273	539
Teeth Present							
N	129	60	189	133	74	207	396
%	74.1	65.2	71.1	80.6	68.5	75.8	73.5
Teeth Lost							
Post-Mortem							
N	28	24	52	27	22	49	101
%	16.1	26.1	19.6	16.4	20.4	18.0	18.7
Teeth Lost							
Pre-Mortem							
N	13	8	21	2	9	11	32
%	7.5	8.7	7.9	1.2	8.3	4.0	5.9
Teeth							
Congenitally							
Missing							
N	4	0	4	3	3	6	10
%	2.3		1.5	1.2	2.8	1.8	1.9
TOTAL	174	92	266	165	108	273	1078

Because so few of the morphological characteristics are present, only a very impressionistic view of the dental morphology can be offered because in only one instance (skeleton #18) was the attrition mild enough to have retained some of the occlusal characteristics. The generalizations that follow are based on that individual plus a very limited number of observations of nine other individuals. Maxillary central and lateral incisors are moderately shovel-shaped. Only one mandibular incisor was observed, and it is weakly shoveled. The maxillary first molar has the characteristic 4 cusp pattern; whereas both 3+ and 4 cusp patterns were observed in equal frequency (two times each) on the second maxillary molars. Of the four maxillary third molars present, all are different; one is peg-shaped, one has 3 cusps, one has 3- cusps, and the other has 3+ cusps. Two juveniles had teeth present, the deciduous second molars and first permanent all have 4 cusps. The mesial-lingual area where Carabelli's trait is found was observed in these juveniles' dentition, and one has a pit present on both the deciduous second molars and the one permanent first maxillary molar; the other has only a pit on the deciduous molars.

The cusp number and fissure pattern of only one permanent first molar was observed, and it is the expected Y-5. The second lower molar has a Y-4 cusp pattern, and the third molars are quite irregular. Four third molars were observed. One has a +4 cusp pattern, whereas the others have 5, 6 or more cusps with no distinguishable fissure pattern, and an irregular shape. No observations were made of any additional cusps such as the protostylid trait.

Three individuals have some sort of supernumerary tooth expression. Two, one male and the other a female, have mesiodens. Only a root remnant is present in the maxilla of the female (#3) so the overall morphology cannot be ascertained. The mesiodens of the other individual (#25), however, has both root and crown areas, and it projects just slightly into the nasal cavity. The third individual (#17), a male, has very distinct, fully formed supernumerary teeth bilaterally symmetrical and located disto-lingually to the mandibular first premolars (Fig. 89).

Only minor crowding was observed among the dental arches of these individuals. Three middle-aged males (Nos. 17, 21, 22) exhibited some minor crowded anterior mandibular area (Fig. 90).

In the eight cases where the occlusion could be examined, it was either edge-to-edge or the normal over-bite characteristic of people whose teeth are weakly worn.

Although observations were not consistently made, it was noted that two of the loose premolars have bifurcated roots. Another first maxillary premolar has three roots instead of the usual two. An enamel pearl was noted at the cemento-enamel junction on the lingual side of a left maxillary third molar. Individual #27, an infant with a few deciduous teeth present, has a geminate tooth. It is the fusion of the mandibular right central and lateral incisor. The corresponding pair are normal.



Fig. 89. Burial #17 oblique occlusal view of mandible showing supernumerary teeth behind first premolars.

PATHOLOGY

Although the primary emphasis of this analysis is on the morphological characteristics of this group of people, observations were made for skeletal and dental pathology. They were limited to a gross examination of the bones and dental arches. Because bone can react to agents of disease in only a limited number of ways, it is risky and/or impossible to assign a specific etiology or pathogen to an observed pathological lesion. Only a general categorization of the types of pathology has been attempted here.

Many pathological lesions of the skeleton were observed in the population, and they are presented here in four general categories. They are, in order of frequency, osteoarthritis, infectious diseases, traumatic lesions, and miscellaneous ones. The expression of each of these types is identified according to its location, age and sex of the affected individual, and a general morphological description (Table 57).

Although projectiles were found in association with several of the skeletons, there is no sign of any inflammatory reaction on any of the bones. This would suggest that, based on the view that made contact with the bone, the individual died rather quickly after being hit.

Arthritis is observed most frequently in the lumbar region of the vertebral column. Although this is very common for adults over the age of 35 to have some expression of lipping in this region, the degree of the lipping in this population seems greater than what is expected for a "normal" condition.

Arthritis can result from "micro-trauma" over long periods of time (i.e., wear and tear), or ". . . more rapidly developing pathology from gross trauma or infection" (Neumann 1967:9). Several instances of arthritic involvement that appear to be the result of trauma or infection can be observed in these remains. The extremely bowed left tibia of the middle-aged female (#12) most likely produced stress which stimulated the arthritic development. The high incidence of arthritis in the knees and ankles of this population suggests a great deal of stress on these two joint areas.

Four of the five examples of healed fractures were observed on male skeletons and all were arm bones which were broken. In addition, all but one was a right arm broken. They had healed after their break but the alignment of all of them was slightly to markedly irregular.

No cut marks or other post-mortem cultural alterations were observed on any of these bones.

The dental arches and teeth were observed for signs of periodontal disease, abscesses, caries, premortem loss, and attrition patterns. The incidence of dental disease in this population is high and the extent of some of the problems is great. The recovery of dental arches was good, but the relocation of teeth which had fallen out of their sockets was



Fig. 90. Burial #17 skull and facial characteristics typical of cemetery population.

TABLE 57
PATHOLOGICAL SKELETAL ELEMENTS

Ind.#	Area/Bone	Sex	Age	Evidence of Pathology
<u>Osteoarthritis</u>				
1	Lumbar Vertebrae	M	Middle-aged	Marked lipping on several bodies
2	Lumbar Vertebrae	M	Middle-aged	Marked lipping on several bodies
3	Mandible	F	Middle-aged	Eburnation and pitting in right mandibular fossa
	Lumbar Vertebrae			Marked lipping on several bodies
4	Sacro-iliac Joints	M	Middle-aged	Mild lipping of both sacro-iliac joints; the right is more severe than the left; mild lipping on lumbar vertebrae bodies present
9	Lumbar Vertebrae	F	Middle-aged	Mild lipping on several bodies
11	Scapula	M	Old	Mild lipping on glenoid fossa
	Lumbar Vertebrae			Moderate lipping on bodies
12	Ankle	F	Middle-aged	Marked eburnation, pitting and lipping of the right tibia, fibula and talus
	Thoracic and Lumbar Vertebrae			Mild lipping on several bodies
13	Sterno-clavicular Joint	M	Middle-aged	Moderate lipping at the left joint

Table 57, continued

Ind.#	Area/Bone	Sex	Age	Evidence of Pathology
13	Knees			Eburnation and lipping in knee (patella), distal femur, and proximal tibia; left more severe than in right.
	Ankle			Moderate lipping of right distal tibia and talus
	Toe			Marked lipping and cloaca on proximal end of left second great toe phalange
	Lumbar Vertebrae and Sacrum			Marked lipping in bodies of 5 lumbar vertebrae and the sacrum
15	Cervical and Thoracic Vertebrae	F	Middle-aged	Marked lipping of bodies
17	Ankles	M	Middle-aged	Marked eburnation, pitting, lipping of distal fibulae, and tall; right leg is more severely affected than left
19	Wrist	M	Middle-aged	Mild eburnation and lipping of right distal radius and slight flattening of right ulnar head
	Thoracic Vertebrae			Mild lipping on articulation surfaces
	Lumbar Vertebrae			Mild lipping on bodies
20	Knee	M	Middle/old-aged	Slight eburnation on posterior aspect of the right patella
	Ankle			Marked lipping almost fusing right calcaneum and talus together

Table 57, continued

Ind.#	Area/Bone	Sex	Age	Evidence of Pathology
20	Lumbar Vertebrae			Mild lipping on body
21	Knee	M	Middle-aged	Moderate lipping of posterior aspect of the right patella, distal femur and proximal tibia
	Lumbar Vertebrae			Mild lipping on bodies
22	Feet	M	Middle-aged	Slight eburnation and lipping on the proximal ends of both right and left first metatarsals
	Lumbar Vertebrae			Slight lipping on several bodies
23	Foot	F	Middle-aged	Marked lipping between the right calcaneum and cuboid
	Toe			Lipping at the distal end of the right first metatarsal and the neighboring phalange
	Thoracic and Lumbar Vertebrae			Mild lipping of several bodies
24	Base of Skull	M	Middle-aged	Possible lipping in the right occipital condyle area (bone is broken in this area, and there is no atlas to confirm)
25	Toe	M	Young	Eburnation, pitting and moderate lipping of distal left metatarsal and the proximal end of the first phalange of the right great toe

Table 57, continued

Ind.#	Area/Bone	Sex	Age	Evidence of Pathology
<u>Infectious Diseases</u>				
1	Legs	M	Middle-aged	Tibiae are bowed ("saber shin")
2	Legs	M	Middle-aged	Mild osteitis of anterior surface in the mid-shaft region
3	Legs	F	Middle-aged	Mild osteitis on the distal shafts of the left tibia and fibula and the right fibula
5	Arms and Legs	M	Young	Cloaca and abscess of the calcaneum at the tendon of Achilles attachment; mild osteitis on shafts of right and left tibiae; marked osteitis on both radii and ulnae of the arms
6	Arms and Legs	?	Infant	Moderate osteitis on shafts of humeri, radii, femori and tibiae
7	Arms and Legs	M	Middle-aged	Mild osteitis on shaft of both ulnae; moderate osteitis on shaft of both fibulae and tibiae
8	Arms and Legs	?	Infant	Marked osteomyelitis with the formation of an involucrum around the sequestrum on the humerus, ulna, radius, femur, tibia and fibula present; the severity of the disease is greater in the legs than the arms
9	Leg	F	Middle-aged	Mild osteitis on the shaft of left tibia

Table 57, continued

Ind. #	Area/Bone	Sex	Age	Evidence of Pathology
10	Arms and Legs	?	Infant	Marked osteomyelitis with the formation of an involucrum around the sequestrum on the ulna, femur, tibia, fibula present; it is most severe in the femur
14	Arms and Legs	?	Infant	Marked osteomyelitis with the formation of an involucrum around the sequestrum on the humerus, femora, tibia and fibula
15	Arms and Legs	F	Middle-aged	Mild osteitis on shaft of right and left ulnae and radius, and on the shafts of the left tibia and fibula
20	Legs	M	Middle/old-aged	Mild osteitis on distal end of tibiae shafts
21	Legs	M	Middle-aged	Mild osteitis on distal ends of right tibia and fibula
<u>Fractures</u>				
2	Arm	M	Middle-aged	Appears to be a healed fracture of the right proximal ulna and radius
7	Arm	M	Middle-aged	Healed fracture of the right distal radius
11	Arm	M	Old adult	Healed fracture of the right distal radius; it set at an angle
18	Arm	F	Young adult	Healed fracture of the right distal humerus; it has an irregular alignment

Table 57, continued

Ind.#	Area/Bone	Sex	Age	Evidence of Pathology
19	Arm	M	Middle-aged	Healed fracture in the mid-shaft area of the left humerus; healed fracture of the first phalange of a hand
<u>Other</u>				
7	Leg	M	Middle-aged	An exostosis on the greater trochanter of the right femur
9	Toe	F	Middle-aged	A nonpathological fusion of the first and second phalange of the left great toe
12	Leg	F	Middle-aged	Left tibia extremely bowed in an anterior-posterior direction
23	Leg	F	Middle-aged	Right fibula bowed

very difficult and in many cases impossible because of the severe attrition. As mentioned previously, 396 teeth were recovered, or 58.9% of the expected number. The relative frequency of abscesses, caries and premortem loss is summarized in Table 58.

Abscesses are the most common dental problem (Table 58) for these people, and this is directly related to the rapid rate and irregular patterns of attrition experienced by most of them. Abscesses occurred secondary to pulp chamber exposure. Caries are in low frequency (Table 58) because this rapid rate of attrition quickly smoothed off the occlusal irregularities where many carious lesions begin. Furthermore, caries may have contributed to the premortem loss of teeth, and as a result, these carious teeth would not be present in the mouth any longer. Men and women, and the maxilla and mandible, were about equally affected by abscesses (Fig. 91).

Periodontal disease is observed in a majority of the dental arches; 12 of 17 maxilla (70.6%) and 10 of 18 mandibles (55.6%) were affected (Fig. 92). Due to the fragmentary nature of the alveolar borders in some individuals, the severity of the disease often cannot be determined. Varying degrees do occur from the porosity of alveolar bone, resorption and pocket formation.



Fig. 91. Burial #13 example of maxillary abcess.



Fig. 92. Burial #13 palatial view showing severe tooth wear, loss and alveolar resorption.

TABLE 58
SUMMARY OF ADULT DENTAL PATHOLOGY (N = 21)

		Maxilla			Mandible			TOTAL
		Male	Female	Total	Male	Female	Total	
Total Sockets	N	174	92	266	165	108	273	539
Teeth Present	N	129	60	189	133	74	207	396
	%+	74.1	65.5	71.1	80.6	68.5	75.8	73.5
Abcesses	N	26	13	39	16	13	29	68
	%+	14.9	14.1	14.7	9.7	12.0	10.6	12.6
Caries	N	4	2	6	1	2	3	9
	%+	3.1	3.3	3.2	0.8	2.7	1.4	2.3
Premortem Loss	N	13	8	21	2	9	11	31
	%+	7.5	8.7	7.9	1.2	8.3	4.0	5.8
Adv. Attrition Rate		2.95	3.02	2.99	2.85	2.86	2.86	2.93

+ = percent of total N sockets

Degree of attrition was rated on a four-point scale with a score of one being the last amount of wear and four being the greatest. Stage one is characterized by no wear or very mild wear; in Stage two, attrition islands of dentin are visible, in Stage three more than two of the islands are coalesced, and Stage four is any wear beyond that. In the case of this population, there are many stage four attrition ratings, and many of these were severely worn teeth with little enamel left. Several of the molars had been worn down to the bifurcation of the roots. Each tooth was given a rating; these were averaged for each dental arch by sex and age (Table 59). As expected, the extent of wear increases in older individuals; however, this summary also shows that wear of the female teeth was greater than the wear of male teeth for the two age categories in which teeth are present for both sexes (Table 59).

Some of the attrition patterns are extremely irregular in this group. No doubt the premortem loss and rapid wear of certain teeth compounded the irregularity of attrition of the other teeth. Many oblique patterns are present; as expected, oblique wear is present on only one tooth which is located next to an empty socket and is also observed in the entire posterior part of the mouth. It is somewhat normal to have the buccal cusps of the mandibular teeth worn to a greater degree than the lingual cusps, but in six of these individuals the

TABLE 59
AVERAGE ATTRITION RATES FOR THE ADULT TEETH

	Young	Adult Male Middle-aged	Old	Young	Adult Female Middle-aged	Old
Maxilla	2.00	3.26	3.58	2.36	3.67	-
Mandible	1.85	2.74	3.64	2.42	2.98	-
Average of Maxilla and Mandible	1.93	3.00	3.61	2.39	3.33	-

angle was much greater than observed in healthy teeth with a normal wear pattern.

Twelve individuals exhibit moderate wear which flattened the occlusal surface. Some of these individuals have one tooth or so with an irregular pattern, but for the most part it is regular. Four others (1, 3, 12, 13) have extremely irregular patterns and exhibit a severe degree of wear. There does appear to be a change in the severity and irregularity of the wear patterns in individuals ranging from the top to the lower levels of the cemetery. Individuals 1, 3, 7, 9, 11, 12, 13, 15 and 16 (who are, except for one, all middle-aged or older and recovered from the upper levels of the cemetery) tend to have irregular wear patterns and a greater degree of attrition than the adults excavated from the lower part of the cemetery.

SUMMARY AND CONCLUSIONS

This group of skeletons does not represent a normal distribution of ages and sexes expected in a hypothetical population. For example, there are fewer children; it can be that up to 50 percent of cemetery populations will be composed of infants, children and subadults. In this case, 78 percent survived into young adulthood. Another distribution bias is observed in the proportion of male skeletons to female skeletons. More than one-half of the total adult population consists of male skeletons.

In considering the demographic implications of a skeletal population one has to consider the question of the possible sources of error that influence the recovery of the sample. There are generally three major sources of activity which would contribute to the fact that a cemetery population may or may not reflect the parent population. One

is the cultural practices of the original population. For example, there may be differential burial practices for people of different ages, conditions of death, etc. Another source is the natural factors including both soil conditions and animal or plant action. The third source is the modern human one, which includes the presence or absence of random collecting, and the excavation strategy of an archeologist.

For this analysis several possible error sources influencing the nature of the sample can be identified. We know that some of the individuals were cremated; and based on the two individuals which were analyzed, it appears that this practice was reserved for adults. However, the limited frequency of observation of this activity limits our understanding of the role it played. Furthermore, we know that individuals were moved aside to bury other individuals. This activity on the part of the Indians has produced some of the mixing of skeletal elements and could have led to a biasing of the sample.

Natural factors do not seem to have played an important part in damaging the skeletons. There is some, but limited, evidence of rodent activity, the soil seems to have preserved the bones fairly well, even some of the more delicate infant ones. Mixing of elements as the result of flooding of the excavation pit did occur after the skeletons were exposed.

The modern human factor is the other one. As noted in the previous report (Prewitt 1974), there have been several groups excavating at this site: Clarence Loeve, The University of Texas Anthropological Society, the Texas Archeological Survey, a summer field school class of the Department of Anthropology of The University of Texas at Austin, and most recently, the research team of North Texas State University. The skeletons excavated by Clarence Loeve (if any) were not included in this group for analysis. Another fact is that in some of the previous excavations, the presence of cremations was not noted. Although areas of charred bone were found, they were not identified as human cremations in the field, consequently, they were not presented with the rest of the skeletons for analysis.

It would seem, however, that even with the error introduced by these various factors, the amount of error is probably not great. The two modern losses of previously present skeletal material are the most regrettable because it is likely they would have contributed important data.

However, the impression is maintained that this group of people represent a group of infants who died of an infectious disease and adults who died either as a result of violence or disease. Because several of the burials are multiple, it seems likely that this cemetery was used over a short period of time and that several people were killed or died at the same time.

Based on the metrical analysis, the population can be characterized as having long and narrow heads which are moderately high, a moderately wide nasal opening, eye orbits which, although rectangular, are almost

as tall as they are wide, and a broad palate (see Fig. 90). As would be expected, there is a difference in the size between the females and males and one place this is observed is in stature. The average female height is 5.3 feet and the average male height is 5.6 feet. The legs are not especially long compared to the arms, but the forearm is relatively longer when compared to the upper arm. The same pattern is observed in the legs in that the lower part of the leg is longer than the upper part of the leg. These are all typical patterns.

Generalized interpretations of the continuous and discrete non-metric traits are difficult because there are no similar data for other late Archaic populations with which to compare these; furthermore, the sample size, especially for the females, is small. Possibly these data will provide a useful source of information for comparisons in the future. Some general observations, however, are possible.

Overall, in terms of skeletal morphology there is homogeneity within this population, and the expression of various traits seems to be on the conservative rather than developed side. For example, there are very few wormian bones present and the sutures between the crania are quite simple. Very few foramina have bridges or are expressed as double foramina. The posterior condylar foramen is rather consistently present. Parietal notches are most common, and a blurred nasal margin is almost the rule. A great deal of variability, however, is observed in the nature of the opening in the supraorbital area. The mandibles show weak or absent gonial eversion; the chins of males tend to be square or bilateral, whereas the chins of females tend to be pointed (median) or median bilateral (Fig. 93).

The degree of attrition is the most outstanding characteristic of the dental considerations of this population. It was rapid attrition which caused many of the teeth to abscess as the pulp chambers were opened. Premortem loss resulted from this as well as caries. There were so few carious lesions found in the teeth recovered, however, that caries probably were not a very important factor. Periodontal disease was also present and in some cases severe (see Fig. 91).

Some anomalies were noted such as the presence of mesiodens in two individuals and the presence of bilaterally mandibular supernumerary teeth. Congenitally missing teeth were in low frequency in this population.

The most outstanding characteristic in the infracranial skeleton is the presence of two facets on the calcaneum a majority of the time. The muscle markings are moderately robust, especially those of males, and often it was observed that the right arm is more robust than the left.

Only three individuals (16, 26, 27) in the entire group do not have some evidence of skeletal disease. The most frequently observed problem is arthritis, and often it is present in more than one part of the body of an individual. It is commonly observed in the lumbar portion of the vertebral column, in knees and ankles. Infectious disease is the next most frequently observed category of disease. Most of the children seem



Fig. 93. Burial #17 left side of skull.

to have died as a result of an infectious disease; the involvement of the bone is extreme in several cases. The expression of osteitis is less extensive in mature skeletons; often there is a patch of irregular/ additional bone on the shaft of a long bone. Healed fractures were observed only on arm bones. All have healed with some malalignment and in some cases were probably the cause for the secondary expression of either an infectious disease or arthritis. Even though arrow points were found in association with six of the skeletons, there is no evidence of a secondary osteological response to these points. In other words, it is most likely that the individuals died immediately or shortly after being hit with the point.

In conclusion, this is the analysis of 27 individuals recovered from a cemetery that contained additional individuals but the total number is not known. The ages and sexes represented are not typical of a hypothetical population, but there is evidence to suggest that the death of the individuals recovered here was not solely from natural causes. Most of the children were affected with disease, and several of the adults had traumatic deaths. The wear and tear of life on these individuals is seen in the high frequency of dental disease and the stress on the body is seen in the high frequency of arthritis and broken bones and susceptibility to various infectious diseases.

REFERENCES CITED

- Anderson, J. E.
1963 Human Skeleton for Archaeologists. National Museum of Canada, Ottawa.
- Bass, W.
1971 Human Osteology. Special Publication, Missouri Archaeology Society. University of Missouri, Columbia.
- Berry, A. C. and R. J. Berry
1967 Epigenetic Variation in the Human Cranium. Journal of Anatomy 101:361-379.
- Brothwell, D.
1963 Digging Up Bones. British Museum, London.
- Buikstra, J.
1976 Hopewell in the Lower Illinois Valley: A Regional Study of Human Biological Variability and Prehistoric Mortuary Behavior. Northwestern University Archaeological Program, Scientific Papers 2.
- Butler, Barbara H.
1974 Human Skeletal Material from the Loeve-Fox Site: A Preliminary Report. In: Archeological Investigations at the Loeve-Fox Site, Williamson County, Texas, by Elton R. Prewitt, pp. 122-131. Texas Archeological Society Research Report 49, The University of Texas at Austin.
- Corruccini, R. S.
1974 An Examination of the Meaning of Cranial Discrete Traits for Human Skeletal Biological Studies. American Journal of Physical Anthropology 40:425-446.
- Dahlberg, A. A.
1949a The Dentition of the American Indian. In: Papers of the Physical Anthropology of the American Indian, edited by W. S. Laughlin, pp. 128-176. Viking Fund, New York.

1949b Materials for the Establishment of Standards for Classifications of Tooth Characters, Attributes and Techniques in Morphological Studies of the Dentition. Zollar Laboratory of Dental Anthropology, Department of Anthropology, University of Chicago.
- Giles, E. and O. Elliot
1963 Sex Determination by Discriminant Function Analysis of Crania. American Journal of Physical Anthropology 21(1):53-68.

- Grant, J. C. B.
1958 A Method of Anatomy. Williams & Wilkins, Baltimore.
- Green, R. F., J. M. Suckey and D. V. Gokhale
1979 The Statistical Treatment of Correlated Bilateral Traits in the Analysis of Cranial Material. American Journal of Physical Anthropology 50:629-634.
- Greene, D. G.
1967 Dentition of Meroitic, X-Group, and Christian Populations from Wadi Halfa, Sudan. Anthropological Papers No. 85. University of Utah Press, Salt Lake City.
- Korey, K. A.
1980 The incidence of Bilateral Nonmetric Skeletal Traits: A Re-analysis of Sampling Procedures. American Journal of Physical Anthropology 50:629-634.
- McKern, T. W. and T. D. Stewart
1957 Skeletal Age Changes in Young American Males. Headquarters, Quartermaster Research and Development Command, Technical Report E, P-45, Natick, Mass.
- Neumann, Holm Wolfram
1967 The Paleopathology of the Archaic Modoc Rock Shelter Inhabitants. Illinois State Museum #11.
- Ossenberg, N. S.
1981 An Argument for the Use of Total Side Frequencies of Bilateral Non-metric Skeletal Trait in Population Distance Analysis: The Regression of Symmetry on Incidence. American Journal of Physical Anthropology 54(4):471-479.
- Prewitt, Elton R.
1974 Archeological Investigations at the Loeve-Fox Site, Williamson County, Texas. Texas Archeological Survey Research Report 49, The University of Texas at Austin.
- Rightmire, G. P.
1970 Iron Age Skulls from South Africa Reassessed by Multiple Discriminate Analysis. American Journal of Physical Anthropology 33(2):147-168.
- Trotter, M. and G. C. Glester
1952 Estimation of Stature from Long Bones of American Whites and Negroes. American Journal of Physical Anthropology 10:463-514.
- Ubelkaer, D.
1978 Human Skeletal Remains: Excavation, Analysis, Interpretation. Aldine Publishing Company, Chicago.

Wilkinson, R. G.
1970 Biological Relationships among Middle and Late Woodland
Populations in the Great Lakes Region. Ph.D. dissertation,
University of Michigan.

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