

BACKGROUND TO THE ARCHAEOLOGY OF
CHAPARROSA RANCH, SOUTHERN TEXAS

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Thomas R. Hester, Series Editor

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PREFACE

The Chaparrrosa Ranch, located in Zavala County, southern Texas, constitutes an ideal area for long-range archaeological research. Flowing through the ranch are Chaparrrosa and Turkey Creeks, two major tributaries in the Nueces River system. These creeks and subsidiary drainages have cut pronounced valleys and terrace systems. As of this writing, nearly 200 prehistoric and historic archaeological sites have been documented in these valleys and in the adjacent uplands.

Late in the summer of 1969, Mr. Wayne Hamilton (former business manager for the ranch) showed me several of the known sites at Chaparrrosa Ranch. I was impressed by the potential for long-term studies which would hopefully contribute to a better understanding of southern Texas prehistory. In early 1970, I prepared a research plan, which was submitted to the ranch owner, Mr. Belton K. Johnson, and to the Texas State Historical Committee (now the Texas Historical Commission). Mr. Johnson approved of the planned research and the Texas State Historical Committee, through Mr. Curtis Tunnell (state archaeologist), provided funding for the first season's work. Additional funding came from the Graduate Division of the University of California, Berkeley, and from the American Philosophical Society (Grant No. 6313, Penrose Fund). Logistical support was made available by the Texas Archeological Research Laboratory, the Texas Archeological Salvage Project and the Texas Memorial Museum. Fieldwork was conducted in August and September 1970, and the results are found in the first paper in this volume.

Since that initial season in 1970, two other major field sessions, and several brief investigations, have been conducted at the ranch. The 1974 and the 1975 sessions of the graduate Field Course in Archaeology of The University of Texas at San Antonio were held there. During the six-week session in summer 1974, there were extensive excavations at 41 ZV 83 (Mariposa Site), and the results of this work have been compiled by John Montgomery in his Master's Thesis at Texas Tech University. His monograph appears as Volume 2 in the Center's Chaparrrosa Ranch series. A preliminary statement on the 1974 fieldwork is reprinted in the present volume. An initial account of the six weeks of research carried out in 1975 is also presented here. This program of investigations has included site survey, controlled surface collecting, testing, excavation and a series of other research endeavors.

The studies have resulted in a mass of data, in terms of artifacts, notes and the results of special analyses. With this volume, in which a variety of background information is provided, we are initiating the final publication of the materials from Chaparrrosa Ranch. It will take several volumes for the publication program to be completed. Some artifacts still await analysis, and there are data yet to be interpreted, but much has already been accomplished and drafts of a number of reports have been prepared. These await editing and revision before they can be published. Vegetational studies, radiocarbon results, faunal analyses and related research data must also be collated and integrated into forthcoming publications.

I am grateful to many people for assistance during the project, and I trust that all have been acknowledged in the various papers reprinted here. I want to

again extend my appreciation to Mr. Belton K. Johnson, owner of the Chaparrosa Ranch, for his cooperation and support, and to Mr. Wayne Hamilton for his sustained interest in, and encouragement of, our research.

Thomas R. Hester
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AN INTERIM STATEMENT ON ARCHAEOLOGICAL RESEARCH AT CHAPARROSA RANCH, TEXAS¹

Thomas R. Hester

INTRODUCTION

In late August and early September 1970, I carried out archaeological investigations at the 60,000 acre Chaparrosa Ranch in southern Texas (Fig. 1). The work was made possible by the cooperation of the ranch owner, B. K. Johnson, and ranch personnel; by grants from the Graduate Division, The University of California at Berkeley; and by the Texas State Historical Survey Committee (Truett Latimer, Director; Curtis D. Tunnell, State Archaeologist). Equipment and vehicle needs were met by the Texas Archeological Research Laboratory, the Texas Archeological Salvage Project and the Texas Memorial Museum.

This brief report is presented in partial fulfillment of a contract signed with the Texas State Historical Survey Committee. A final report is forthcoming, but must await analysis of the large body of artifactual and documentary data collected during the research. A number of special studies are planned, and in some cases, already in progress. These include: (1) analysis of flake debris from a number of recorded sites; (2) studies of faunal remains; (3) studies of soil samples, including pollen analysis; and (4) radiocarbon dating of charcoal samples.

ENVIRONMENTAL PERSPECTIVE

The Chaparrosa Ranch is located in northwestern Zavala County, on the Rio Grande Plain of southern Texas. The present-day climate is semi-arid, with current annual rainfall of 21.87 inches (*Texas Almanac* 1970:352). Temperatures in winter are usually mild though lows in the 20-30°F range can occur, especially after the passage of cold fronts. Summers are hot and humid with temperatures often climbing near or above 100°F. The ranch area is one of low topographic relief, cut by the stream valleys of Turkey, Chaparrosa and Palo Blanco Creeks. These major creeks are fed by numerous minor tributaries. The larger creeks were perennial up until the early part of this century when the water table was lowered by several factors, including denudation of the watershed caused by overgrazing (Wayne Hamilton, personal communication).

The vegetation and fauna are typical of the Tamaulipan Biotic Province (Dice 1943; Blair 1950). On the ranch, thorny brush such as mesquite, black brush, retama, guayacan and huisache dominate the vegetation; portions of the ranch have been cleared of these brushy species and grasslands have been restored. Kroeber (1939:Map 4) characterizes the region as a mesquite and desert grass.

¹This research was conducted in summer 1970, while the author was a student at the University of California at Berkeley. Funding was provided by the University and by the Texas State Historical Committee. This report was submitted in 1970 to the Office of the State Archeologist, Austin.

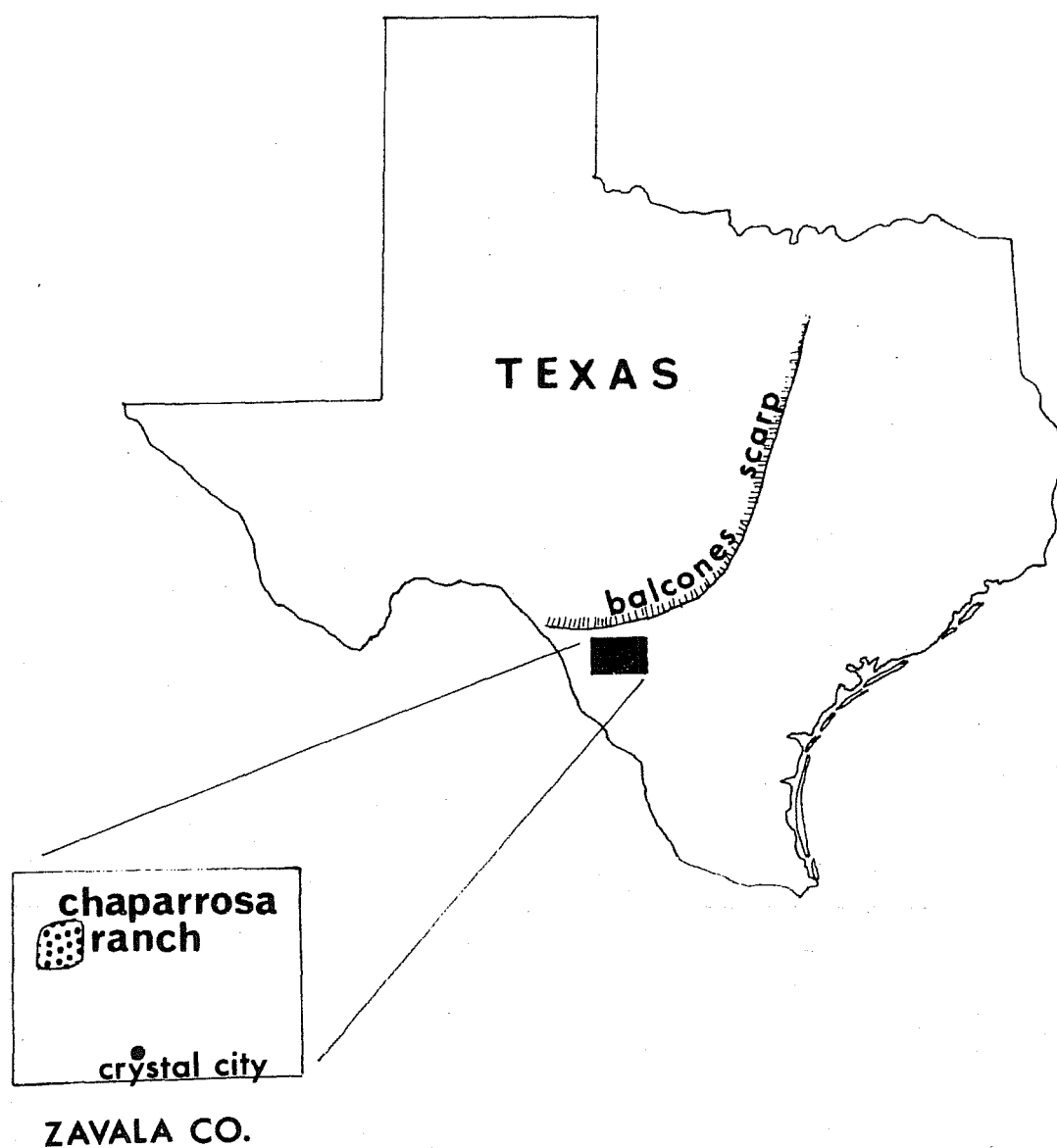


Figure 1. Location of Chaparrosa Ranch, Zavala County, Texas.

savanna. There are large hardwoods and other trees concentrated in riparian zones of the major stream courses (cf. Havard 1885). These include oak, elm, ash, hackberry, pecan and persimmon. There are additional localized vegetational patterns which reflect ecological and topographical conditions (Soil Conservation Service 1966) and these will be treated in detail in the final report.

The native fauna include whitetail deer, javelina (or peccary), coyote, jack-rabbit, cottontail rabbit, turkey, quail, hawks and a variety of other avifauna, snakes, lizards and tortoises. For detailed data on the faunal inventory of the Tamaulipan Biotic Province, see Blair (1950; 1952).

There has been a dramatic shift in vegetational patterns on the Rio Grande Plain since the beginning of the historic period. A number of Spanish expeditions crossed Zavala County (Inglis 1964; parties led by del Bosque in 1675 and Teran in 1691 appear to have been the earliest). In general, these groups recorded open, level prairies with occasional groves and thickets of large trees and mesquites. Dense forests were noted in the riparian environments of the Nueces River stream bed, while in other years, visitors observed a deep, flowing stream. The prairie conditions (grassland climax) continued well into the first half of the 19th century. Beginning around 1850, travelers record an apparent increase in the occurrence of mesquite and associated thorny species on the grasslands (Inglis 1964:83-84). These thorny invaders came to dominate the vegetation in the latter part of the 19th century. Bogusch (1952) feels that this rapid invasion of thorn brush was brought about by several conditions, especially the restriction of cattle range through fencing and the cessation of the aboriginal practice of periodically firing the prairie (cf. Covey 1961; Jelinek 1967).

Most of the fauna in the region in early historic times remain today, though their numbers and distribution have been somewhat altered by civilization. There are certain exceptions. For example, Manzanet (quoted in Inglis 1964:81) reported seeing "great quantities of buffaloes" in northern Zavala County in 1691. Some years earlier, the Bosque-Larios expedition made a stop somewhere along Chaparrosa Creek and recorded "many buffalo" (Bolton 1916:299; Brewster 1947:8). Bollaert (1956) noted antelope in northeastern Zavala County in the 1840s. Bear were also present (Espinosa, in Weddle 1968:60). The extent of the bison, antelope and bear populations remains unclear.

It is obvious that we can utilize the Spanish and early Anglo sources to obtain a moderately complete view of the fauna and flora of the Rio Grande Plain (and in particular, the Zavala County area) at the beginning of the historic era. We can also trace various environmental changes from that time to the present. However, we are hard pressed to deal with prehistoric environments of the region, though we can assume that the conditions present at historic contact had existed for some time.

Pollen studies in the Trans-Pecos (Bryant and Larson 1968) and in central Texas (Bryant, in Valastro and Davis 1970) have supplied us with the following general scheme of prehistoric climatic progression: (1) between 14,000 and 7000 B.P. (B.P.=before present, as calculated from a base date of A.D. 1950), both areas

were dominated by parkland vegetation with pinyon in the Trans-Pecos and deciduous woodlands/oak savannas in central Texas; (2) between 7000 and 4500 B.P., conditions were hot and dry (the Altithermal of Antevy 1948); (3) from 4500 years ago to the present, the climate has been one of increasing aridity (interrupted by a brief mesic period in the Trans-Pecos about 2800 B.P.). A similar climatic progression may have been experienced in southern Texas, but we must await the results of paleoenvironmental research.

ETHNOGRAPHIC AND ARCHAEOLOGIC BACKGROUND

The Rio Grande Plain of southern Texas was inhabited at the time of European contact by more than 200 bands and small tribes of the Coahuiltecan linguistic stock (Swanton 1952). We assume that their ancestors inhabited the region for most, if not all, of the prehistoric period (cf. Suhm, Krieger and Jelks 1954: 138). The Coahuiltecan population of southern Texas and adjacent northeastern Mexico has been placed at 88,000 by Ruecking (1955). However, the Coahuiltec people were gone by 1800, destroyed by disease and acculturation (Troike 1962: 58).

Excellent ethnographic summaries of the Coahuiltecan have been published by Ruecking (1953, 1955) and Newcomb (1961). These peoples lived in small groups and practiced a semi-nomadic, hunting and food-collecting lifeway. The nature of the Coahuiltecan subsistence pattern necessitated the moving of camps every few days, after the resources of the surrounding countryside had been partially (but never fully) exploited. As Kelley (1952:139-144) has indicated, Coahuiltec groups living near the Nueces River and its major tributaries are known to have harvested pecan nuts in the late fall and early winter. In many areas of southern Texas, the ripened fruits (*tunas*) of prickly pear attracted Coahuiltec groups in late summer and early fall. The gathering of large numbers of peoples at the pecan and *tuna* harvests also provided a mechanism for cultural contact (Krieger 1956). Other seasonal wild foods could have included hackberry seeds (late September through early November), persimmon fruit (August and September) and in some areas, mesquite beans (Havard 1885; Kellet 1952). Various authors have concluded that life in the *monte* of southern Texas was one of a constant struggle for food (cf. Krieger 1956; Newcomb 1961). However, early Spanish accounts such as that of Espinosa in 1726 (see Weddle 1968:60) make it evident we should also take into account the probability that foodstuffs were processed and stored for later consumption; for example, Espinosa remarks (Weddle 1968:60) that " . . . the natives gathered enough wild nuts (pecans) to last them most of the year . . . storing them in holes in the ground."

Ethnohistorians have noted that the material culture of the Coahuiltecan was quite meager (Ruecking 1953, 1955; Beals 1932). They used weapons and tools of wood and stone, made clothing from skins and fibers, and built flimsy houses of grass and reeds. Only the objects of stone are preserved in the south Texas area.

We have few accounts of the native peoples in the immediate study area (Chaparrosa Ranch). The various Spanish expeditions which crossed Zavala County would at times record the presence of aboriginal groups, while at other times it would

be noted that the area was uninhabited or that abandoned campsites were observed. This may be due in part to the mobile subsistence activities of groups in the area. Campbell (ms) has recorded a number of Coahuiltec groups who lived in the general vicinity; these include: Quem, Pitalac, Pitahay, Patzau, Payuguan, Pampopa (recorded as living on the Nueces River in Uvalde, Zavala and Dimmit Counties in the 18th century), Pachal, Pacuachiam, Chaguane and Paac. It could also be noted that Tonkawan groups were known to have ventured into the area from central Texas (Sjoberg 1953a). In the 1700s and later, both Lipan and Mescalero Apache groups were sometimes forced southward into the region by the encroachment of Comanches (Sjoberg 1953b; Weddle 1968; Newcomb 1969; Campbell ms).

The archaeology of southern Texas has been summarized by Suhm, Krieger and Jelks (1954), Hester, White and White (1969) and Hester (1976). Eroded, multi-component archaeological sites are common throughout the area, their locations reflecting attachment to water sources (cf. Taylor 1964; Hester 1970a) and the proximity of various resource areas (or "microenvironments"). Research at these sites has consisted largely of random surface collecting, from which several descriptive reports have resulted (Weir 1956; Sollberger 1951; Nunley and Hester 1966; Hester 1968a; Hester, White and White 1969; Hester 1972). Limited excavations were conducted in the Falcon Reservoir basin in the early 1950s (Cason 1952) and in the Rio Grande Valley (Newton 1968); in both instances, the results have yet to be fully published or interpreted. Small-scale attempts at controlled surface sampling have been carried out, but again, full interpretation is lacking (Shiner 1969).

Because of the lack of data from both excavations and controlled surface collections, the cultural sequence in southern Texas remains poorly known. There are scattered occurrences of *Folsom* and *Clovis* fluted points and an array of later lanceolate styles, all of which suggest the presence of Paleo-Indian groups (Weir 1956; Hester 1968a,b). However, no occupation sites are yet known for this early period. The majority of the archaeological remains from south Texas sites can be attributed to Archaic occupations (my concept of the Archaic approximates that of Willey and Phillips 1958:107, and Rolingson and Schwartz 1966:3). These materials include numerous unstemmed and stemmed dart points, thinned bifaces ("knives"), a variety of chopping and scraping tools, tools and ornaments of ground stone, and large amounts of debitage resulting from flint-knapping activities. There have been limited attempts to order these materials through correlation with cultural sequences established for northeastern Mexico, Trans-Pecos Texas and central Texas (Hester, White and White 1969; Hester 1976). The final prehistoric occupations in southern Texas (Neo-American or Late Prehistoric) are represented by the presence of arrow points of several types, a few changes in chipped stone tool forms, and in rare cases, the introduction of plain bone-tempered ceramics (Hester 1968c; Hester and Parker 1970; Hester and Hill 1971). Radiocarbon dates on similar late prehistoric manifestations from the southwestern edge of the Edwards Plateau suggest they began between A.D. 1000-1200 (Hester, in Valastro and Davis 1970; Hester 1971).

Ethnohistorical and archaeological data clearly indicate that a hunting and gathering lifeway persisted relatively unchanged in southern Texas from the earliest times into the historic era. The archaeological record, as we now interpret it, reveals little change in material culture through time, suggesting

that the native peoples had so adapted to their environment that only unusual events (such as the introduction of the bow and arrow, and ceramics, in the Late Prehistoric period) caused new traits to be acquired (cf. Coe and Flannery 1967:103).

RESEARCH PROBLEMS AND METHODOLOGY

The Chaparrosa Ranch was selected as a research area for a number of reasons. It covers a large geographic area, and access is easy to all parts. There has been relatively little disturbance of subsoil by land-clearing activities or erosion. Surface collecting of sites has been limited. There are a variety of topographical and ecological situations available for investigation. The presence of three major stream courses indicated that large numbers of sites could be anticipated.

The initial research at Chaparrosa Ranch in 1970 was oriented toward two major goals: (1) the recording and sampling of sites in varied topographical and ecological locales with a view toward preliminary reconstruction of prehistoric subsistence-settlement systems; (2) the location and test excavation of buried archaeological deposits with sufficient depth to warrant future archaeological excavation; such sites and excavations are sorely needed in the region since a sound cultural sequence is lacking. Both of these endeavors have to be considered preliminary in nature, in that subsistence-settlement studies mean little without supporting chronological data or vice versa. In essence, this initial fieldwork at Chaparrosa Ranch was designed to recover as much data as possible, thus permitting us to begin a number of special studies, as well as plan future investigations in the study area.

The techniques and methods used in the course of the fieldwork will be detailed in the final report. Test excavations were conducted, controlled surface sampling of several sites was done (with complete samples obtained from a few of the sites), intrasite activity areas were noted, and archaeological transects were made across the major stream valleys in order to document sites in various locales.

THE SITES

The archaeological investigations at Chaparrosa Ranch resulted in the documentation of 58 sites; four sites had been recorded on a day-long inspection in August, 1969. A number of the new sites had been previously plotted on an aerial map of the ranch which was made available to me by Wayne Hamilton. Use of the aerial map during the survey greatly facilitated the accurate plotting of the sites and other features. Sites were found during archaeological transects of the stream valleys and through general survey in the ranch area. Each site was recorded on a standard form designed especially for the project; each was assigned a project number (for example: CH-18, or "Chaparrosa Ranch, Site 18"). At a later date, these designations were replaced by site numbers assigned by The University of Texas at Austin Archaeological Research Laboratory. Site CH-18 became 41 ZV 73 (41=state of Texas; ZV=Zavala County; 73=73rd site in the county).

After a site was recorded, one or more data-gathering procedures was implemented. For example, at four of the sites, test pits were dug. At site 41 ZV 83 (CH-28), a 1-meter square and a 1 x 2 meter unit were excavated to depths of 1 meter and 1.4 meters, respectively. At 41 ZV 82 (CH-27), two 1 x 2 meter units were dug to depths of 60 cm and 80 cm. Two 1.5 x 1.5 meter squares were excavated at site 41 ZV 11 (CH-14), reaching depths of 80 cm and 1 meter. At 41 ZV 113 (CH-59) a single 1-meter square was excavated to a depth of 1 meter. These excavations produced an abundance of cultural remains (artifacts, flake debris, faunal remains, charcoal, burned rock, mussel and snail shells) which are currently under analysis.

Controlled surface sampling of various types was used at several sites. At other sites, all cultural material (with the exception of scattered hearthstones) was collected from the surface. Other sites were sampled through selective collecting ("grab" samples).

Very preliminary studies of the sites show that most are located on the floodplain of major streams, or on low terraces bordering the streams. Many of these sites are extensive, situated on natural levees, and have buried deposits 1 to 1.5 meters in thickness. Sites are also situated on gravel terraces which rim the stream valleys. Most debris at such sites indicates use as short-term camps and/or chipping stations.

There were several sites found in the uplands. These include chipping stations on gravel hills, as well as small scatters of debitage and hearthstones in open, sandy country (perhaps short-term foraging or hunting camps).

It is apparent from the superficial analyses conducted to date that the main villages ("base camps") were situated in the floodplain, usually on natural levees adjacent to and paralleling the stream course; subsidiary sites (chipping stations, hunting and foraging camps, short-term occupation sites) are on gravel terraces and in the uplands. Examples of the various site types are described below:

Floodplain Village (41 ZV 83; CH-28)

The site is located on a long, low knoll (natural levee) near the east bank of Turkey Creek. There is heavy vegetation along the creek banks, consisting primarily of oak, white ash, Texas persimmon, huajillo, guayacan, granjeno, white brush and catclaw. The site area itself is rather open, with scattered small mesquites and guayacan. The site was divided into two parts. Area A (northernmost) is 150 meters long (north-south) and 60 meters wide. Minimal sheet erosion has exposed scattered flakes and hearthstones. Area B (southernmost) covers an area 80 meters long (north-south) and 40 meters in width. An old ranch road crossed this portion of the site leading to considerable gully erosion and the exposure of quantities of burned rock and debitage. Areas A and B are artificially separated by a 50 meter wide band of low vegetation.

On the first visit to the site, only Area A was inspected. For the purposes of collecting a surface sample, the site area was divided into north and south

halves and all debitage within each was collected. At a later date, I returned to the site with a two-man crew, and excavated Test Pits 1 and 2. Test 1 was a 1-meter square excavated to a depth of 1 meter, using 20 cm arbitrary levels. Test 2 was dug immediately to the west of Test 1. It was a 1 x 2 meter unit and was dug to a depth of 140 cm. Combining the data from the two pits, the following level descriptions have been prepared:

Level 1: gray-brown midden soil (alluvium) with much burned rock, lots of flakes, flecks of charcoal, fragments of mussel shell, and snail shells. Artifacts include a corner-notched arrow point, two triangular arrow points, an arrow point distal fragment, a small notched dart point (*Frio?*), and a biface fragment.

Level 2: midden soil continues, grading to a tan-brown at ca. 40 cm; soil is more granular. Decrease in cultural remains, although burned rocks, mussel shell fragments, charcoal flakes and snail shells still occur in some quantities.

Level 3: soil identical to Level 2. In Test 1, there was a continuing decrease in cultural remains. However, to the west in Test 2, there was an increase, including many burned rocks and flakes. A large charcoal sample was obtained from Test 2; associated was a concave based lanceolate dart point fragment (*Kinney?*).

Levels 4 and 5: essentially the same, with some increase in clay content of soil; lots of burned rocks, but few flakes; also snail shells, charcoal and mussel shell fragments.

Level 6 (Test 2 only): mostly a tan clay, with a few burned rocks; no charcoal; lower one-half of level is sterile.

Level 7 (Test 2 only): tan clay, compact and hard; sterile.

After the excavation of these units, a column sample of the soils was obtained from the north wall of Test 2. Both pits were backfilled. A profile of the north wall of Test 2 is shown in Fig. 2 of this report.

Site on Gravel Terrace (41 ZV 81; CH-26)

The site is located on what appears to be a gravel terrace remnant on the east side of Turkey Creek. Erosion of the terrace formation has created an east-west gravel ridge beginning just east of the creek. At the west end of this ridge is a small "peak" covered with siliceous gravels and extensive workshop (flint-knapping) debris. Just east of the workshop, there are scattered burned rocks,

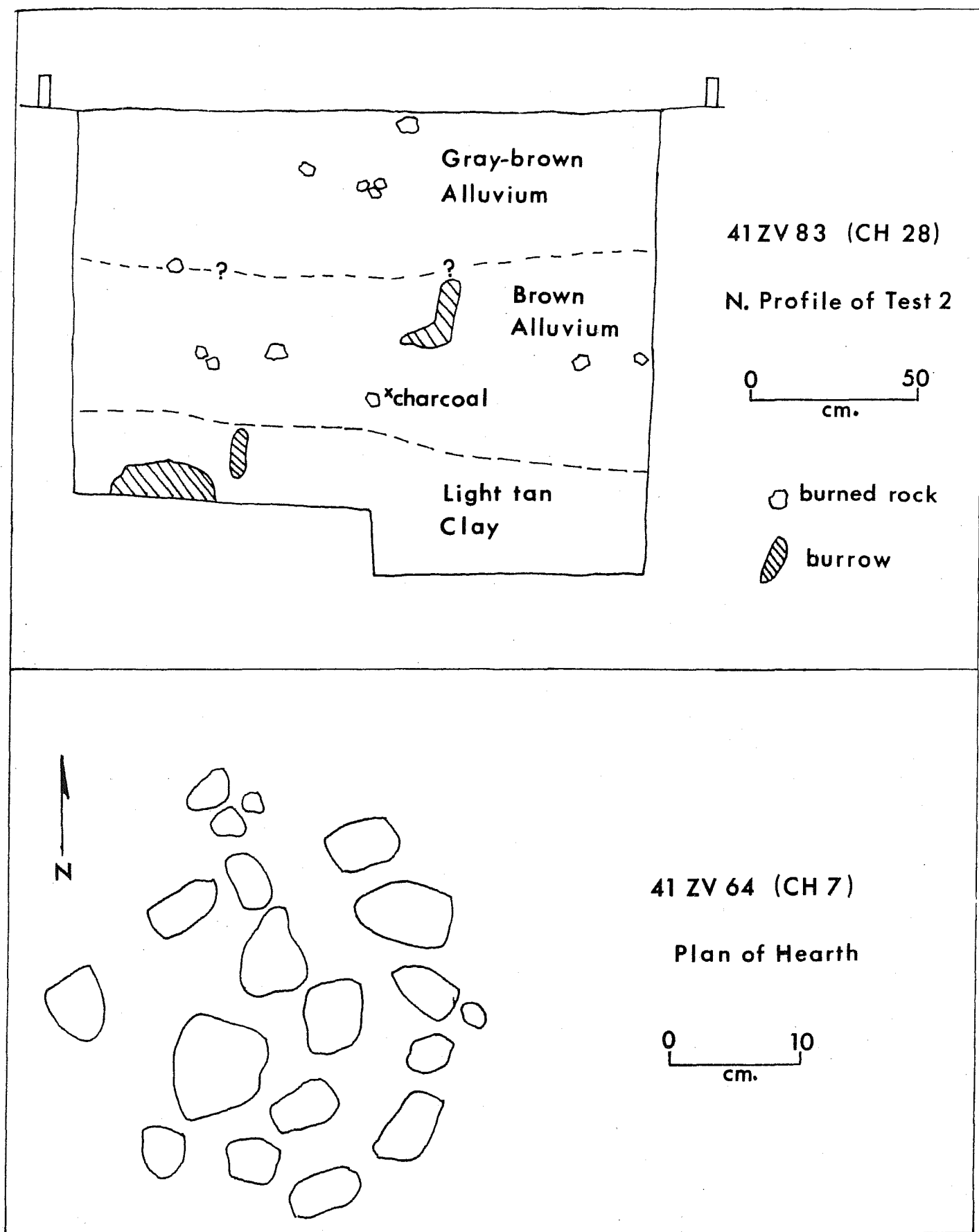


Figure 2. Sites 41 ZV 83 and 41 ZV 64. Upper, north profile of Test Pit 2, 41 ZV 83 (CH-28); lower, plan of hearth at 41 ZV 64 (CH-7).

flakes and artifacts on a "desert pavement" surface. Artifacts collected included the basal fragment of an *Angostura* point (Fig. 3,c). It is felt that if cultural remains of Paleo-Indian occupations are present within the ranch area, they may be located on these high gravel terraces. The workshop at the western end of the ridge may be related to a large village site on the floodplain below (41 ZV 82; CH-27).

Uplands Site (41 ZV 90; CH-35)

The site is located in broad grassy uplands, on a red sand hill about three miles west of Chaparrosa Creek. There is no visible water source in the vicinity. Exposed remains consist of several flakes and a core-chopper around a small concentration of burned rocks (hearth). A very similar site is located to the northwest (41 ZV 89; CH-34). The limited amount of cultural material, as well as the position of the site, suggests that the area may have served as a short-term camp for a small foraging or hunting party. Another short-term campsite has been reported by Hill and Hester (1971) in western Zavala County.

A variety of intrasite features were recorded during the reconnaissance. Most common were concentrations of burned rocks, interpreted to be hearths. These hearths are mostly oval in outline and were built on the ground surface. Several were mapped and sectioned. A plan of a hearth at 41 ZV 64 (CH-7) is shown in Fig. 2. At most sites there were small concentrations of mussel shells and snail shells. In most instances, these are undoubtedly food remains; however, raccoons are known to gather mussels from creek bottoms and carry them up on the floodplain, and roadrunners often have a special snail-cracking rock around which snail shells will accumulate (cf. Holdsworth 1969:202).

Other intrasite features include chipping loci (concentrations of debitage) observed at several sites, a cache of limestone manos at 41 ZV 66 (CH-10) and a pit filled with ashes, charcoal and baked clay lumps at 41 ZV 82 (CH-27).

THE ARTIFACTS

Several hundred artifacts of chipped and ground stone were collected. In addition, a large quantity of flake debris (debitage) was recovered. Analysis of these materials is incomplete and detailed artifact descriptions are not presented here. A variety of artifacts present in the collections is shown in Figures 3-5.

Dart Points (Fig. 3,a-m)

Recognized dart point types include *Abasolo*, *Catan*, *Matamoros*, *Tortugas*, *Pandora*, *Frio*, *Ensor*, *Pedernales*, *Desmuke*, *Kinney*, *Carrizo*, *Langtry*, and *Angostura*. Included in the collections are a number of small, thick and stubby dart points which do not conform to any currently defined type; examples are illustrated in Fig. 3,i-j (see also Hill and Hester 1971). Miscellaneous unclassified

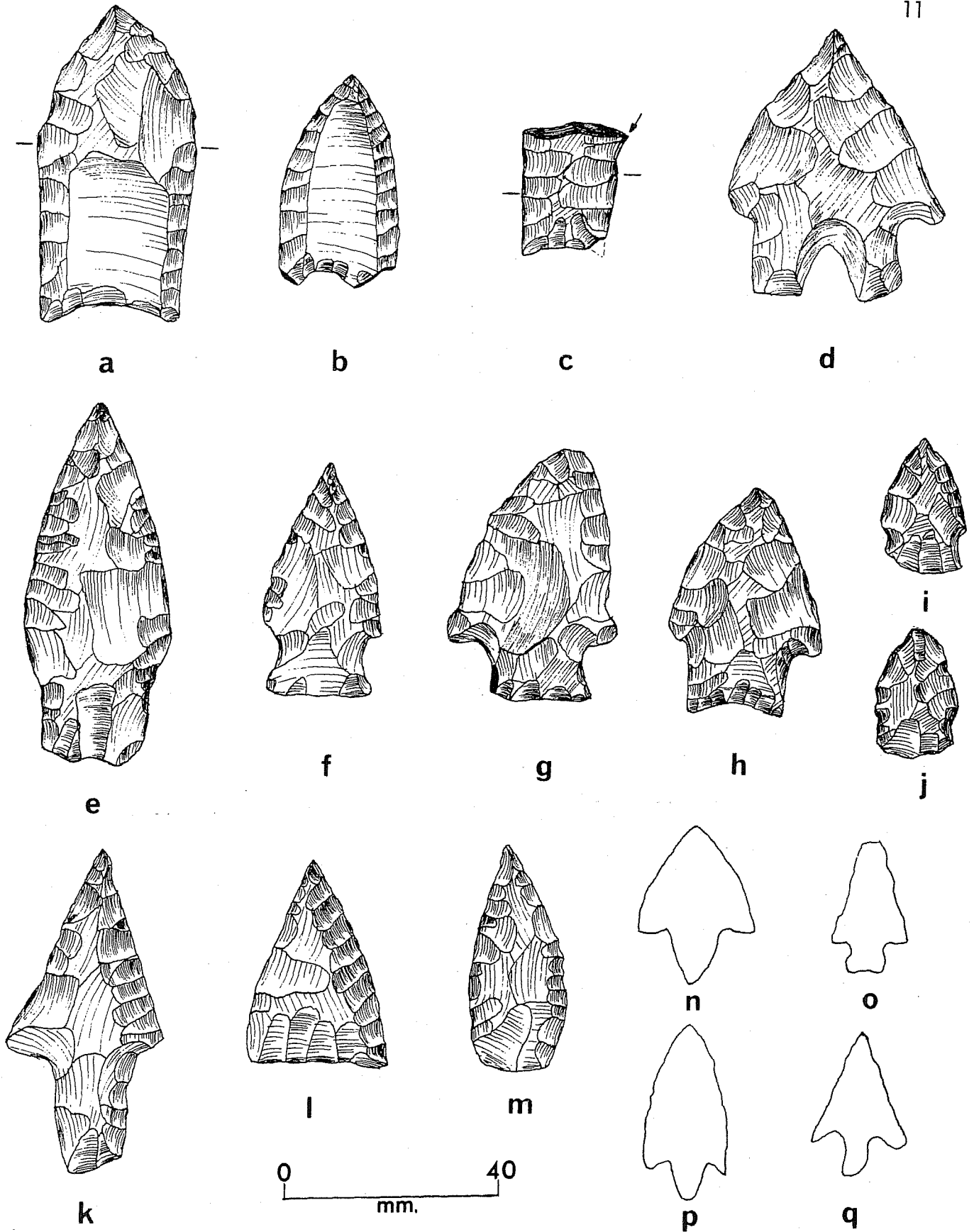


Figure 3. *Projectile Points from Chaparrrosa Ranch and Vicinity.* a, Clovis point; b, Folsom point (both from northwest Zavala County); c, Angostura basal fragment, 41 ZV 81 (CH-26, arrow indicates burin facet); d-m, various dart points from sites on Chaparrrosa Ranch; n-q, various arrow points from sites on Chaparrrosa Ranch

corner side notched dart points are also present. During the course of the fieldwork, I observed the following dart point groups in private collections from the ranch area: *Uvalde*, *Bulverde*, *Scottsbluff*, *Marshall* and "Early Corner Notched" (cf. Hester 1971). Also present were several contracting-stem dart points similar to examples shown by MacNeish (1958:34-40) from sites in Tamaulipas.

Arrow Points (Fig. 3,n-q).

Very few were collected; several occurred in excavations. These include *Scallorn*, *Perdis*, and triangular forms. *Edwards* arrow points (Sollberger 1967; Hester 1970b) are present in private collections.

Other Bifaces (Fig. 5,a)

These include ovate, triangular and lanceolate bifaces which could have functioned as knives. Some are obviously preforms (thick rough-outs), while others have been skillfully thinned and probably represent finished forms. Perforators are present, and a four-bevel knife was noted in a private collection.

Unifaces (Fig. 4,a-f)

A variety of unifacially chipped artifacts are present. Most are flakes re-touched along the edges. Also represented are end-scrapers and side-scrapers showing varying degrees of use-wear. Among the most common unifacial tools are triangular gouge-scrapers (the *Dimmit* scrapers of Nunley and Hester 1966), a recurrent tool form in southern Texas (Hester, White and White 1969).

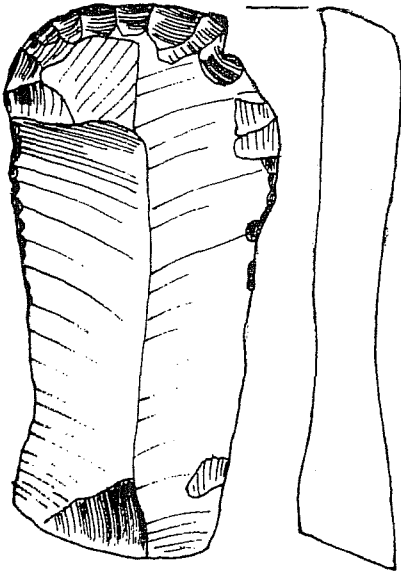
Cores (Fig. 5,b,c)

At least two forms are present: (1) simple prepared - a flint cobble is split, with the resultant fracture plane used as a platform for flake removal; (2) random bifacial - flakes are removed at random from both sides of a cobble, producing a large ovate bifacial form. These cores were used to obtain flakes suitable for manufacture into unifacial and bifacial tools (including projectile points).

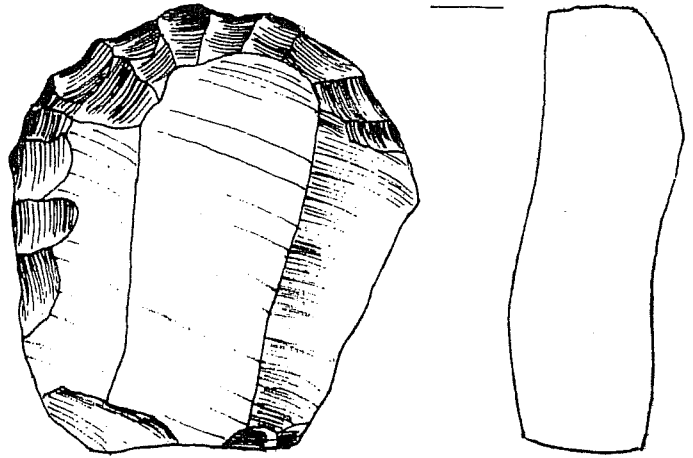
Ground Stone Artifacts (Fig. 5,d,e)

Fragments of grinding slabs (metates) were found; a complete specimen is present in a private collection. Milling stones (manos) were found at a number of sites. Hammerstones were very common; pebbles of purple quartzite were preferred by the aboriginal flint-knappers. Two pendants (Fig. 5,e) are in private collections at the ranch.

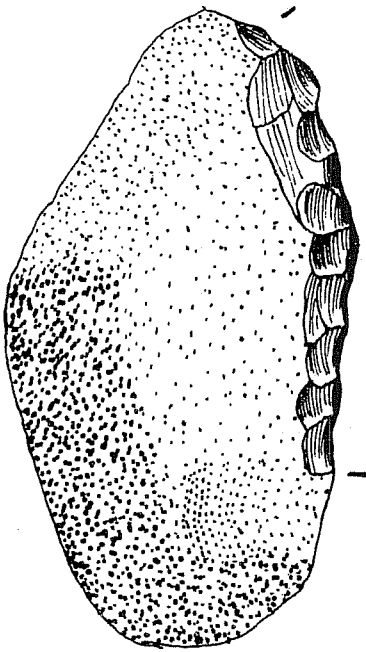
Figure 4. *Unifacial Tools from Chaparroso Ranch.*
a,b, end-scrapers; c, side scraper made on cortex
flake; dashes indicate extent of heavily dulled
edge; d,d', both faces of a uniface; upper end has
been removed by a transverse blow; blow probably
intended as a resharpening technique; e,f, trian-
gular gouge-scrapers.



a

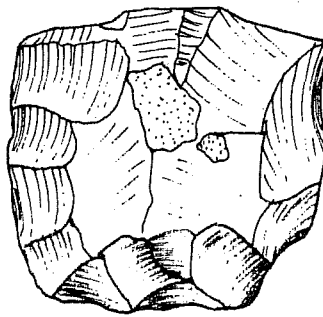


b

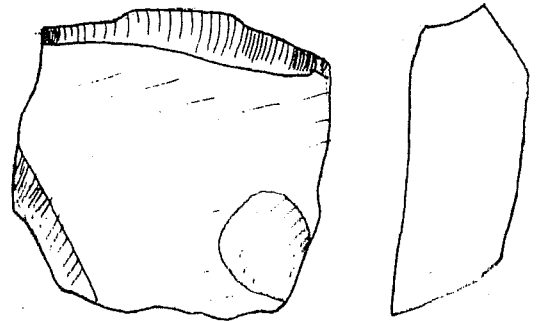


c

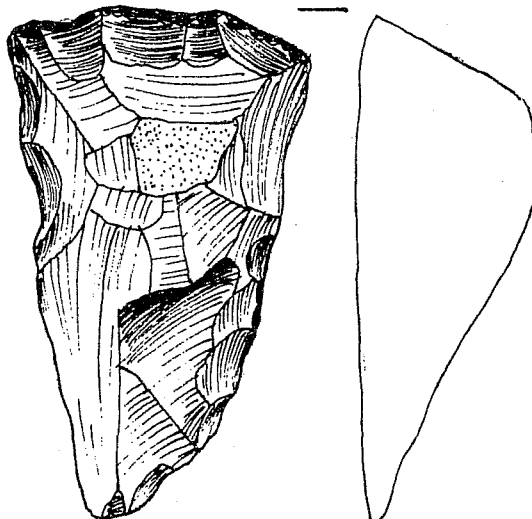
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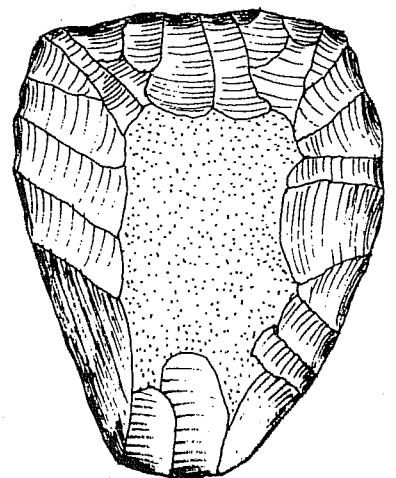
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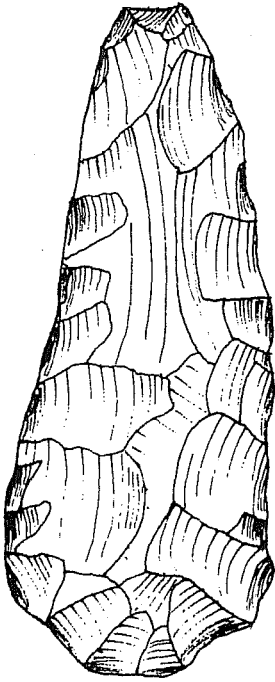


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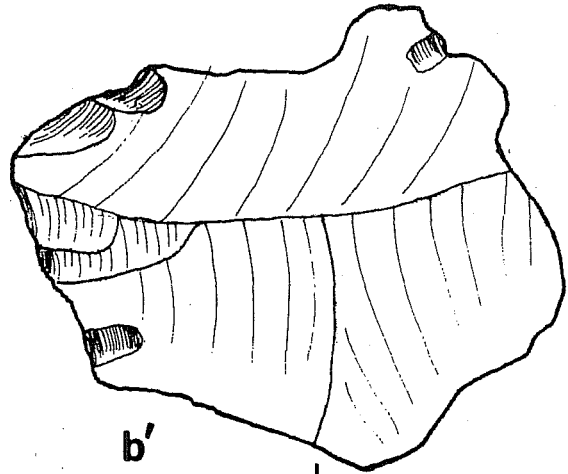


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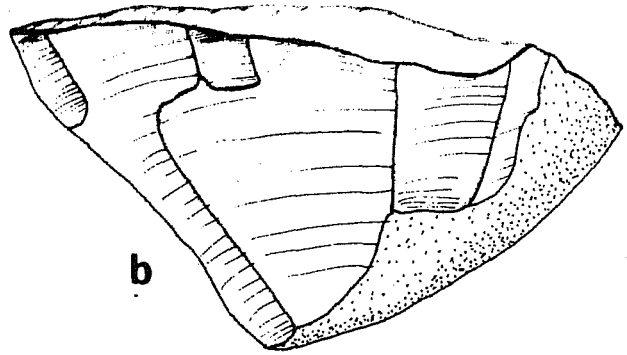
Figure 5. *Artifacts from Chaparrrosa Ranch.*
a, thick biface (probably a preform); b,b', prepared platform core; b' is a view of the platform; c, one view of a random bifacial core; d, quartzite hammerstone; blackened areas indicate battered portions of the piece; e, fragmentary pendant of tan limestone.



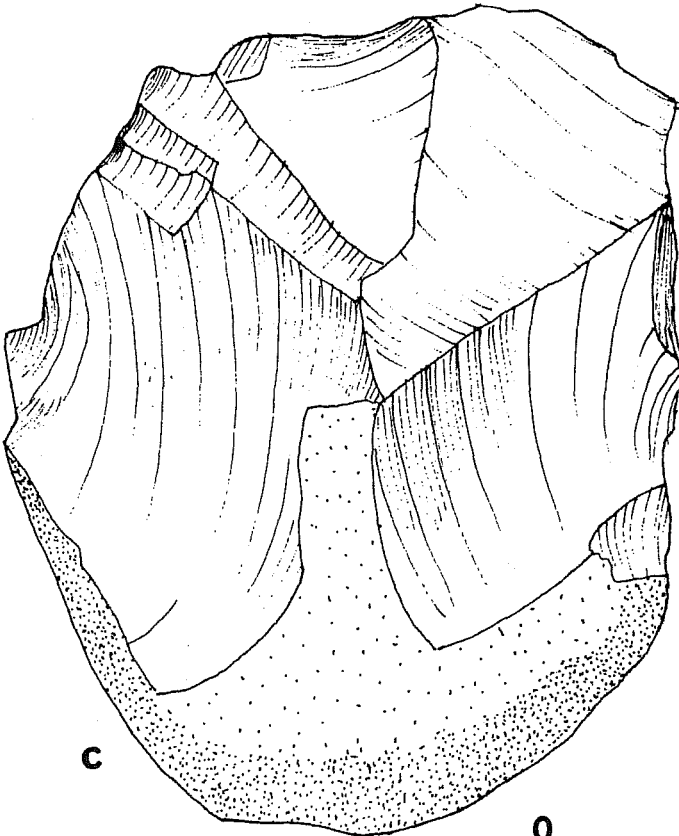
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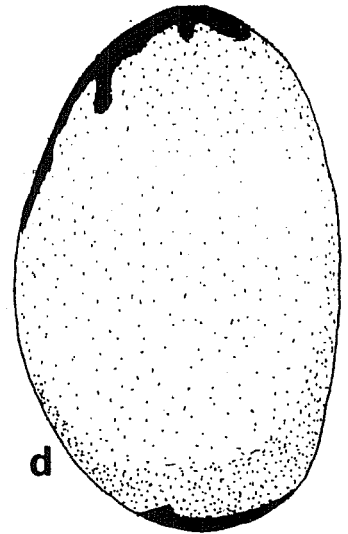
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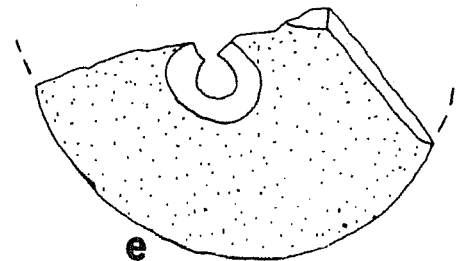
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CONCLUDING STATEMENT

The archaeological investigations carried out at Chaparrosa Ranch in the late summer of 1970 have been briefly summarized. Background data on past and present environments, ethnohistory and regional archaeology have been presented. Research goals and methods have been outlined and preliminary analyses of site and artifact data have been discussed. Full interpretation of these data will be given in the final report.

The two primary goals set for the initial phase of research have been met; sufficient controlled data were obtained for preliminary subsistence-settlement studies and a number of sites with buried deposits were located, with four of the sites test-excavated. The analysis of the information that we now have will permit the formulation of additional research problems. For example, large-scale excavation programs are needed at several sites in the floodplains of Turkey and Chaparrosa Creeks. Intact archaeological deposits are rare in southern Texas (Hester 1969) and the sites at Chaparrosa Ranch offer great potential. Much additional reconnaissance is needed in the Chaparrosa, Turkey and Palo Blanco stream valleys, and on the terraces and adjacent uplands. We were able to sample portions of these stream valleys, but continued survey will give us detailed information on aboriginal use of the land and environment.

Archaeological materials and documentary data resulting from the fieldwork are now on loan to the author. After preparation of a final report, the bulk of the artifactual material will, by prior agreement, be returned to the ranch. Documentary data (color slides, black and white photographs, maps, field notes) and a sample of the artifacts will become the property of the Texas State Historical Survey Committee.

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At Chaparrosa Ranch: Mr. B. K. Johnson, owner of Chaparrosa Ranch, very graciously permitted the archaeological research and cooperated in every way possible. Mr. Wayne Hamilton (business manager) was of especial help in supplying information on known sites and in arranging for research to be carried out in various parts of the ranch. Other assistance was rendered by Mr. Jack Youngblood (ranch manager) and Mr. Kley Johnson.

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CHIPPED STONE INDUSTRIES ON THE RIO GRANDE PLAIN, TEXAS:

SOME PRELIMINARY OBSERVATIONS¹

Thomas R. Hester

INTRODUCTION

The data presented here were obtained chiefly through the analysis of chipped stone tools and debris found at archaeological sites on the Rio Grande Plain of southern Texas. Many of the data result from problem-oriented investigations conducted on the Chaparrosa Ranch in Zavala County (Hester 1970; Hester and Hill 1971). Work at this study area was supported by grants from the Graduate Division, University of California, Berkeley, and the Texas State Historical Survey Committee, Austin (Curtis Tunnell, State Archeologist). It is my belief that the general statements regarding lithic technology made in this paper are broadly applicable to the Rio Grande Plain area, but there are certainly local manifestations or variations which remain to be defined. This is a preliminary report because: (1) the continuing study of stone technology in the area may modify some of the initial concepts expressed here; (2) the lack of firm chronological control makes it impossible to document the development of, or changes in, the stone industries through time; (3) there are no comparable controlled collections of lithic materials from other parts of the Rio Grande Plain.

FABRICATION PHASES AND THE CHIPPED STONE INDUSTRIES

It is most useful, I think, to consider the chipped stone technology of this region as a segment of the total aboriginal cultural system which operated there in prehistoric and early post-contact times. Collins (1971) has proposed a linear systems model which can be effectively used in the study of lithic technology in a given region (for a similar model, see Kobayashi 1970). It permits the archaeologist to trace the multi-stage progression within the stoneworking system. One can use a model of this sort to examine a stoneworking technology, from the acquisition of raw materials to the ultimate discard of the tools. Here I will use but a portion of Collins' suggested model, which I have modified to consist of three phases dealing primarily with the fabrications processes. Detailed statements regarding the use, reworking and discard of tools must await the completion of studies now underway. In addition, it is impossible with our current information to adequately articulate the chipped stone industries (discussed below) with the three phases.

Phase I in this model involves the procurement of raw materials. In the Chaparrosa study area, the major stream valleys are flanked by high gravel-covered terraces. These gravel exposures consist largely of rounded and weathered cobbles of chert, and occasionally petrified wood. Our study of the

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settlement system in this area has shown that occupation sites are confined to a rather narrow zone on the floodplains, particularly on natural levees paralleling stream channels. Siliceous raw materials are not present on the alluvial floodplains and so the terrace exposures had to be exploited for chippable stone. Flintknappers would leave the occupation sites and use locations on the terraces as workshops.

These workshop activities form the basis for *Phase II*. Once a workshop (chipping station) had been established at a spot on the terrace, the initial working and shaping of the raw materials was begun (using hammerstone percussion techniques). The exposed gravels are highly varied in texture, and the archaeological evidence indicates that the flint-knappers "tested" many cobbles by removing one or two flakes. The collections obtained from terrace workshops at Chaparrosa Ranch suggest that activities could take at least two directions: (1) the roughing-out of cores; these were then taken back to the occupation sites for the removal of flakes to be used as blanks for tool manufacture; (2) the manufacture of preforms, i.e., of roughly-shaped bifaces intended for further reduction and shaping, and use as knives, points or other tools. Both activities are reflected by the high incidence of decortication flakes. These are flakes removed from the outside of a cobble, and have their dorsal surfaces entirely covered with nodular cortex (they are usually referred to in the literature as "primary cortex flakes"). Further shaping of both cores and preforms is represented by flakes with dorsal surfaces retaining some cortex, but showing one or more previous flake removals ("secondary cortex flakes").

Based on the analysis of workshop debris (and lithic debris from the occupation sites), I have recognized two major flint-knapping technologies or industries, and possible indications of a third. The first can be termed a flake industry in which both prepared and unprepared cores were worked to obtain suitable flakes which could then be fashioned into tools of various sorts. Our data indicate that the shaping and perhaps the removal of flake blanks was carried out at the terrace workshops; most often, roughed-out cores (core preforms) were taken down to the floodplain occupation sites for the production of usable flakes.

The prepared cores can take several forms. Most common is a simple prepared core formed by the halving of a cobble (Fig. 1,a) and the use of the resultant broad fracture surface as a striking platform. Once the platform had been established, flakes were detached around the circumference by direct hard hammer percussion. Roughly conical polyhedral cores often result (Fig. 1,b-e).

Another type of prepared core has a multifaceted striking platform. The surface appears to have been obtained much like those just mentioned, but further preparation was done in the form of faceting (e.g., through the removal of a number of flakes across the platform). Two variants are represented. One has what might be termed a "horizontal" striking platform, often forming an 80° angle with the sides (Fig. 2,b). The second variant has an oblique platform, with angles ranging between 50° and 60° (Fig. 2,c,e). We can speculate that the presence of these two forms represents some differences in the flake-removal technology. For example, Bordes and Crabtree (1969) have suggested that perhaps the most efficient way to work a core with an oblique platform is by indirect percussion with the use of a punch.

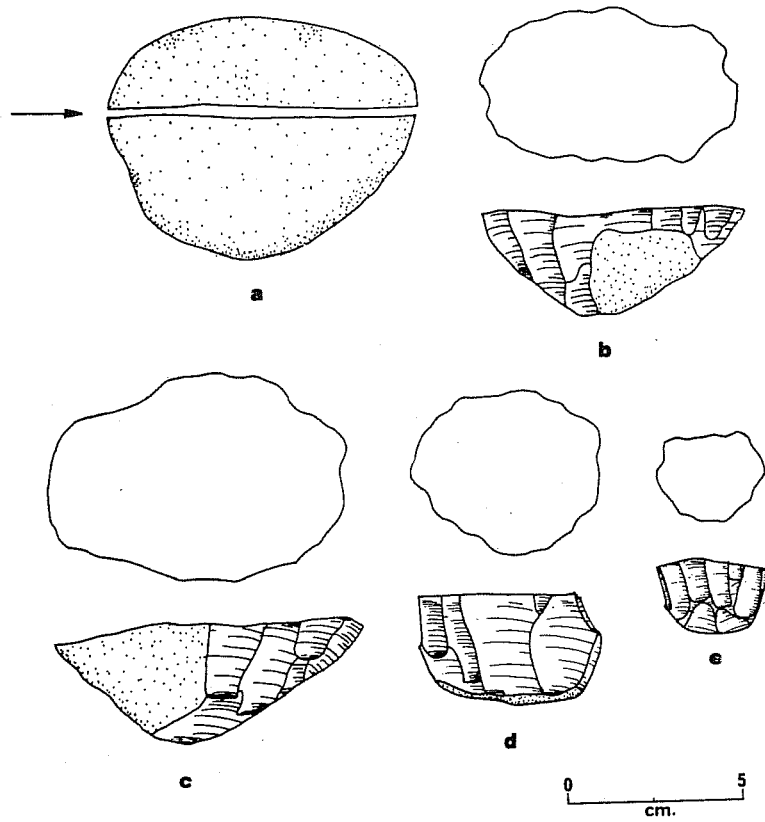


Figure 1. Flake Industry Core Preparation and Representative Cores.

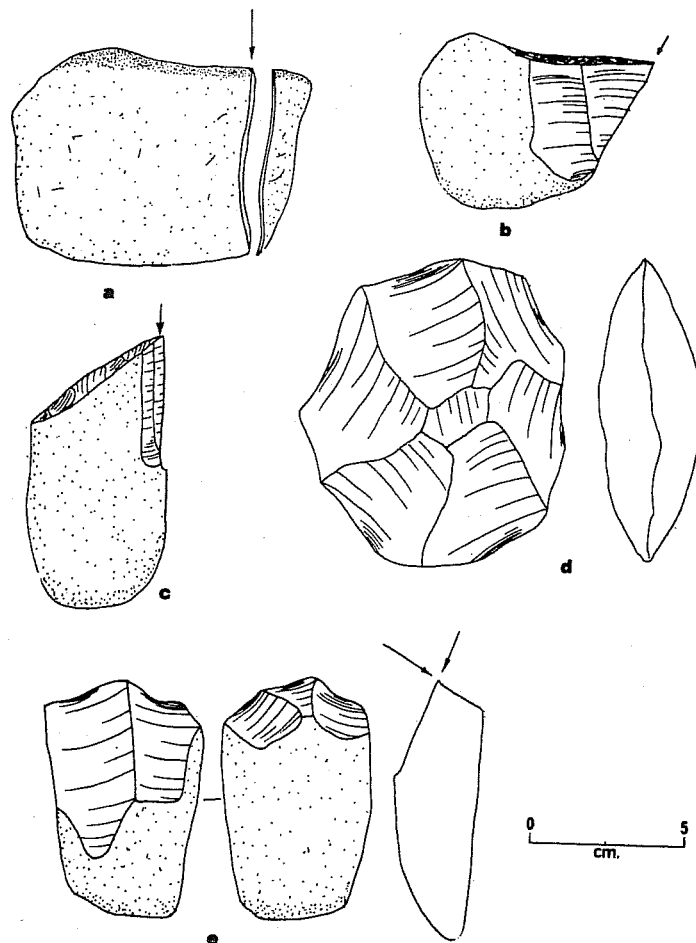


Figure 2. Flake Industry Core Preparation and Representative Cores.

There are also ovate bifacial cores (Fig. 2,d). Some appear to have been randomly worked and have multidirectional flake scars. Others have undergone careful preparation; these were edge-struck, much in the manner that a biface would be thinned (cf. MacDonald 1968).

Unprepared cores are sometimes found (Fig. 2,a). A flat cortex surface was used as a natural striking platform and flakes were detached by hammerstone percussion.

The flakes obtained through the reduction of both prepared and unprepared cores were used in a variety of ways. Some were marginally-trimmed for use as light duty cutting and scraping tools. Others were converted into tools such as projectile points, knives, gravers, perforators, and scrapers. In the manufacture of end scrapers, the sample from Chaparrosa Ranch reveals an aboriginal preference for long, blade-like flakes with two median ridges. The distal ends of these flakes were trimmed to a convex working edge; occasionally, the bulb of percussion was removed.

Acknowledging our lack of temporal control, I believe that the data from Chaparrosa Ranch indicate that this flake industry has considerable antiquity in the area. Many tools of the local Archaic (preceramic) period are made on flakes, and the Archaic occupation sites yield both prepared and unprepared flake cores. The flake industry is most prominent, however, in the Late Prehistoric era probably beginning after A.D. 1250. Arrow points are made on flakes, as are gravers, perforators, and some scrapers (a number of the Late Prehistoric scrapers, particularly end-scrapers, are made on blade-like flakes).

The second major stoneworking industry involves the manufacture of tools through the bifacial reduction of cobbles, and can be termed either a *core-tool* or *cobble industry*. In it, selected cobbles were bifacially-reduced to produce a variety of implements, including projectile points, knives, chopping tools, and large scrapers. Experiments by J. B. Sollberger of Dallas (personal communication) have shown that in order to effectively reduce a cobble into a bifacial tool, the selected cobble must be thin and tabular. Evidence of a core-tool industry in the Chaparrosa area comes from heavy chopping tools made on cobbles, from bifacial tools retaining patches of cortex on both faces, and from numerous preforms broken during the reduction process (these are found at both workshop and occupation sites). It is apparent that if a cobble is completely bifaced, removing all cortex, it is impossible to determine if the finished implement was made on a cobble or from a flake blank. Parker Nunley (personal communication) informs me that he has distinguished two distinctly different core-tool traditions in the Falcon Reservoir-Laredo area.

Yet a third industry, based on a *core-blade* technology, may be present in parts of the Rio Grande Plain. Thus far, occupation sites at Chaparrosa Ranch and in adjacent areas have yielded occasional blades and blade fragments, tools made on blades, and rarely, polyhedral blade cores. The best estimate at this moment is that these materials date primarily from the Late Prehistoric period. It is significant, I believe, that a well-developed core-blade technology was present on the southern Texas littoral in Late Prehistoric and

Protohistoric times. These materials are currently under study by H. J. Shafer and the author. Cores were made on small cobbles obtained from inland sources, and blades were detached at an early stage of core reduction. This is indicated by the presence of nodular cortex on a high percentage of the blades (43% in the sample from the Kirchmeyer site in Nueces County). The blades are most frequently modified by trimming along one or both lateral edges. At some sites, they were shaped into end-scrapers and projectile points. Wear pattern analyses indicate that the laterally-retouched pieces functioned as knives. The techniques used in the production of the coastal blades are not immediately apparent. A few have lipped or overhanging striking platforms and diffuse bulbs of percussion, suggesting the use of a soft hammer in detachment (Epstein 1964). However, most of the blades have small platforms and distinctive bulbs; Honea (1966) has suggested that indirect percussion (with a punch) may have been the method used for removing such blades.

Phase III in this model involves the shaping, trimming and completion of lithic artifacts. This phase was carried out at the floodplain occupation sites using flake blanks obtained from cores or preforms brought down from the terrace workshops. Flakes could be shaped by bifacial thinning and then finished by trimming (completed forms consist of projectile points, knives, perforators, etc.). Preforms were further reduced by bifacial thinning and trimmed into final form. This shaping and trimming process, whether it began with a flake blank or preform, would involve several stages (Skinner 1971); however, we have not yet defined these stages for the materials from the Chaparrosa area. Flakes could also be shaped by unifacial chipping and trimmed into end scrapers (convex trimming of the distal end of a flake), side scrapers (trimming of lateral edges), notched pieces and graters.

An examination of debris categories (and frequencies) at both occupation and workshop sites makes it apparent that different kinds of flint-working were done at each. The workshop sites (used in Phases I and II) are dominated by decortication flakes. Interior flakes, those removed from a shaped core, and thinning flakes are rare. At occupation sites (where Phase III took place), decortication flakes occur infrequently, with primary cortex flakes almost entirely absent. Instead, there are much higher percentages of interior flakes, some of which are large and represent blanks for tool manufacture; others are quite small, probably representing core trimming activities. There are also numerous thinning flakes. These are broad, thin flakes with lenticular faceted platforms which overhang slightly on the ventral face. Most are apparently the result of bifacial reduction. One special form is the "overshot flake", in which the thinning flake unintentionally carries across the bifaces and detaches a portion of the opposite edge. Excellent examples of these have been illustrated by Skinner (1971). A small percentage of biface thinning flakes from the Chaparrosa area have dulled striking platforms. In some instances, this dulling could result from wear on a biface (knife) edge, with the thinning flakes the simple result of resharpening. However, in most examples, the dulling probably represents striking platform preparation. It would be most difficult (if not impossible) to distinguish between use-wear dulling and platform preparation dulling in this case. There are recognizable resharpening flakes (detached from dulled uniface edges) found at Chaparrosa occupation sites (see Frison 1968 and Shafer 1970 for a discussion of uniface and biface resharpening methods).

Knapping techniques at the occupation sites include hard hammer percussion (direct free-hand), soft hammer or billet percussion, and pressure flaking. The latter was usually the final step in the fabrication of many implements, especially projectile points and other thinned bifaces.

The workshop and occupation sites also give us some concept of the flint worker's tool kit. Most common are small round to ovate pebbles of quartzite used as hammerstones. The flint workers in the Chaparrosa area (and elsewhere in this part of the Rio Grande Plain) appear to have had a distinct preference for purple quartzite pebbles (Hester and Hill 1972). These show battering at one or both ends. Although some bone tools survive in buried deposits at Chaparrosa sites, no objects we can interpret as cylinder-hammers or as pressure-flaking tools have yet been found. Soft hammers could have been made from wood, especially such hard wood as oak (cf. Bordes 1969), a species found commonly on the local floodplains.

INFERENCES BASED ON LITHIC ANALYSIS

While this preliminary multi-phase model enables us to follow the fabrication process of the stoneworking technology in the Chaparrosa area, we have used other methods of lithic research to obtain both settlement and behavioral data. The analysis of waste flakes and other lithic debris can provide information about site function. Earlier, we contrasted the flake type frequencies at terrace and floodplain sites, noting that the high incidence of decortication flakes at the terrace sites is probably indicative of the use of those sites as workshops. Also present in large quantities at these workshops were core fragments and roughed out cores. Different types of flakes occurred at the floodplain sites (such as interior flakes, thinning flakes, and tool rejuvenation flakes); taking into consideration the array of maintenance and exploitative tools (scrapers, knives, points, and others) at the floodplain sites, we can safely infer that they are occupation areas, probably base settlements.

Similarly, analysis of waste flakes and other chipped stone materials can give information on intrasite behavior. At site 23 (Chaparrosa Ranch), controlled surface sampling revealed that one portion of the site contained about 40% of the thinning flakes from the site, as well as all of the bifaces, biface fragments and preforms. This area was apparently a chipping locus, where finished tools were manufactured, using either flakes derived from cores and/or preforms. The presence of biface fragments (including dart point and knife fragments) suggests that implements (dart shafts, hafted knives) with broken flint components were probably being repaired or refurbished there, and the broken parts discarded.

At the Stewart site (41 ZV 121) on an adjoining ranch, a survey of the site surface revealed a distinct cluster of lithic debris within a 6-foot diameter. The concentration was collected and the debris analyzed. Sixty-three percent of the classifiable flakes are attributable to biface thinning activities, and we can safely infer that this was a chipping locus devoted to such endeavors. While this is an isolated case, the careful horizontal exposure of buried sites in this region should reveal similar activity loci which would be valuable in reconstructing intrasite behavior.

Such horizontal excavations might also reveal clusters of specific tool forms, indicative where certain tasks were carried out. Such clusters are occasionally noted on surface sites in this area. At site 41 ZV 57 (just west of Chaparrosa Ranch), a concentration of 17 triangular unifaces ("Clear Fork" tools) was found within an area 10 yards in diameter. There was no associated debris to indicate that the tools had been made at this spot; in fact, unfinished examples of similar artifacts were collected at a gravel terrace workshop just east of the site. While we can assume that this concentration of tools might result from special activity, we can only speculate what that activity was. In a recent paper, Hester, Gilbow and Albee (1973) have put forth the hypothesis that "Clear Fork" tools on the Rio Grande Plain were used in wood-working. This hypothesis is based on wear pattern analysis and comparisons of the wear pattern data with a number of experimental studies. Therefore, it is possible that this cluster of tools at 41 ZV 57 represents a spot where wooden tools were being shaped, perhaps projectile shafts, digging sticks or some other form of wooden equipment.

CONCLUDING STATEMENT

In this paper, I have attempted a review of what is currently known about the lithic technology on the Rio Grande Plain, and have particularly emphasized data obtained during settlement-subsistence studies at Chaparrosa Ranch, Zavala County (Hester 1970). Quantitative treatment of the lithic data will be published in the final report on the Chaparrosa investigations. Earlier, I alluded to the fact that we are presently unable to interrelate the defined chipped stone industries with the postulated fabrication phases. In other words, we cannot take each of the three industries and trace it through the series of phases. In essence, the linear model which is presented here is a generalization based on our current information. We will have to await further study of materials collected under controlled conditions before this model can be refined and completed.

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SOME OBSERVATIONS ON
ARCHAEOLOGY AT CHAPARROSA RANCH, 1974¹

Thomas R. Hester

From June 4 to July 11, 1974, The University of Texas at San Antonio held its first summer archaeological field school at Chaparrosa Ranch, in north-western Zavala County, Texas. Six graduate students participated and were enrolled in two courses, ANT 549 "Archaeological Field Course" and ANT 529 "Supervised Field Research."² The field school was directed by the writer. The archaeological investigations had four major objectives: (1) to provide training in archaeological field techniques for the enrolled students; (2) during the course of this training, to carry out excavations at a major Late Prehistoric campsite with a view towards obtaining information on intrasite (community) patterning of archaeological remains; (3) to continue the archaeological site survey initiated by Hester (1970) and, (4) to excavate test pits at several sites to obtain data on site content and the local prehistoric culture sequence.

As a brief review of the work carried out by the UTSA field school, I shall discuss some of the information obtained relating to these four major goals. The foremost goal of any archaeological field school is to provide intensive training for students beginning in archaeology. Of course, most of this training comes through field experience--the actual digging of a site. However, a great deal more is involved: the student has to adjust to the environment in which the field school is situated, the student has to learn to work with other members of the crew, and he or she must undergo a type of "conversion" in which the mind is trained to "think archaeology" at practically all hours of the day. There are also the rudiments of archaeology to be learned: recognizing and recording sites, proper methods of collecting artifacts from surface contexts, the techniques of excavation--from grid layout to mapping to backfilling (the latter being one of the more painful learning experiences).

The teaching of excavation techniques was combined with the investigation of a Late Prehistoric campsite, Chaparrosa 28 (Mariposa Site), extending over 200 meters on the east bank of Turkey Creek. At site 28, test pits dug in 1970 had revealed archaeological remains buried, in alluvium, up to one meter in depth. Radiocarbon dates obtained by the writer in 1971 indicate that the earliest occupations at the site took place around A.D. 550 (UCLA-1821E) and that perhaps the last habitation was ca. A.D. 1650 (UCLA-1821D; Hester 1974). In 1974, our excavations were carried out in a block of nine 2-meter squares. This large area was opened up in an effort to obtain a view of the horizontal distribution of cultural remains in one portion of the site. The excavation was slow and tedious. Digging proceeded with trowel and brush in 5 cm levels.

¹Reprinted from: *La Tierra*, Newsletter of the Southern Texas Archaeological Association, Vol. 1, No. 3, pp. 19-22. San Antonio, 1974.

²The students were: Feris A. Bass, Jr., Mary Frances Chadderdon, Jill Gates, Edwin S. Harris, Margarita Vazquez and Mary Wagner.

All artifacts in each level were left in place and were precisely plotted before being removed. This enabled the development of a series of "distribution maps" showing the patterning of archaeological remains across the excavated area. In addition to information on spatial patterning, some data were obtained on the local projectile point sequence. In general, the last occupations (surface to 20 cm) were characterized by the co-occurrence of a variety of projectile point forms, especially specimens resembling the *Perdiz* and *Scallorn* types; triangular and subtriangular arrow points; small, thick "dart points," some of the tentative *Zavala* points; and in a nearby test pit, at 40 cm, a *Tortugas* dart point. The far southern edge of the site, known as Area B, has a deep erosional cut, from which a number of "Archaic" stemmed points have been collected, especially *Tortugas* and *Langtry* specimens.

A third goal of the field school was to continue site documentation within the 65,000 acres of the ranch. This again was combined with student training--providing experience in site survey and surface collection techniques. As of 1970, 61 archaeological sites had been reported from the Chaparrosa Ranch; at the close of the field session, 102 sites were known. The sites include a large number of buried occupation sites along the stream channels (Turkey and Chaparrosa Creeks), flint workshops on gravel ridges paralleling the streams, occupation sites (some temporary and others of longer duration) on high elevations overlooking the streams, and small upland sites. Site records are on file at The University of Texas at San Antonio and duplicates will be placed in the site files at the Texas Archeological Research Laboratory, Austin.

Finally, a number of sites were tested to obtain information on site content and culture sequence, the latter being very poorly known in the southern Texas area. There were few surprises as far as site content. The occupation sites along the Turkey and Chaparrosa Creek drainages consist of a variety of debris (fire cracked rock, charcoal, flint flakes, snails, mussels, chipped stone artifacts, occasional animal bones) buried in gray-brown alluvium, overlying a tan-yellow basal clay.³ One site which intrigued us was Chaparrosa 84. The site lies in an upland situation west of Chaparrosa Creek and was initially recognized through roadbed erosion which had exposed a small scattering of burned rock. Exploration of the site by the students led to the discovery of several small depressions. When a couple of these were trenched (in order to obtain a profile of the depressions; they were later determined to be the remains of old pack rat dens), large quantities of burned rock were exposed. Further test pits were opened up, always with the same results: concentrated burned rock at 15-20 cm, again at ca. 40 cm, and scattered burned rock continuing to a depth of 95 cm below the surface. No intact hearths were excavated. In studying upland sites in similar locales in 1970, I had concluded that they were all small, "temporary" sites, perhaps linked to hunting and foraging activities (Hester 1970). Test pits and shovel cuts at Chaparrosa 84, what I had considered a "typical" upland site, revealed deeply buried burned rock rather evenly distributed over an area of at least 70 square meters. The excavation of approximately six square meters of the site failed to produce any diagnostic artifacts; there were many pounds of fire-cracked quartzite and

³The soils at the sites were studied by Dan Arriaga of the USDA Soil Conservation Service and his observations will be provided in a future report. From these sites soil samples were collected for palynological analysis, as part of the continuing effort to obtain further empirical data on pre-European vegetation patterns.

sandstone, a few flint flakes, a scraper and two or three mussel shells, and that was it. This is a completely different assemblage of debris (and a greater amount of burned rock) than one finds in the creek-side occupation sites. We can rather safely surmise that the quantity of burned rock at the site results from some "special activity," perhaps the cooking or roasting of some type of food resource, but we are no farther along as to learning what that activity might have been. The local vegetation has been greatly altered by rootplowing and chaining, and was changed even before that by the "mesquite invasion" of the past 300-400 years. This upland locale may have been an area in which some particular plant assemblage was exploited, but it will be difficult to determine what this food resource might have been.

As far as learning more about the culture history of the area, we gained a little more knowledge through our test-pitting program. From test pits at a number of sites (CH-91, CH-79, CH-9, CH-5, and others), we were able to confirm the placement of the *Zavala* series of projectile points.⁴ They originate prior to the introduction of *Perdiz*, *Seallorn* and triangular arrow points but persist in use along with these. One site, CH-91, indicates that *Frio*-like points precede *Zavala*, with "Archaic" points, such as *Tortugas*, *Langtry*, *Montell*, and others coming earlier in time.

Another aspect of the site documentation and testing program was the analysis of hearths. At most of the sites, occupational remains are buried and hearths are only occasionally exposed. However, a number of hearths were found and mapped, the area around them collected, and details of hearth construction recorded. One particularly large hearth was excavated at CH-66 and debris collected around it (interestingly, projectile points and point fragments were clustered in one area at the southeast edge of the hearth). Recording of the hearth was facilitated through the use of a grid of 20 cm units superimposed over the feature.

I have mentioned here only a few of the results of the 1974 UTSA archaeological field school at Chaparrosa Ranch. A great quantity of field notes, artifacts, photographs, and other data await analysis before definitive statements about Chaparrosa archaeology can be made. In sum, I believe it was a successful field program, made much easier by facilities made available by Mike Dillingham (Alice, Texas) at the Eight Mile Mill hunting camp on the Chaparrosa. It was a good learning experience for the students (and the director!) and it produced a very substantial amount of information on south Texas prehistory.

Acknowledgments

We are very grateful to Mr. Belton Kleberg Johnson, owner of the Chaparrosa Ranch, for his permission to hold the field school at the ranch. Mr. Wayne T. Hamilton, Ranch Resources Manager at the Chaparrosa, aided us in innumerable ways. We are, of course, extremely appreciative of the support of The University of Texas at San Antonio (Dr. Peter T. Flawn, President), the University's

⁴The *Zavala* series bears some resemblance, both in point morphology and temporal placement, to the *Figueroa* type of Johnson (1964).

Physical Plant (Mr. George Mangrem, Director), the College of Humanities and Social Sciences (Dr. Richard E. W. Adams, Dean), and the Division of Social Sciences (Dr. Thomas C. Greaves, Director). There were many others who were helpful to the field school in a variety of ways, including Mrs. Manerva Andrews, Dan Arriaga, Mike Dillingham, Drane F. Grant, Kathy Hamilton, Mr. and Mrs. T. C. Hill, Jr., Mr. and Mrs. Harvey P. Smith, Jr., Jamis Townsend, and the secretaries of the College of Humanities and Social Sciences.

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PREHISTORIC SUBSISTENCE AND SETTLEMENT SYSTEMS

ON THE RIO GRANDE PLAIN, SOUTHERN TEXAS¹

Thomas R. Hester

The Rio Grande Plain encompasses much of southern Texas, in the region between San Antonio and Brownsville. It is a semi-arid area, with the vegetation dominated by thorny shrubs and trees. This region and adjacent northeastern Mexico were occupied at the time of European contact by many small groups of hunters and gatherers (most of whom spoke dialects of the Coahuiltecan language). However, the prehistory of the Rio Grande Plain has not been intensively investigated by archaeologists; only limited excavation had been conducted and most research up until recent times involved site survey and documentation, the recording of private artifact collections, and distributional studies of artifact forms.

In 1970 a long-range investigation of prehistoric settlement and subsistence in the Rio Grande Plain area was initiated at Chaparrosa Ranch, western Zavala County. The original research design involved systematic site documentation, controlled surface collecting, test excavation, and the recording of ecological data. The ranch is drained by Chaparrosa and Turkey Creeks, major tributaries of the Nueces River. Both streams have large valleys, and field work was concentrated within these drainages. Since part of the research was to secure information on settlement distribution, numerous transects were made of the valleys, sampling archaeological remains in all microenvironmental situations.

Research was begun at the same time in a nearby area in association with T. C. Hill, Jr. Additional site survey, documentation of sites, and test excavations were concentrated along Tortugas Creek in eastern Zavala County. Emphasized in this research was the maximum recovery of faunal remains from excavated deposits.

As a result of the 1970 field work, as well as limited excavations carried out since then, a variety of archaeological data was accumulated. The bulk of these materials are chipped stone artifacts and lithic debris, being analyzed by the grantee. However, some of the collected remains required special study, and funds granted by the Society have been used for these purposes.

Since the prehistoric chronology of the Rio Grande Plain has been almost totally unknown, an effort was made through stratigraphic excavations to obtain charcoal samples for radiocarbon dating. Using grant funds, eight samples were processed by radiocarbon laboratories at The University of California, Los Angeles, and The University of Texas at Austin. These samples were from three Chaparrosa Ranch occupation sites, 41 ZV 11, 41 ZV 82 and 41 ZV 83, located on the floodplain of Turkey Creek and situated adjacent to the present stream channel. The radiocarbon determinations indicate that the earliest occupations

¹Reprinted, with minor changes, from *American Philosophical Society Yearbook*, 1973, Philadelphia, 1974. Report on Grant No. 6313, Penrose Fund, 1972.

at these sites (buried by one meter of alluvium) occurred around A.D. 500, and that intermittent habitation continued to ca. A.D. 1450 or later. These dates are of interest for settlement pattern studies, as they indicate that earlier sites are probably located elsewhere, apparently at a greater distance from the stream, and that human occupation within the past 1,500 years has been concentrated along the present stream. The dates are also important in ascertaining the temporal position of certain diagnostic artifacts in the area.

Another facet of research, particularly at Chaparrosa Ranch, was environmental change. The Rio Grande Plain is today a brushland, with most streams either dry or flowing only on an intermittent basis. However, early Spanish and American records indicate that these conditions came about comparatively recently. On the basis of these accounts, I have hypothesized that most of the area was a grassland savannah, with numerous perennial streams, and with woody vegetation concentrated along stream courses. The environment was radically altered by Anglo-European ranching and farming practices, and a concomitant "invasion" of mesquite and associated thorny shrubs from north-eastern Mexico.

In an effort to learn more about the prehistoric environment, soil samples suitable for palynological analysis were collected at excavated sites on Chaparrosa Ranch. Initial examination indicated a potential for good pollen preservation. However, subsequent study of eight samples by Dr. V. M. Bryant, Jr. revealed that the samples were almost totally void of pollen. It is possible that some pollen destruction could have been caused by fungal attack, or, more likely, that the soil in the study area is strongly alkaline and has undergone severe oxidation.

Although the excavations at Chaparrosa Ranch failed to produce significant samples of animal bone refuse, abundant faunal remains were recovered from other sites in the area. These materials are crucial to learning more about prehistoric subsistence activities on the Rio Grande Plain. The most important faunal assemblage was obtained from excavations at site 41 ZV 155, a Protohistoric site in the Tortugas Creek drainage. A variety of fauna were identified, including antelope, bison, deer, rabbits, rats, mice, snakes, turtles, fish, fox, gophers, and marmot. Of particular significance is the occurrence of antelope, the predominant species at the site. Antelope was recorded in early documents, but has been absent from most parts of southern Texas for 200-300 years. The species did survive in open, savannah-like areas of southern Texas as late as the mid-nineteenth century. Thus, the antelope may serve as an indicator of savannah conditions in the study area during Late Prehistoric times. The presence of bison is also of interest as this area is considerably south of the normal bison range. However, we do have nineteenth-century accounts of irregular bison intrusions into the region. Marmot, as documented at 41 ZV 155, is no longer found in this area.

In summary, grant funds were expended primarily for radiocarbon analysis and faunal identification. These data are currently being analyzed in more detail and will be presented in the final publication on the subsistence and settlement research.

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A SUMMARY OF THE 1975 ARCHAEOLOGICAL INVESTIGATIONS

AT CHAPARROSA RANCH, SOUTHERN TEXAS*

Thomas R. Hester

In June and July 1975, the Field Course in Archaeology of The University of Texas at San Antonio returned to Chaparrosa Ranch to pursue the goals initiated in earlier fieldwork (see Hester 1974). Fieldwork in 1975 focused on block excavations at site 41 ZV 10 (Chaparrosa-9, originally tested in 1974; Harris 1974) and continued site survey and documentation. During this field session, survey work concentrated on specific terrain--the uplands and upland fringes--and those areas of the ranch which had been insufficiently covered during earlier surveys.

Twelve graduate students were enrolled in the course: L. C. Fletcher, E. S. Harris, Joseph and Wanda Kaufmann, T. C. Kelly, and Irma Richie (all of San Antonio), Barbara E. Wolf (Austin), Joan Melasky (Austin), Mary Damsgaard (Grinnel College), John Montgomery (Texas Tech University), Charles Moffatt (University of Pennsylvania) and S. W. Sandison (Sul Ross State University). We are grateful to ranch owner B. K. Johnson for his cooperation, to Wayne Hamilton (formerly the business manager at the ranch) for his continual assistance, and to T. C. Hill, Jr. (Crystal City) for his visits and help.

Research at 41 ZV 10

Site 41 ZV 10 (Chaparrosa-9) is located on the east edge of Turkey Creek, with archaeological deposits extending from the eroded edge of the floodplain westward for 50 meters. The site is approximately 200 meters long, oriented roughly north-south and paralleling the stream channel. As the floodplain breaks toward the creek, there are areas of erosion and some gullying. It was these exposures that revealed hearths and lithic materials and led to the documentation of the site in 1969. In general, however, the site deposits are undisturbed.

The site is buried in soils identified by Wayne Hamilton (personal communication) as Uvalde Silty-Clay Loam (see Smith *et al.* 1940:13-14). Riparian vegetation along the creek channel is dense, and is composed of mesquite and associated thorny brush, as well as Texas persimmon, oak and white ash. In recent times, the creek flows only after heavy rains; however, deep pools in the creek bed will hold water during dry weather for weeks and even months. One such pool was located adjacent to the site in summer 1975. It was about three feet deep and contained crayfish, mussels, small water snakes, and minnows. A favorite activity during the lunch break each day was crayfishing with string and dough-balls at this pool; this food resource (which must have also been readily accessible in prehistoric times) proved to be both abundant and, when cooked right, very tasty.

*This paper is derived from several public lectures that were given on the 1975 investigations during 1976-1977.

Site 41 ZV 10 had been tested in 1974, at the time excavations were going on at 41 ZV 83 upstream. The four excavation units were scattered across the site and they served to indicate that the site was both deep (at least 80 cm of deposits) and contained considerable lithic debris and charcoal (Harris 1974).

Surface collections made at the site in 1969, 1974 and those present in the Wayne Hamilton collection, suggested that the site was Archaic in age. The test pits seemed to confirm this (e.g., a *Montell* point was found in one unit; Harris 1974), and the presence of abundant charcoal made the site appear quite promising in terms of learning more about the chronology of Archaic occupations in the study area. And, since the deposits seemed well preserved, there was every expectation that block, or open area, excavation would permit excavation of hearths and activity loci, and would yield additional data on intrasite patterning for the various Archaic occupations.

Therefore, in early June 1975, major excavations were initiated at the site. Work was focused on a flat, grassy area near the west-central part of the site. In this area, erosional activity just to the west had exposed hearths and lithic debris, and it thus seemed that the intact deposits in this particular locale had the potential for yielding hearths and areas of concentrated occupation. A datum point (designated N100/W100) was established at the south end of the site, and a base line was extended northward for 50 meters. A 100-square meter grid was laid out between N130 and N140 extending west to the W110 line; within this block (10 meters long on each side) 25 2-m² units were staked out. Eleven contiguous units were either fully or partially excavated during the season.

Excavations followed standard field procedures. Since the 1974 test pits indicated an absence of physical stratigraphy, vertical control relied on arbitrary levels 15 cm thick. Each unit was designated according to its grid location (coordinates at the southwest corner stake were used; e.g., N138/W102). Each 2-m² unit was divided into four 1-m² quadrants (NW, NE, SW, SE), thus permitting greater control over horizontal provenience for those materials not plotted *in situ*. All excavated deposits were passed through 1/4-inch and 1/8-inch hardware cloth. While the use of the smaller mesh often slowed excavations (especially when the soil was damp), it was more than justified by the extensive recovery of small animal bones. Because of the good preservation of faunal remains, matrix samples were taken and were subjected to flotation at the field camp. This led to the recovery of microfauna, tiny snails and some seed remains.

Nineteen features were recorded during the excavations and were numbered sequentially. Fifteen of these could be identified as hearths, and one consisted of a concentration of charcoal and large pieces of baked clay. The others were: a charcoal concentration, a concentration of baked clay pieces and a concentration of baked clay which possibly represented a small cooking pit. In terms of vertical distribution, the number of features occurred as follows: level 1 (2), level 2 (1), level 3 (12), level 4 (2) and one each in levels 5 and 6. Horizontally, the 12 features found in level 3 were fairly evenly scattered over seven units in the NW quadrant of the grid, but with a cluster evident in N138/W106 (a hearth, a charcoal concentration and a concentration of baked clay) and in N138/W108 (two hearths and a charcoal concentration).

In terms of vertical distribution, the 12 features in level 3 were found between 24-45 cm, with most at the 30-35 cm level. Two soil units were disclosed by the

excavations. The upper, in which the archaeological remains were buried, is a grayish brown to dark grayish brown alluvium (Uvalde Silty-Clay Loam), with Munsell readings of 10 yr: 4/2 (dry) and 10 yr: 5/2 (moist). It was 45-60 cm thick, overlying a clay unit that contained only scattered cultural debris. Munsell readings for the clay varied from very pale brown (dry profile; 10 yr: 7/3-7/4) to brown (moist profile; 10 yr: 5/3). Excavations cut through the clay to depths of more than 100 cm below the surface.

In addition to the excavations at the site, the students also carried out controlled surface collecting in the northernmost part of the site. Five adjacent rectangular units, 7 meters long (east-west) and 5 meters wide (north-south), were laid out extending from the edge of the site, near the creek bank, to the east (over eroded areas). All surface materials within these units were collected. In addition, two surface hearths near the excavation area were mapped, and locations of a number of exposed surface artifacts were plotted.

Following completion of the excavations, profiles were drawn, including two long profiles--one 8 meters long on the N140 line, and one 6 meters long on the W106 line. Soil sample columns were collected from profiles and all units were completely backfilled.

The extensive faunal assemblage has been analyzed by Billy Davidson (Austin) and will be described in the final report. A list of identified species is presented in the Appendix.

A single radiocarbon date is available from the site. It comes from a sample obtained from a charcoal concentration found in level 4 of unit N136/W104. This *in situ* concentration was at a depth of 57.5 cm. The date is A.D. 1150 \pm 40 (TX-2932). Using the MASCA correction tables (Ralph, Michael and Han 1973), the date is probably closer to A.D. 1210. Because of the occurrence of *Shumla*-like points at this approximate depth, I felt that the sample should be much older. However, of the seven dates now available from floodplain sites at Chaparrrosa Ranch, none are any earlier than A.D. 490 (see Hester and Hill 1975; Montgomery 1978).

Numerous artifacts were found, and detailed descriptions and illustrations will appear in the final report. Temporally diagnostic projectile points indicate the presence of a Late Prehistoric occupation (or occupations) primarily in the upper 20-25 cm of the deposit; this late component had not been expected based on previous surface collecting and the 1974 test pitting program. Arrow points linked to the late occupations include *Perdiz* and *Scallorn*. A *Zavala* point was also found, as well as a triangular arrow point preform. A large, thin triangular biface was found associated with a hearth (Feature 1). *Perdiz* and *Zavala* points were also found in the second arbitrary level (15-30 cm), but appeared to come from the upper part of the level. There was a distinct occupation at roughly 25-45 cm, especially noted at ca. 30-35. It was elusive and practically impossible to trace horizontally; however, in profile, the occupation could be easily distinguished. Cultural affiliation of this occupation was not clear cut. However, apparently associated with the features and other debris at this depth were *Ensor*, *Zavala* and *Montell* (a single example) points, unifaces, cores and biface fragments.

Below, in levels from roughly 45-75 cm below the surface, earlier Archaic materials were found, but debris was not as frequent. Diagnostics include a *Marcos*

point, two *Shumla*-like points (of the heat-treated variety described by Hester and Collins 1974), a large perforator, cores, biface fragments, etc. At 92 cm, a large antler tine, probably used as a flaking tool, was found *in situ*. It began to deteriorate after exposure, and was treated with preservative before it was removed.

Other artifacts from the excavations included two grooved pieces of sandstone used either in manufacture of bone tools or edge preparation of bifaces preparatory to thinning.

Until further analysis is done, it is best not to offer any broad-ranging conclusions or speculations about the occupations at 41 ZV 10. The detailed data recorded on the features and associated materials will undoubtedly produce useful activity information, especially from the occupational zone in level 3. One significant aspect of the site which can be noted at this early stage is the contribution it makes to the building of a chronological sequence in the study area. Although the stratigraphy of the diagnostic materials is not clear-cut (as it rarely is in southern Texas), there is sufficient separation to distinguish Late Prehistoric components with *Perdiz* and *Scallorn* points and Late Prehistoric or Late Archaic components with *Zavala* points. The Late Archaic is represented rather clearly by distinctive *Enser* points (and a single *Montell*), and there is an ostensible Middle Archaic occupation represented by *Marcos* and *Shumla*-like points. Potentially earlier occupations at the site may be present, given the occurrence of lithics, burned rock and the antler tine implement at depths of 90-100 cm.

In retrospect, we should have attempted finer vertical control in excavating the site deposits. Although there was considerable evidence of artifact displacement (rodent burrows, roots, soil cracks), the use of 5 or 10 cm levels might have allowed a better view of the stratigraphic positions of the diagnostic lithic materials.

Results of Site Survey Activities

As noted at the beginning of this paper, site survey and documentation was one facet of the field course. Earlier surveys in 1970 and 1974 had led to the documentation of 103 archaeological sites. Although a systematic effort had been made to sample various topographic areas within the ranch (e.g., by the use of east-west transects which cut across the Chaparrosa Creek and Turkey Creek stream valleys), we still did not have a very large sample of sites from the uplands and upland margins. This was particularly true of the eastern side of the Turkey Creek drainage. And, there were certain pastures within the ranch where only minimal survey work had previously been done.

The work schedule dictated that the mornings and early afternoons were devoted to excavations at 41 ZV 10. Following a lunch break and a respite from the heat in what shade could be found at the field camp, survey work was conducted in late afternoon. Survey teams were composed of 3-4 students each, equipped with the requisite materials for site documentation. If a particularly interesting site was found, it was later visited by all of the field school participants. As a result of the 1975 survey, 64 new sites were documented, bringing the total

number of sites at the ranch (both prehistoric and historic Anglo-European) to 167. It is my estimate that this represents something on the order of 65% of the potential sites to be found within the ranch boundaries.

Sites representing the entire known cultural span for the study area were documented, i.e., from Paleo-Indian through Late Prehistoric. A major Late Prehistoric site was found near the Chaparrosa Creek (Chaparrosa-150). It yielded surface materials that included *Perdiz*, *Scallorn* and *Zavala* projectile points, and a number of end scrapers. Another important site is Chaparrosa-138, found across Turkey Creek from 41 ZV 10 (Chaparrosa-9). Gullying had exposed a large concentration of baked clay and charcoal; the concentration was 38 cm long, 20 cm wide and 20 cm thick. Troweling revealed a cylindrical impression near the center, as if a log (?) or some other perishable had been encased in the clay. Adjacent to the concentration was a large bone fragment which appeared to be the head of a human femur and which was also burned. Around this feature was a zone, about 10 cm thick, of various materials, including baked clay lumps, land snails, some burned rodent and mammal bone fragments, scattered burned rocks and both burned and unburned flakes. The feature and related materials are within a midden deposit which is at least 60 cm thick. There is abundant cultural debris in the midden, including animal bones, mussel shells, land snails, large flakes and cores, hearthstones, etc. Cultural diagnostics included two *Scallorn* points, a subtriangular dart point and a stemmed dart point. It appears that both Late Prehistoric and Archaic occupations were present. Two 1-m² test units were also excavated; a *Perdiz* and an *Ensor* point came from these, along with materials similar to those just described.

Some very important settlement data came from several sites documented on the eastern uplands of the Turkey Creek drainage. At site Chaparrosa-159, a *Golondrina* point and a bifacial *Clear Fork* gouge were found. The site apparently has no depth; the surface materials date to ca. 7000 B.C. (cf. Hester 1978). At Chaparrosa-156, another *Golondrina* point was found, along with Pre-Archaic dart points ("Early Corner Notched", *Gower*), and a blade core (cf. Hester 1977). Chaparrosa-146 also yielded Pre-Archaic "Early Corner Notched" projectile points. These, and other upland sites, indicated that the upland areas were favored habitation and hunting localities in Paleo-Indian and Pre-Archaic times (roughly 7000-5000 B.C.). It is likely that the dendritic drainage pattern exhibited by Turkey Creek today reflects, in geomorphological terms, stream-cutting in the past 2000 years or so (see Hester and Hill 1975). However, it is not possible, with present dates, to identify the locations of earlier channels (these have, in all likelihood, been obliterated) or ascertain anything about their size.

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APPENDIX

IDENTIFIED FAUNA FROM EXCAVATIONS AT 41 ZV 10

The extensive faunal assemblage excavated at 41 ZV 10 had been completely analyzed by Billy Davidson of Austin, Texas. A detailed faunal study will appear in the final report. For the present, a list of identified species is provided below:

<u>SCIENTIFIC NAME</u>	<u>COMMON NAME</u>
<i>Rana caresbeiana</i>	bullfrog
<i>Rana pipiens</i>	leopard frog
<i>Rana</i> sp.	frog
<i>Bufo</i> sp.	toad
<i>Terrapene</i> sp.	box turtle
<i>Phrynosoma</i> sp.	horned toad
<i>Elaphe</i> sp.	rat snake
<i>Couber</i> sp.	racer snake
<i>Pityophis</i> sp.	bull snake
<i>Agkistrodon</i> sp.	cottonmouth
<i>Crotalus</i> sp.	rattlesnake
<i>Natrix</i> sp.	water snake
<i>Thamnophis</i> sp.	garter snake
<i>Lepisosteus</i> sp.	gar
<i>Cnemidophorus</i> sp.	whiptail lizard
<i>Basariscus astutus</i>	ringtail
<i>Procyon lotor</i>	raccoon
<i>Mephitis mephitis</i>	striped skunk
<i>Citellus spilosoma</i>	spotted ground squirrel
<i>Sigmodon hispidus</i>	cotton rat
<i>Neotoma</i> sp.	pack rat
<i>Neotoma</i> cf. <i>microps</i>	South Plains packrat
<i>Perognathus</i> sp.	pocket mouse
<i>Geomys</i> sp.	gopher
<i>Sylvilagus</i> sp.	cottontail
<i>Lepus californicus</i>	jackrabbit
<i>Odocoileus</i> sp.	deer
<i>Odocoileus virginianus</i>	whitetail deer
<i>Artiodactyla</i>	deer or pronghorn

THE MARIPOSA SITE: A LATE PREHISTORIC SITE
ON THE RIO GRANDE PLAIN OF TEXAS

John L. Montgomery

Center for Archaeological Research
The University of Texas at San Antonio
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1978

Volume 2. Studies in the Archaeology of Chaparrosa Ranch
Thomas R. Hester, Series Editor

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PREFACE

In Volume I of the Chaparrrosa Ranch Series, a series of brief papers outlined the nature and scope of archaeological research conducted at the ranch since 1970. It was noted that in 1974, extensive excavations were conducted at site 41 ZV 83 (Chaparrrosa 28). The field work was done, under my direction, by the students of the first archaeological field school to be offered by the Division of Social Sciences, The University of Texas at San Antonio (UTSA).

In 1975, John Montgomery, then a graduate student at Texas Tech University, was one of the participants in the 1975 UTSA Field Course in Archaeology, also carried out at the ranch. Montgomery became interested in the past year's work at 41 ZV 83, and in his spare time (i.e., in the hottest part of the day when the rest of us had repaired to the shade of the field camp), he and two other students dug a test unit in a part of the site that had been previously unexcavated. Their discoveries further increased Montgomery's interest in the site.

After the conclusion of the field school, Montgomery and I discussed the possibility of using the 41 ZV 83 materials in the preparation of his Master's Thesis. This was agreed upon by other members of his thesis committee.

Thus, in this second volume in the Chaparrrosa Ranch series, the results of Montgomery's extensive analysis are presented. Some minor revisions have been made, and I am grateful to Elizabeth Branch for her careful editing of the draft manuscript. I am particularly proud of John Montgomery's continued efforts and careful research in producing this piece of work. It is the first fully-detailed report of a major archaeological excavation in southern Texas. It is valuable in that regard, and will serve as a basic reference for south Texas archaeologists for many years. In addition, it is an excellent summary of Late Prehistoric cultural remains in southern Texas. The Late Prehistoric, we are now learning, was a time of substantial--and very intriguing--cultural change in southern Texas. Montgomery's data, and those obtained in other parts of south Texas since he completed his research, present a multitude of problems to be resolved and challenges to be faced by archaeologists working in this region.

Thomas R. Hester
Director, Center for Archaeological
Research
June 1978

FOREWORD

This study of the results of archaeological survey and excavation at the Mari-
posa site is a contribution to three levels of the discipline. As a pioneering
report of detailed excavation data from south Texas, it is a contribution by
way of a substantial start on filling in a "gap" which has existed in regional
cultural history. While this is an elementary contribution, it is just the
sort of fundamental effort which we are discovering must yet be done in many
geographic areas of the United States. The fundamental, detailed examination
of the archaeological record in North America is far from complete. Happily,
with public support, via legislation, the threatened segments of the archaeo-
logical record are now receiving much more serious and systematic attention
than ever before. We can confidently look forward to a period of massive
recovery and interpretation of large segments of the unexplored record of the
past.

The second contribution of this study is in the form of a sophisticated attempt
to further our understanding or interpretation of evidence from the prehistoric
past. The definition, comparison and testing of a lithic technology model (or
theory) has moved our understanding of this general aspect of prehistoric
people forward, perceptibly.

Thirdly, by using the concepts of "objective" and "operation" explicitly as
means of organizing the writing of this study, Montgomery has taken a signifi-
cant step into the future of explicitly "operational" archaeology. Although
of limited application here, these concepts have had an important guiding
function in his report preparation and the all-important final step of the
research process--communication.

I am pleased to note, finally, that this field and laboratory-library project
was from start to finish a joint effort, linking individuals at both Texas
Tech University and The University of Texas at San Antonio in the common effort
to explore and learn about Texas prehistory.

William J. Mayer-Oakes
June 1978

ACKNOWLEDGMENTS

I am greatly indebted to my committee members, Dr. William J. Mayer-Oakes, thesis chairman, Dr. P. Hickerson, and Dr. Thomas R. Hester, for their continued suggestions, criticisms and support during the preparation of this thesis. Philip Bandy assisted with many of the technical aspects of this thesis and Richard Alvey prepared several artifact drawings. Many faculty members and graduate students of the Department of Anthropology, Texas Tech University, must be thanked for their useful ideas and comments. The support of the Department of Anthropology, Texas Tech University, and the Center for Archaeological Research, The University of Texas at San Antonio, with facilities and supplies is appreciated. Mr. B. K. Johnson of the Chaparrosa Ranch allowed this research to occur on his ranch and permitted the author to move the artifacts to Lubbock for analysis. Jeannette Shaver typed the initial and final drafts of this thesis, and Sharon Crawford printed the plates. The support and encouragement of my parents made this thesis possible. Words cannot express the thanks due to Cori Montgomery. My wife washed, labeled, and cataloged artifacts, typed and edited many portions of the thesis and contributed needed encouragement during this project. Any errors or omissions are the author's responsibility.

I. INTRODUCTION

It has frequently been asserted that there is a dearth of information concerning the culture history and the lithic and ceramic technologies of south Texas (cf. Hester and Hill 1975b). This study presents archaeological data from the excavation of a Late Prehistoric occupational locality, the Mariposa Site (41 ZV 83), on the Rio Grande Plain of Texas. It is hoped that this report will contribute to the understanding of Late Prehistoric lifeways and material culture, and will constitute a step toward bridging gaps which presently exist in the archaeological record.

Analysis of the materials excavated at Mariposa utilizes three general operations to achieve three corresponding, yet interrelated, archaeological objectives. The first objective to be considered here is description and compilation of the recovered archaeological data. To insure that future archaeological research can proceed from data recovery (in its most general sense) into realms of processual questions (e.g., settlement patterns, ecological adaptation, etc.), a solid information base as well as initial interpretations must exist. Since this objective has been only partially fulfilled for most areas in the Rio Grande Plain, it was considered to be an important objective to achieve in this thesis. To generate such data, a general site report format was chosen to act as an "outline" within which the operation of material description and analysis would be applied. A brief section on the environmental characteristics of the Mariposa site, along with a summary of the associated archaeological research previously reported, forms a background for the description of the excavated materials. An effort is made to elaborate on the significance of the horizontal and vertical distribution of artifacts and other cultural material (burned rock, snail and mussel shells, bone fragments). This aspect of the thesis results in statements concerning intrasite patterning and the possible location of functionally specific activity areas within the site. All of this information will be derived from the surface collections, test pits and excavation units executed at the Mariposa site.

Interpretation of the lithic technology utilized by the Late Prehistoric inhabitants of Mariposa, the second thesis objective, will be much more limited in scope than the previous objective. Here, the operations to be considered rest upon a test of a generalized lithic technology model previously presented by Hester (1975b). A basically technological artifact description combined with a flake attribute analysis forms the bulk of the operations to be initiated. Tabulation of specific artifactual items mentioned by the model (cf. Hester 1975b) should, when combined with the other two operations mentioned above, spell out the overall validity of the lithic technology model.

Finally, results from the first two objectives form the basis of the third objective: a brief integration of the archaeological evidence excavated from Mariposa into the context of the regional archaeology. Operations necessary to resolve this final objective consist primarily of extracting the pertinent literature for comparison with the archaeological information excavated from Mariposa. Types of data considered most important include the results of the flake analysis, faunal analysis, feature descriptions, intra- and intersite

patterning of artifacts and/or features, and descriptions of basic lithic assemblage. Data prepared for this report will be compared and contrasted with related materials from other published Late Prehistoric sites within the Rio Grande Plain.

II. THE ENVIRONMENTAL SETTING

For an adequate understanding of the prehistory of any area, a description of the natural resources and the physical setting is necessary. The Rio Grande Plain of southern Texas has many characteristics which directly relate to its utilization by humans in the past and present. The following section presents a physiographic definition of the Rio Grande Plain region, its boundaries, geology, topography and natural features, climate, soils, and biota.

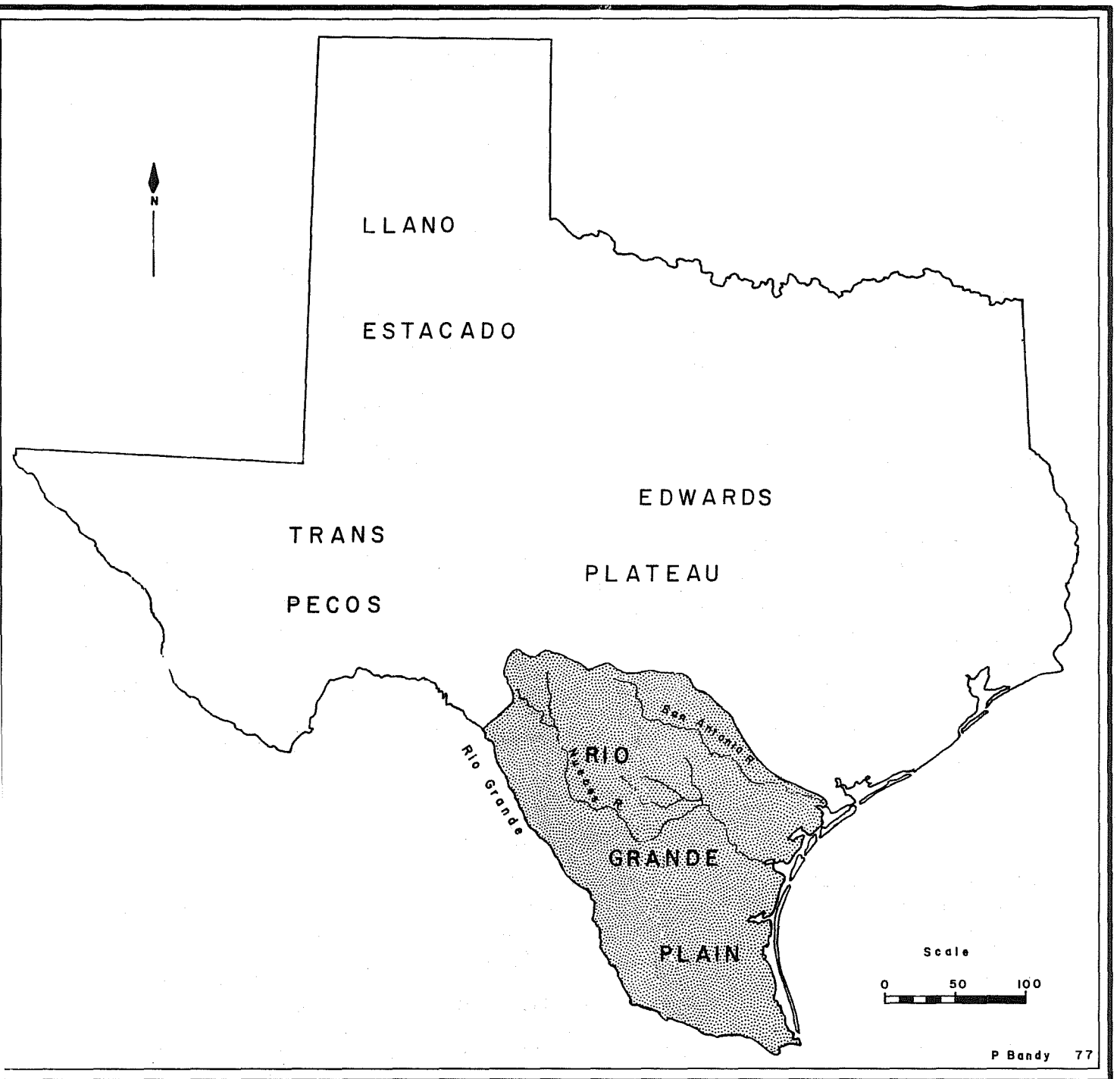
Definition of the Rio Grande Plain

The Rio Grande Plain is that area of southern Texas whose western boundary is the Rio Grande, whose eastern and southern boundary is the Gulf of Mexico, and whose northern boundary lies just below the Balcones Escarpment of the Edwards Plateau. Thus, the Rio Grande Plain encompasses most of the region of southern Texas between San Antonio and Brownsville (see map 1). Counties within this area are Maverick, Zavala, Dimmit, Frio, LaSalle, Atascosa, McMullen, Live Oak, Jim Wells, Duval, Jim Hogg, Starr, Brooks, Hidalgo, Zapata and Webb. The region covers approximately 26,350 square miles (Chambers 1946:111). Field research for this thesis was centered within the Chaparrosa Ranch, located in northwestern Zavala County.

As a physiographic unit, the Rio Grande Plain lies within the West Coastal Plain of Fenneman (1938) and Thornbury (1965). It is also considered part of the Coastal Plain by Hunt (1972). Johnson (1931) treats the region as a unique one, which he terms the South Texas Plains. To retain terminological consistency established by Inglis (1964) and Hester (1971), this thesis uses the regional term Rio Grande Plain to describe the area in question. Elevation of the plain varies from 1,000 feet in the interior of the region to sea level in the coastal zone. In general, the region is a semi-arid lowland characterized by a mild climate and a long growing season of approximately 260 days (Johnson 1931:133).

Physiography and Topography

The Rio Grande Plain exhibits a varied topography. Overall it is a lowland which reaches a maximum elevation of 1,000 feet to 1,100 feet at the base of the Edwards Plateau (Chambers 1946:112). Sub-areas within the Rio Grande Plain, though, reveal different types of topography. The central and most of the northern areas are rolling plains while the southeastern area is a level section which parallels the Gulf coastline. A more rugged topography is seen in the western and southwestern areas where the land slopes down toward the Rio Grande. This rugged (or dissected) topography is due to the action of short, rapid streams flowing into the Rio Grande (Chambers 1946:112).



Map 1. Map of the Rio Grande Plain of Texas.

Geologic and Physiographic History

Taken as a whole, the Rio Grande Plain is underlain by poorly consolidated sediments which date from the Cretaceous to the Recent Period (Shimer 1972:7). Resistant layers of these sediments are seen as erosional remnants which have formed low, elongated, asymmetric ridges or *cuestas*. These ridges are generally oriented parallel to the coastline. Shimer (1972:8) notes that the "steeper slopes of these features face inland." Towards the interior, erosional forces on the underlying Cretaceous and Tertiary sediments have formed a series of lowlands on the weaker rocks and west-facing scarps on stronger rocks (Thornbury 1965:64).

Climate

The fundamental climatic feature of the Rio Grande Plain is its general mildness, which is determined primarily by its areal proximity to the Gulf of Mexico. Seasonal stability of the water temperature in the Gulf of Mexico provides both a stable and a moderate (in terms of temperature) source of air flow over the Rio Grande Plain. In addition, the Rio Grande Plain is geographically the most southward region of Texas, a location favoring (in my opinion) overall seasonal climatic stability. The northern boundary of the region, the Edwards Plateau, also forms a "barrier" to severe influences of northern weather (Chambers 1946:112).

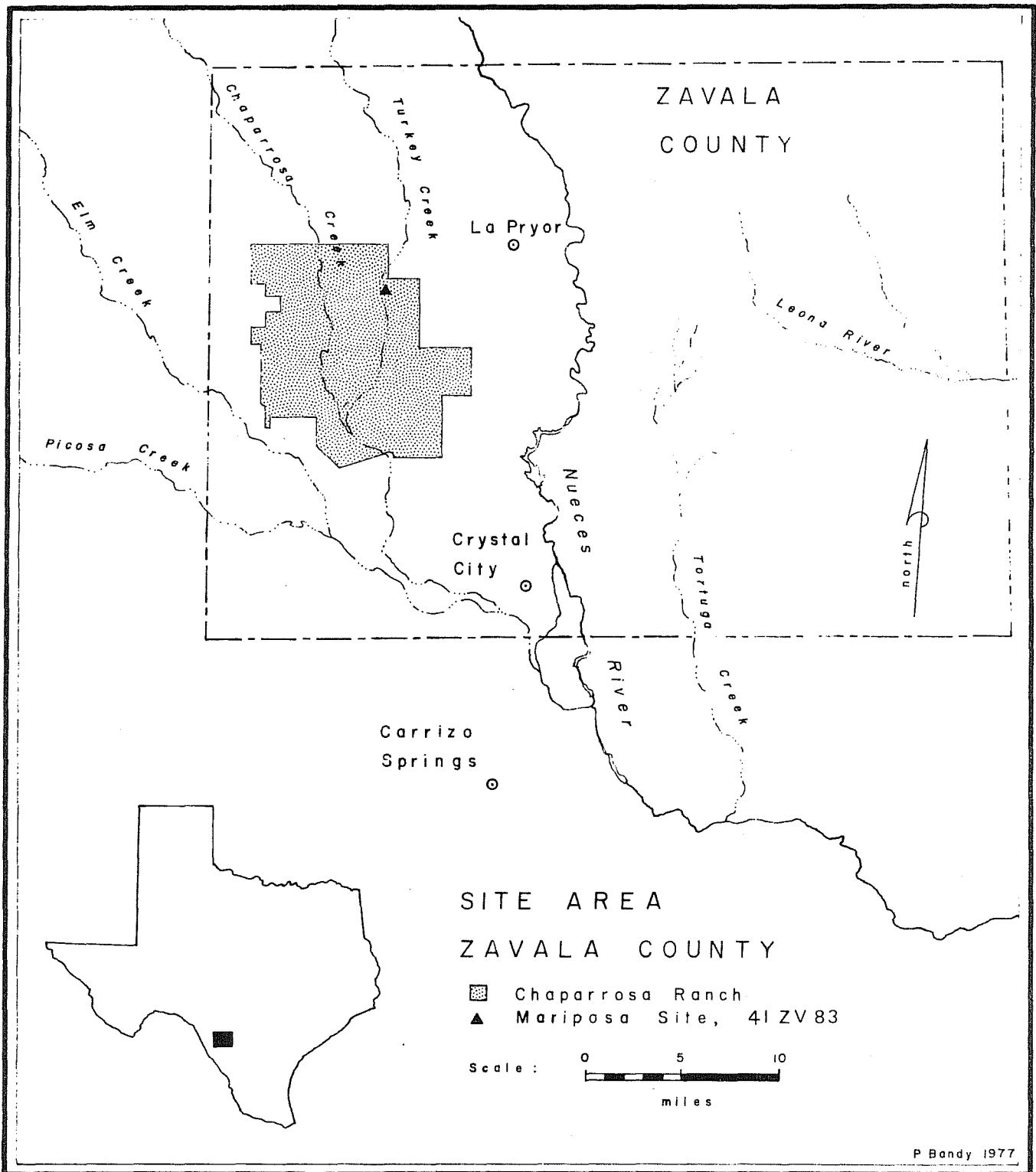
In comparison to other regions within the state of Texas, winters are milder and growing seasons are longer in the south Texas area. When colder conditions do occur they are relatively short-lived, and the temperature rarely drops more than a few degrees below freezing.

Records indicate that at La Pryor (in Zavala County, see map 2) the average date of the latest killing frost is March 1 while the average date of the first killing frost is November 28. This results in an average frost-free season of 272 days (Smith *et al.* 1940). Monthly, seasonal, and annual temperature and precipitation data reported for La Pryor present quantitative information useful for summarizing Zavala County's climatological picture (cf. Smith *et al.* 1940:6, Table 1).

Mildness is also a characteristic of the summer season as sea breezes alleviate heat (Chambers 1946:173). While temperatures are generally stable throughout the Rio Grande Plain, other aspects pertaining to the climate of the area, notably rainfall, show some variation.

Hydrology

Within the south Texas area precipitation is greatest along the eastern border, where the average annual rainfall ranges from 26 to 28 inches. Annual rainfall decreases from east to west to around 20 inches at Laredo and increases northward to about 25.5 inches at Uvalde (Chambers 1946:113). The most important amounts of rainfall usually coincide with the early growing months of April, May and June; September and October are also periods of significant precipitation.



Map 2. Location of the Mariposa Site, 41 ZV 83, on the Chaparrosa Ranch in Zavala County, Texas.

Chambers (1946:113) has noted that the Rio Grande Plain is regarded as a subhumid region. Despite this classification, irregular rainfall also characterizes the general climatic pattern, causing frequent droughts. This fact makes irrigation an important necessity for the present agricultural economy of the area.

Considerations concerning the rainfall patterns of an area do not, of course, describe the whole hydrological picture. In addition to rainfall pools and runoff, there are two main water sources in the Rio Grande Plain: year-round rivers and streams.

Permanent flowing rivers are fairly numerous in the region. Major river systems (and their tributaries) are the Nueces, the Western Nueces, Frio, Sabinal, and Medina (the last four are not illustrated). These are the "principal spring-fed streams" within the area (Chambers 1946:115). The largest river in the area, the Rio Grande, also forms the western boundary of the region. These river systems cut across the belted geological strata (described above) and form broad, shallow valleys filled with alluvial deposits (Johnson 1931:134).

When considering only Zavala County, the principal streams are the Nueces and Leona Rivers and Turkey and Chacon Creeks (Chacon not illustrated). These streams "occupy broad shallow valleys, and most of the upland slopes rise smoothly and gently away from the floodplains," due to the original geology and topography of the area (Smith *et al.* 1940:2).

Soils

The diverse topography present within the Rio Grande Plain gives rise, in part, to a corresponding variation in soil types in the area. Soil types characteristic of the region range from red and reddish-brown loam to light, sandy soil. The sandy soil actually forms dunes when proper wind conditions are present (Chambers 1946:112). Alluvial soils near streams are very fertile and are cultivated today.

Surface deposits and soils within the region consist mainly of marly deposits along the coast and sandy, silty clay deposits associated with the poorly consolidated formations of the Rio Grande Plain interior (Hunt 1972:87). Another large group of soils, the Zonal and Intrazonal soils, are found in most other areas where the underlying bedrock formations are more consolidated. In warm, semi-arid regions, dominated by a mixed shrub and grass vegetation (like that of the Rio Grande Plain), both reddish-brown and reddish-chestnut zonals are frequently present, along with the darker Rendzina soils of the Intrazonal group. Local climatic conditions and vegetation patterns can be correlated for the most part to the type of soil group likely to be present (Hunt 1972:87).

"Since soil characteristics and their area distribution may be regarded as a summation of natural forces and conditions" (Johnson 1931:66), it would be advantageous to describe the basic soil characteristics of the Rio Grande Plain region. Soils within the region are very similar to other areas of Texas, especially those of East Texas. But, while the soils commonly found in East

Texas are leached of their minerals and nutrients, those found on the Rio Grande Plain are not leached to a significant degree. This lack of leaching is principally due to relatively lesser amounts of annual rainfall (about 20 inches). Thus the soils of the region exhibit a continual accumulation of mineral nutrients, most notably calcium carbonate.

Accounts concerning the various soils which have developed in the Rio Grande Plain are available. One source describes 23 soils grouped under six divisions, based on distinctive soil features, topography and vegetation (Carter 1931:91-94). Since these divisions are used to characterize soils found in the 22,000,000 acres making up the Rio Grande Plain, it is reasonable to scale down the scope of inquiry for detailed soil descriptions.

Light-brown soils are predominant in the northwestern portion of the Rio Grande Plain (Carter 1931:101). Further, this portion of the Rio Grande Plain encompasses the area of immediate concern. Briefly stated, the soil characteristics of this area are: (1) development from calcareous parent-materials, mainly limestone, marl, or alluvial deposits of calcareous soil materials; (2) lack of heavy grass coverage; and (3) subsurface build-up of calcium carbonate layers. Native vegetation associated with the light-brown soils are "short grasses and scattered shrubs" (Carter 1931:101). Carter (1931:101) divides the light-brown soils into the following series: Maverick, Zapata, Ector and Uvalde.

Within the Chaparrosa Ranch in Zavala County (map 2), the soil complex can be more completely defined. Inspection of the soil survey report dealing with Zavala County reveals considerable soil type variation. For Zavala County alone, 32 soils have been described; these are also considered representative of the northwestern part of the Rio Grande Plain (Smith *et al.* 1940:13). Descriptions of all these and the remaining 27 soil groups are available in detail which cannot be approached here. One should consult Smith *et al.* (1940) for further detailed information.

The Chaparrosa area has been described as a gently sloping upland with some areas being nearly level (Arriaga 1974). The dominant soil type, Uvalde silty clay loam, is considered a member of the finely-silted, mixed, hyperthermic family of Aridic Calciustolls (Arriaga 1974). When profiled, this soil type is generally dark greyish brown, calcareous, silty clay loam from 10 to 20 inches in depth (the A1 horizon). The next horizon (B2), from 20 to 42 inches, is characterized by silty clay loam of a greyish brown to brown color. This horizon has a higher CaCO_3 content and is also considered more "clayey" (Arriaga 1974). From 42 to 64 inches, the soil color becomes a paler brown. Associated with this horizon, the C1, is a general increase in alkaline conditions and clayish soil. Highest CaCO_3 content (alkalinity) and clayish conditions are found in the last soil divisional profile, the C2. The Cca horizon extends from 64 to 80 inches in depth. Beds of limestone and chert gravel underlie the soil horizons just described.

The Uvalde soil series described above found on the Chaparrosa Ranch extend from the alluvial fans which flank the Edwards Plateau. They are found on the terraces of streams which drain the Edwards Plateau within Texas. Associated slope gradients are usually less than 1 percent but can range up to 3 percent (Arriaga 1974). Since the soil is formed in alluvium from limestone, there is an associated high percentage of alkalinity within the soil, usually in the form of calcium carbonate (CaCO_3). Ranges in alkalinity vary from "5 to 25 percent in the A horizon up to 40 to 75 in the C horizon" (Arriaga 1974). There is usually a rise in calcium carbonate content with increasing soil depth.

Johnson (1931:66) has noted the soils, topography and climate are interrelated features within the total environment of any area. Each one determines (to some degree) the characteristics of the other features, and together they form the environmental setting. However, biota must be included as another aspect of the environment which exerts influence upon and which is influenced by the other three environmental factors.

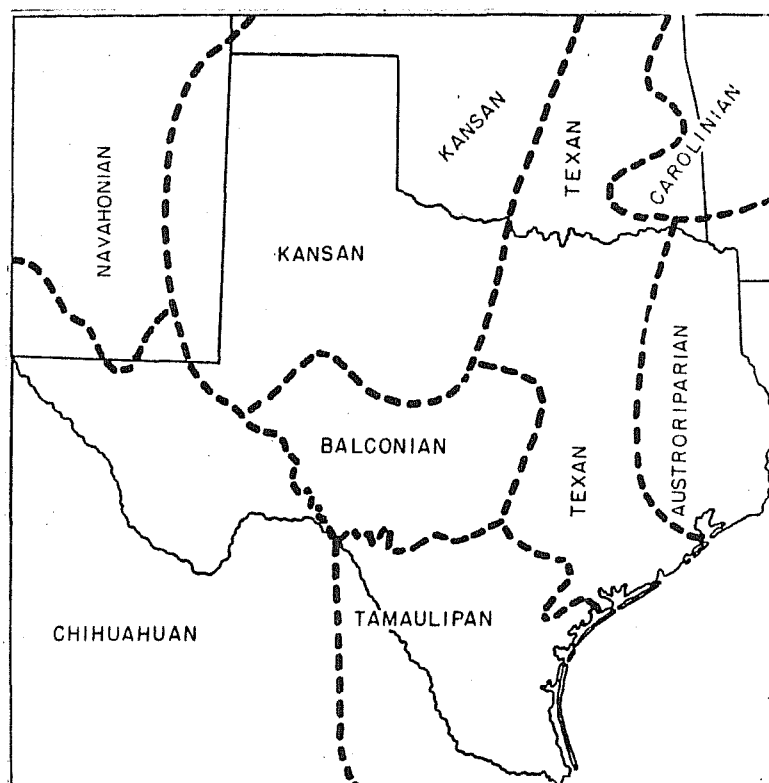
Biota

Blair's (1950:102-105) Tamaulipan biotic province encompasses most of the Rio Grande Plain area, and his data can be drawn on for a description of the flora and fauna characteristic of the region (see map 3). The dominant vegetation of the Tamaulipan province of Texas is thorny brush. Blair (1950:103) notes that this vegetation pattern begins just below the Balcones fault line and continues to the south across the Rio Grande into Mexico. When viewed from east to west, the brushland tends to thin out as available moisture declines. Plant species presently found in the Tamaulipan province include mesquite (*Prosopis juliflora*), certain species of *Acacia* and *Mimosa*, granjeno (*Celtis pallida*), lignum vitae (*Porlieria angustifolia*), cenizo (*Leucophyllum texanum*), white brush (*Aloysia texana*), prickly pear (*Opuntia lindheimeri*), tasajillo (*Opuntia leptocaulis*), *Condalia* and *Castela* (Blair 1950:103).

Describing floral components associated with the Uvalde silty clay loam soil series, Smith *et al.* (1940:14) indicate that the soil supports a

. . . grassland, on which a more or less thick growth of small trees and shrubs characteristic of a semiarid climate, has encroached. The grass cover is fairly thick in places and consists of curly mesquite, buffalo grass, certain species of grama, and some tobresa grass. There is a growth of scattered mesquite trees and of such shrubs as guajillo, soapbrush, false-mesquite, persimmon, lotebush and others.

Large trees such as live oak, pecan, elm, cottonwood and cypress presently populate river floodplains and stream courses. Many of the smaller stream valleys are characterized by stands of mesquite trees. Grama, buffalo grass, mesquite grasses--to name only a few--are found in the upland areas among the



Map 3. Map of the Biotic Provinces of Texas (from Blair 1950:98).

scattered growth of small trees and shrubs. Mesquite is the most widespread small tree here. Shrubs characteristically found in the upland areas include blackbrush, huisache, guajillo, black persimmon, false-mesquite (lambrush), catclaw, soapbrush or guayacan, lotebush, whitebrush, yucca, sangre de drago, prickly pear and other catci, and jointfir. This brush assemblage is commonly termed chaparral (Smith *et al.* 1940). Cenizo, creosotebush, saladillo, and alkali weed are present where local conditions are suitable.

Tamaulipan biota are well adapted to the semiarid and megathermal climate of the area (Thornwaite 1948). In quantitative terms, a moisture deficiency index ranging from -20 to -40 percent is regarded as characteristic of a semiarid and megathermal climate. Climatically, the south Texas plain is unique, as it is the only megathermal climate area in Texas and one of three located in the United States.*

According to Blair (1950:103-104), the vertebrate fauna within the Tamaulipan biotic province are characterized by a large number of "Neotropical" species and a group of grassland species which range to the neighboring Texan and Kansan provinces (see map 3). A few species from the Austroriparian province are also present. A total of 61 mammal species have been recorded in the Tamaulipan biotic province. In addition to the mammals, 36 species of snakes, 19 species of lizards, 9 of anurans, 3 of urodeles, and 2 species of land tortoises have been reported.

Blair (1950:104) describes in detail the distribution of Neotropical mammal species and other fauna within the Tamaulipan province (see also Blair 1952). Previous statements concerning regional flora and fauna are extended further by Holdsworth (1972). In "A Study of Modern Flora and Fauna in the Vicinity of the Holdsworth Site (41 ZV 14)," Holdsworth (1972) presents a summary of plant and animal species now living within the local site area. This in-depth view provides the best approximation of the ecological situation faced by the inhabitants of this site, and the possible ramifications of this study should be explored.

The vegetation patterns presently observed on the south Texas plain have not, however, been constant since the first human occupation of the area (Inglis 1964; Hester 1971). Prior vegetational shifts will be included as part of the paleo-environmental presentation.

*Southern Florida and the arid portions of southern California and southwestern Arizona are the other megathermal areas of the United States.

Paleo-Environment

Introduction

There is evidence of human occupation of the Rio Grande and the surrounding area for approximately the last 11,000 years (Hester 1975a, 1976a). Over this period of time, man has lived in environments quite unlike that of the present. It is therefore important to examine the available evidence for previous environments of the Rio Grande Plain. This review provides the background of climatic and concomitant biotic changes to which man has adapted.

Climate Change

Significant climate shifts have occurred in the general southwestern United States region since the end of the Pleistocene, considered to have occurred at about 10,000 B.P. (Butzer 1971:41). Ecological conditions present today have developed since the end of the Pleistocene. Climate, a significant part of the ecology, has fluctuated through time, probably in response to small changes of other variables (Bryson 1974). While intensive investigations concerning the paleo-environment of the Rio Grande Plain have not been conducted, neighboring areas, most notably the Trans-Pecos region of Texas, have produced useful environmental data directly pertaining to previous climates.

Based on the palynological data, Bryant and Larson (1968) have constructed a paleo-climatic model of the post-Pleistocene environment for the Trans-Pecos region of Texas. A more recent investigation in this area by Alexander (1970:7) provides the following interpretation:

In brief, pollen data collected from a number of localities in southwest Texas, but principally from three canyon and floodplain sites indicate a gradually increasing aridity from post glacial times (ca. 10,000 B.P.) to present. A pinyon-juniper (and perhaps oak?) parkland-savanna dominates the uplands until about 4000 B.P. when more xeric vegetation dominates the pollen spectra. A brief return to mesic conditions is seen at 2500 B.P., but dramatic shifts in climate are not in evidence.

It is most probable that this general climatic pattern occurred in the Rio Grande Plain as well. To the north, in central Texas, Bryant (in Valastro, Davis and Rightmire 1970:625) has outlined a climatic picture generally equivalent to Alexander's. Mammalian cave populations in Kinney County, Texas (south-central Texas), reinforce this pattern of general aridity being interrupted "at least once by a period of increased moisture" (Semken 1967:10). Studies of Late Pleistocene and Holocene faunal assemblages in central Texas also point to climate conditions of increasing aridity in the last 10,000 years (Lundelius 1967). As can be expected, climate shifts will necessarily cause some corresponding changes in the biotic community of the area.

Biotic Change

The biotic structure of the Rio Grande Plain has also changed within the last 11,000 years. However, a quantification of this change would be highly tenuous, given the present evidence. The major change within this time period has been the introduction and subsequent domination (by the 19th century) of thorny brush in most areas. The most notable protagonist of this "invasion," as it has been termed, is mesquite. This type of thorny brush is a relatively recent phenomenon, first present perhaps no more than 300 or 400 years ago (Bogusch 1952; Johnston 1963; Harris 1966). Considerable research for the origin and cause of this abrupt takeover has as yet revealed no clear details (Inglis 1964). The change was probably induced, or at least aided, by human activity. Field clearing, fencing, grass fire suppression, and short term climate fluctuations are now recognized as important factors leading to the mesquite invasion of the area (Harris 1966; Wells 1970). This recent change in the flora obscures the Late and post-Pleistocene environments which once existed on the Rio Grande Plain.

Bryant (1970), working in central Texas, has reported the environment of that area was a "parkland" in the Late Pleistocene period. In addition, mastodon and mammoth remains in southern Texas point to the presence of both grassland and forest areas during the Pleistocene (Hester 1971:2). The previously noted climatic shift toward aridity affected both flora and fauna of the Pleistocene to the extent that grasslands increased at the expense of the forests, thus forming a savanna environment in the post-Pleistocene (Hester 1971:2). The floral environment encountered by early peoples was most probably divided into the two ecological zones which can still be distinguished today. One of these can be termed the upland zone. This zone is "rather open" and has a "plant community dominated by mesquite and other thorn brush, grasses and prickly pear" (Hester 1971:1). The other zone, the floodplain, is associated with rivers and their tributaries. Hester (1971:2) notes that the floodplains "are often infested with mesquite, but have forested areas of oak, ash, elm, hackberry and pecan in riparian zones along the stream courses."

Obviously much more research is needed to further define the ecological picture of the Pleistocene and post-Pleistocene periods. It is still necessary to rely upon data drawn from neighboring areas to construct a complete environmental model for the Rio Grande Plain. Given the data at hand, the general picture of the paleo-environment reveals an area dominated by both savanna and forested zones of vegetation. The forested zone is centered primarily along the stream and river channels while the savanna covers the areas away from the watercourses (Hester 1971:2). Temperatures during this period were probably not significantly different from those presently reported for the area. Hester (1971:3) succinctly outlines the faunal component of the paleo-environment as follows:

The fauna were similar to those of today though habitats have no doubt been altered by historic farming and ranching practices. Notably absent from contemporary fauna, but present in the early post contact and prehistoric periods are bison, antelope and bear. Bison may have been restricted to the northern fringes of the region (Inglis 1964) and are excellent indicators of the former savanna conditions.

Analyses of faunal remains recovered from excavated and tested Late Prehistoric sites in Zavala County have contributed information regarding both the possible aboriginal subsistence regime and the possible change in savanna conditions. The emerging picture indicates that a large variety of animals were utilized as food. One site contained 26 different faunal species (Hester and Hill 1975b). Preferred large game were antelope and deer; smaller game, such as rabbits and a variety of rodents, were also taken. Riverine fauna were not neglected, since remains of turtles, frogs and fish have been recovered (Hester and Hill 1975b). This variety of faunal utilization indicates that the aboriginal inhabitants frequented a corresponding variety of "microenvironments" (upland, floodplain, riparian, aquatic) all relatively close to "their streamside camps" (Hester and Hill 1975b:17).

The reported occurrence of certain mammal remains in many sites has been shown to be correlated to vegetation shifts (Hester and Hill 1975b; Hester 1971, 1975c). Noteworthy in this respect are bison and antelope, both of which are no longer present in the area. Both mammals are usually found in short grass biotic communities (Gilbert 1973:60). Their existence in prehistoric contexts indicates that the present "mesquite brushland environment" of this part of the Rio Grande Plain was more savanna-like during prehistoric times (Hester and Hill 1975b:17). This position has also been taken by range and wildlife ecologists (Price and Gunter 1943; Inglis 1964).

Along with the overall indication of a prior savanna environment, there are early Spanish and Anglo accounts (Hester 1971:3) which point to the fact that surface water was more plentiful in prehistoric times. Numerous perennial streams and springs mentioned in these sources had failed by the middle of the 20th century, due to lowered water tables "resulting from watershed destruction and deep well irrigation" (Hester 1971:3).

A clear sequence detailing the floral and faunal changes during the last 10,000 years is still unavailable. Contrasting terminology and research results have led to a general conflict concerning the reasons and facts concerning biotic changes on the Rio Grande Plain. No attempt can be made (in this thesis) to weigh the many sides of the issue and arrive at a satisfactory synthesis.

III. THE ARCHAEOLOGICAL BACKGROUND

Introduction

It is best to consider the known archaeological sequence for the Rio Grande Plain in light of the overall outline as put forth by Suhm, Kreiger and Jelks (1954). According to this framework, four cultural periods are represented within Texas: the Paleo-Indian, Archaic, Late Prehistoric and Historic. The temporal parameters given for each period within the Rio Grande Plain have been adapted from Hester (1974d). Problems which arise when one considers the prehistory of the Rio Grande Plain stem from one fundamental source: paucity of long-term prehistoric research in most areas for almost all the periods considered. It is beyond the scope of this study to synthesize all the known archaeological sites and the associated material found within southern Texas. Such syntheses already exist (Sayles 1935; Suhm, Kreiger and Jelks 1954; Kelley 1959; Campbell 1960; and Hester 1975a) and can be referred to for a more complete picture of the regional prehistory. Such "pictures" should, however, be examined in light of an observation by Hester (1971:1):

Archaeological work has been sporadic in the region, with most activity occurring within the past 10 years. Some small areas are now known in some detail, but vast portions remain to be studied.

The archaeological record has recently been supplemented by contract-related work within the region. Though hindered by the lack of a firm chronological sequence, these reports nonetheless contribute much needed descriptions of the variety of cultural resources in the region and generate new ideas for further archaeological exploration and testing. Such work includes Nunley and Hester (1975), Wakefield (1968), Hester and Bass (1974), Shafer and Baxter (1975), Hester *et al.* (1977) and Mallouf, Fox and Briggs (1973). Hester (1974b) has described the problem-orientation of his recent work in Zavala County. Though smaller in scope, many non-contract related reports have concentrated on describing archaeological resources through surface reconnaissance and/or limited test excavations (cf. Hester, White and White 1969; Nunley and Hester 1966; Prewitt 1974; Varner 1968; and Weir 1956).

Paleo-Indian Period (9200-6000 B.C.)

Scattered surface remains of distinctive projectile points (many of them fluted) associated temporally with this period occur within the Rio Grande Plain and adjoining areas (Arguedas and Aveleyra 1953; Enlow and Campbell 1955; Hester 1966, 1967, 1968a, 1968c, 1971, 1974a, 1975a; Hester and Hill 1971b; House 1974; Mitchell 1974b; Mitchell and Winsch 1973; Orchard and Campbell 1954; Weir 1956). An excellent synthesis of the evidence concerning the Paleo-Indian occupation in Texas may be found in Hester (1976a).

For the initial portion of this period, evidence consists primarily of *Clovis* and *Folsom* projectile points. While no distinctive distributional patterns can be constructed for the lithic material associated with the Paleo-Indian period, Hester (1971:3) has noted some general geographical patterns for projectile points:

The greatest concentration of *Clovis* points are found in the northern part of the Rio Grande Plain. *Folsom* specimens . . . are present in the south.

Since sea levels were lower in the Late Pleistocene period, Hester (1971:3) believes that much of the evidence for early human occupations may now actually lie below water on the continental shelf. However, there is some additional evidence (beyond scattered projectile point finds) which can be assigned to this period.

For example, near the Texas coast on the Berclair terrace, Sellards' (1940) excavations revealed early point styles in apparent association with a variety of extinct fauna. In addition, evidence of association between mammoth remains and human artifacts has been reported for the Falcon Reservoir located on the lower portion of the Rio Grande (Hester 1971:3). Hester (1971:3) reports a site near Corpus Christi, on Oso Creek, in which a large mineralized bone point (suggestive of those characteristic of the Llano Complex kill-sites) was loosely associated with extinct elephant remains (cf. Haynes 1966).

Until very recently, no Paleo-Indian occupation sites had been reported within south Texas. However, excavations conducted at the St. Mary's Hall site (41 BX 229) have exposed occupational material assigned to the Paleo-Indian period (Hester 1975a, 1978). Underlying a compressed Archaic deposit, *Folsom* and *Plainview* artifacts have been excavated in association with "bone tools, faunal remains (mainly deer-sized mammals), lithic debris, and fragmentary preforms" (Hester 1975a:3). Percussion flakes, pressure flakes, and bifacial thinning flakes have been recorded from the same geological stratum as the Paleo-Indian artifacts (an alluvial deposit of small gravels in a reddish brown clay matrix labeled as Stratum III; Hester 1975a).

Clovis points, associated in certain sites with mammoth remains, have been assigned a temporal position between 9500 and 9000 B.C. Other fossil faunal species from this time span (and also now extinct) include the camel, horse, and bison (Haynes 1966:107). With the subsequent disappearance of species of mammoth, camel and horse, a now extinct species of bison became the focus of human hunting activities. From a general time period between 8500 and 7000 B.C., *Folsom* points dominate the tool kit used to kill bison. After this period new varieties of projectile points came into use. Lanceolate points and stemmed dart points such as *Plainview*, *Plainview golondrina*, *Angostura*, *Meserve*, *Milnesand*, *Lerma* and *Scottsbluff* are common varieties which have been reported from the Rio Grande Plain (Hester 1971). Recovery of such projectile points indicates more extensive aboriginal occupation in the area during the latter part of the Paleo-Indian period. As Hester (1971) points out, the lack of clearly stratified Paleo-Indian sites in the Texas Rio Grande Plain necessarily dictates comparison with points forms and associated tools excavated under tighter chronological control from neighboring areas of Texas and Mexico. For Texas, both Alexander (1963) and Sorrow, Shafer and Ross (1967) provide comparative evidence from central Texas. MacNeish's (1958) investigation in the Sierra de Tamaulipas furnishes dated Paleo-Indian materials from northeastern Mexico for comparison and chronological correlation. Additional comparative information concerning the Paleo-Indian period from other regions of Texas close to the Rio Grande Plain includes Bonfire shelter, a kill-site in Val Verde County (Dibble and

Lorrain 1968), Montell Rockshelter in Uvalde County (Sellards 1952; Suhm, Kreiger and Jelks 1954), Kincaid Rockshelter in Uvalde County (Sellards 1952; Suhm, Kreiger and Jelks 1954), Baker Cave in Val Verde County (Word and Douglas 1970, Hester 1978), the Johnston-Heller site in Victoria County (Birmingham and Hester 1976), and Devil's Mouth in Val Verde County (Johnson 1964; Sorrow 1968).

Other areas within Mexico have also generated valuable data in this context. Epstein's (1969, 1972) work in Neuvo Leon has brought to light Paleo-Indian materials which have crystallized some reinterpretation of Paleo-Indian subsistence and technology (cf. Hester 1976a).

After describing the distribution of Paleo-Indian artifacts within the Rio Grande Plain, little can be conclusively said, due to the lack of clear evidence concerning the hunting of Pleistocene megafauna. According to Hester (1971) and Newton (1968), small, nomadic groups of non-specialized hunters and gatherers constituted the human population in the Paleo-Indian period on the Rio Grande Plain.

The question of whether or not this general type of subsistence regime lasted throughout the 3000-year period designated as Paleo-Indian cannot currently be answered. Broad theoretical pictures concerning the technology and subsistence pattern have been formulated for other areas during the later stages of this period (Late Paleo-Indian) (Mason 1962; Sollberger and Hester 1972). Citing the archaeological evidence for the Eastern United States, Mason (1962: 246) constructs an image of "involution" during the Late Paleo-Indian period. This involution is characterized by a "regionalization" of the Paleo-Indian artifact types which is probably due to a greater dependence and subsequent "adaptation to local food resources."

In an area closer to southern Texas, a somewhat similar statement has been forwarded by Sollberger and Hester (1972). With the loss of the megafaunal component in the environment, dependence shifted to vegetable materials to supplant small game kills. This adaptation can be seen in the archaeological record, especially at the Strohacker site of central Texas. Careful surface collection of this site adds to a growing body of data which demonstrates the presence of corner-notched and stemmed dart points in "both Paleo-Indian and pre-Archaic contexts in Texas" (Sollberger and Hester 1972:335). The evidence reviewed for Texas has now tentatively defined a pre-Archaic transitional phase (Sollberger and Hester 1972:335-337). Over a period of approximately 2500 years, between 6000 and 3500 B.C., new projectile points appear along with Late Paleo-Indian styles. There are three types: (1) corner-notched, expanding stem dart points, similar to the *Martindale* type; (2) stemmed dart points with concave bases (*Gower* type); and (3) corner-notched dart points similar to the *Uvalde* type. This sequence, as defined by Sollberger and Hester, still lacks specification in terms of associated lithic material. Clear evidence for the corresponding transition into the Archaic period in southern Texas has yet to appear.

Archaic Period (6000 B.C.-A.D. 1200)

As a distinct period, the Archaic has only been nebulously defined for the Rio Grande Plain. This situation arises from the lack of stratified sites associated with this period in time. In general, the Archaic is characterized by the appearance of dart points, which are believed to be technologically and morphologically separate from the preceding points associated with the Paleo-Indian period. Point types commonly recovered from this period are *Tortugas*, *Abasolo*, *Refugio*, *Langtry*, *Shumla* and *Almagre*, with *Tortugas* being the type most frequently encountered. Projectile point types usually associated with the Paleo-Indian period are also known to be present in eroded Archaic sites (*Plainview*, *Angostura* and *Scottsbluff*) but most investigators believe these to be either mixed via erosion or picked up by later aboriginals (Suhm, Kreiger and Jelks 1954:139; Hester 1968c:159). Other chipped stone artifacts known to occur in Archaic contexts are triangular and leaf-shaped knives, and side, oval and end scrapers. Ground stone tools such as manos and metates are recognized as part of the Archaic technology. As Suhm, Kreiger and Jelks (1954:140-141) note, based on tool types, the Archaic period of the Rio Grande Plain exhibits ties with almost all the neighboring areas of Texas and Mexico within the same time period. Descriptions of this period have, until recently, consisted of two foci, the Falcon and Mier. Neither of these complexes was ever clearly isolated and defined and Hester (1971) recommends dropping these terms, since they seem to only confuse what little is known archaeologically about the Archaic period in this area.

Evidence for the occupation of the Rio Grande Plain during the Archaic period is scattered and in many cases, incomplete. Up until the late 1960s, few field studies had been initiated dealing specifically with the Archaic. Within the last decade, however, attention has been drawn to the need for clearer archaeological definition of the Archaic period. At Falcon Reservoir, a living floor dated to this period was described by Hartle and Stephenson (1951). This floor revealed triangular and subtriangular dart points with various unifacial and bifacial tools, including *Clear Fork* gouges (Hester 1971). A radiocarbon analysis from organic material recovered on the floor indicated a date of 2700 B.C. (Krieger 1954:565). In Mexico, MacNeish (1958) has outlined the Archaic sequence for the northern Tamaulipas area. The archaeological data from his survey and excavation research resemble much of the scattered evidence recorded on the Rio Grande Plain and his divisions of the Archaic period can only be broadly applied to southern Texas. These divisions, the Nogales, Repelo, Abasolo and Catan Complexes, however, do little to describe human adaptations throughout the Archaic. Instead, the picture of an overall continuum of similar artifacts which are not significantly changed permeates the period (Hester 1971). As an example, Hester (1971) refers to a unique artifact tool type, the *Clear Fork* gouge, which is actually present in contexts associated from the Paleo-Indian period up to the Late Prehistoric period, a length of time which roughly approximates 10,400 years (from 9200 B.C. to A.D. 1200).

Integration of data from surrounding areas has changed the picture of Archaic subsistence and technology on the Rio Grande Plain (Hester 1976b). Throughout the period, dart points such as *Tortugas*, *Langtry*, *Shumla*, *Abasolo*, *Refugio*

and *Almagre*, show relationships to the Pecos River Focus to the west, while the presence of *Almagre* points indicates contact to the south in Tamaulipas (Suhm, Kreiger and Jelks 1954). According to Suhm, Kreiger and Jelks (1954), the above mentioned dart points are associated with the Falcon Focus, which they place chronologically between 5000 B.C. to A.D. 500 or 1000. The introduction of smaller yet morphologically similar points such as *Matamoros* and *Catan* and the much smaller arrow points of the *Fresno* and *Perdiz* variety marks the beginning of the next focus, Mier. The similarity of artifact types in these two foci makes them hard to distinguish. Suhm, Krieger and Jelks (1954: 142) regard the Mier Focus as being "transitional between Falcon Focus and the historic horizon. It might also be regarded as a late phase of Falcon Focus."

Investigators in the area, most notably Hester, have produced evidence for a clearer definition of the Archaic period. Again using projectile points as time-space markers, triangular and stemless *Tortugas* points are taken to indicate "Middle Archaic" occupations, followed temporally by the appearance of "smaller, notched forms" (*Ensor*, *Frito*) in the "late Archaic" (Hester 1974a:8). Associated radiocarbon dates for Late Archaic forms from the Zavala County area appear to cluster around A.D. 580 (Hester 1975a:8). A smaller, dart-like point with side notching, typed as *Zavala*, is also interpreted as indicating Late Archaic occupation. Unfortunately, artifactual evidence for other tools associated with Middle and Late Archaic point types has not yet been specified.

Although the nature of the Archaic occupations on the Rio Grande Plain is obscured by the lack of stratified contents and absolute dates, investigations are now underway to improve matters. A summary of the Archaic period in southern Texas (including the Rio Grande Plain) is now available (Hester 1976a). Studies concerning the aboriginal settlement patterning during this period have appeared for various areas and/or river drainages (Hester 1974b, 1975a, 1976b; Nunley and Hester 1966, 1975; Shafer and Baxter 1975; Shiner 1969). Archaic subsistence strategies (Hester 1975b; Hester and Hill 1971a, 1976b) and technological strategies (Hester 1975b; Hester and Hill 1971a; Nunley and Hester 1975; Hester, Gilbow and Albee 1973; Shafer and Hester 1971; Shiner 1969) are also being reconstructed. Additional information concerning some or all of the above-mentioned aspects of the Archaic lifeway is being contained in site reports (Hester and Hill 1972; Hill and Hester 1971; Mitchell 1974c; Schuetz 1966) and survey reports (Newton 1968; Nunley and Hester 1966, 1975; Weir 1956).

Late Prehistoric Period (A.D. 1200-A.D. 1528)

By contrast to the confusion associated with the Archaic period, evidence for the Late Prehistoric period occupations on the Rio Grande Plain is readily available. Suhm, Kreiger and Jelks (1954) indicated an apparent absence of a Late Prehistoric occupation in the area. However, since 1954 a significant number of single and multi-component sites for this period have been tested and/or excavated and subsequently reported. Zavala County stands out as a center of research dealing with Late Prehistoric subsistence settlement pattern

and technology. Hester and Hill (1975b) have compiled an important synthesis of the Late Prehistoric data in this area.

For Texas, the beginning of the Late Prehistoric is marked by the occurrence of new items in the cultural inventory. These new traits include arrow points, ceramics, and agriculture (Hester and Hill 1975b). Lack of research in the area of south Texas led to the erroneous conclusion that the Late Prehistoric period, as defined above, did not exist in the area (Suhm, Kreiger and Jelks 1954). This earlier view held

. . . that the peoples of this area, ancestors of historic Coahuiltecan groups, survived in an Archaic-style, hunting and gathering lifeway until historic contact. There was some indication from surface sites (in the form of arrow points of the *Perdiz*, *Scallorn* and *Fresno* types) that the bow and arrow had been used in the area. However, there was no substantial evidence for the presence of ceramics, alterations in settlement patterns, different subsistence activities, or other Archaic patterns (Hester and Hill 1975b:1).

With the description of a bone-tempered plainware ceramic tradition in a Late Prehistoric time span, related to the already known *Leon Plain* ware of central Texas, initial archaeological definitions for the south Texas area during the Late Prehistoric have been attempted (Hester 1975c; Hester and Hill 1971a, 1975b). Intensive excavations and survey work in Zavala and Dimmit Counties form the interpretative basis for this new definition (Hester 1970a, 1974c; Hester and Hill 1972; Hill and Hester 1973).

The archaeological evidence for Late Prehistoric sites from areas geographically proximal to the Rio Grande Plain remains fragmentary, especially when compared to the known information available for the lower Rio Grande (Hester 1975c:109-125). Data from one nearby region, termed the Chihauhuan desert area, has been summarized elsewhere (Hester 1975c:109-111), and there are

. . . similarities between the late prehistoric remains from the lower Pecos and the southeastern Trans-Pecos and the materials in southern Texas. Unfortunately, so little is known about the late prehistoric that we cannot go much beyond this generalization (Hester 1975c:121).

No cultural "complex" presently exists for the Rio Grande Plain, except near the coast. Two complexes which represent Late Prehistoric occupations have been defined for this coastal area. The Brownsville Complex, described by MacNeish (1947, 1958), is represented by a shell industry, triangular arrow points and possible ceramic artifacts and is generally in the Rio Grande delta (Hester 1971). On the central Texas coast, the Rockport Complex (Campbell 1960), with its various types of arrow points and an asphalt painted, sandy paste pottery, existed during the same time (Hester 1971:4). Corbin (1974) has recently summarized evidence for the Rockport Complex, noting that some re-evaluation in interpretation is necessary.

No similar Late Prehistoric complex has been defined for the south Texas interior (Hester 1971:4). Artifacts assumed to date from this period include a variety of arrow points, with *Perdiz*, *Scallorn* and *Fresno* the most frequently occurring types. *Zavala* points, which appear to be morphologically and technologically intermediate between arrow points and dart points, are often recovered in association with Late Prehistoric artifacts. It is believed that the *Zavala* type (which is very similar to Johnson's *Figueroa* of Trans-Pecos and *Trinity* of East Texas) functioned as arrow points (Hill and Hester 1971).

The Late Prehistoric lithic inventory also contains blades exhibiting lateral retouch, end scrapers (made from flakes), and perforators (Hester 1971), in addition to an occasional occurrence of plain bone-tempered ceramics (Hester 1968b; Hester and Hill 1971a). Hester and Hill (1975b) and Hester (1975c) describe items of lithic, ceramic and bone which are commonly found in the Late Prehistoric context. Most radiocarbon dates from these sites indicate a span of only 250 years (A.D. 1400 to A.D. 1650) (Hester 1975a; Hester and Hill 1975b). Tortuga Flat and 41 ZV 155 appear to have been inhabited into early historic times or about A.D. 1760 (Hester and Hill 1975b; Hill and Hester 1973). Despite the fact that this date seems to place Tortuga Flat outside Late Prehistoric temporal parameters, there is no evidence of historic contact (Hill and Hester 1973; Hester 1975c).

Because recent investigations have dealt with more (numerically) Late Prehistoric sites as compared with earlier sites, the information concerning settlement patterns, general subsistence, and technology is more readily available and more detailed (cf. Hester 1975c; Hester and Hill 1975b). This archaeological evidence indicates that environmental zones which closely flank stream channels were considered prime occupation areas by the aboriginal inhabitants. Large sites (approximately 3600 meters) with rich middens have been located and excavated in such areas. Midden material generally consists of large quantities of lithic tools, animal bone, land snail shells, charcoal, hearths and burned (fire-cracked) rock (Hester 1975a, 1975c).

Terraces located some distance from the streams supported two activities: workshop and occupation. Since these terraces frequently contain outcrops of chert and other knappable material, it is only natural that chipping stations and workshops should be located there. Most of the workshop sites were utilized for brief periods of time and were abandoned when the desired lithic materials had been obtained. Such sites contain "large amounts of flake refuse, partially worked cores, and broken preforms" (Hester 1971:66). Sporadically occupied, short-term campsites also are found in the terrace areas. These sites may represent overnight "stations" for extended hunting and/or gathering activities originating from the floodplain sites (Hester 1971:6). Occupation sites are also encountered in upland areas, above the terraces, and at considerable distances from water sources. Again, temporary or short-term habitation is indicated for these sites.

There are detailed statements concerning settlements and subsistence of the northwestern part of Zavala County (Hester 1975c; Hester and Hill 1975b). Most Late Prehistoric occupation sites occur on the floodplains of the Nueces River

and its tributaries. At least 12 major single and multi-component sites, including Mariposa, have been described and mapped for this area (Hester 1975a; Hester and Hill 1975b). Holdsworth (Hester and Hill 1972) and Tortuga Flat (Hill and Hester 1973) stand out as important published Late Prehistoric sites located in close proximity to Mariposa. Away from the Nueces River drainage, yet still within the Rio Grande Plain area, Oulline (41 LS 3) (Hester, White and White 1969), 41 ZV 153 (Hester *et al.* 1975), Stewart (Hester and Hill 1972) and Berclair (Hester and Parker 1970) sites also have provided published material concerning Late Prehistoric occupation of southern Texas.

Subsistence strategies have also been a focus of attention in the Zavala County area. Large land snails (*Rabdotus* sp.) and river mussels (*Unio* sp.) are found in great numbers and frequently clustered. Such patterning may indicate that snails were collected and extracted, perhaps by boiling (Hester and Hill 1975a, 1975b).

Along with invertebrate remains, vertebrate remains are also present at many Late Prehistoric sites. Diversity of species seems to be typical, for as many as "twenty-two different species of mammals and reptiles" were recovered from a "bone pile" at 41 ZV 155 (Hester and Hill 1975b; Hester *et al.* 1975). The Holdsworth site, in one locality, contained 21 species.

While the archaeological record indicates that many types of animals were being utilized, it is also evident that patterns of "preferred" food sources had been established. Among the larger mammals, deer and antelope were sought instead of bison (Hester and Hill 1975b:17), although bison was utilized. Rabbits and rodents constitute the major components in the small mammal category (Hester *et al.* 1975). Turtle, snake and frog were favorite reptilian species obtained by the aboriginal population, with the box turtle (*Terrepenne ornata*) the most commonly occurring species (Hester and Hill 1975b).

The natural deterioration of evidence through time inhibits statements concerning the gathering activities of the Late Prehistoric populations. Two sites have produced data which can shed some light on the matter. It appears that acorns and spiny hackberry (granjeno) seeds were obtained by the inhabitants of Holdsworth and 41 ZV 10, respectively. Both samples have been burned (Hester and Hill 1975b).

Riverine areas close to the occupation sites probably provided the majority of animal food resources (Hester and Hill 1975b). Upland areas were utilized when larger mammals (deer, bison, antelope) were being sought.

Historic Period (After A.D. 1528)

Cabeze de Vaca's journey across Texas marks the beginning of the Historic period. His entrance is generally thought to have occurred around A.D. 1528. Spanish influence in southern Texas gradually culminated in the local Indians being either killed, missionized, or assimilated into Spanish-Mexican groups. Not to be overlooked, though, is the large number of ethnohistorical accounts which also resulted from the Spanish and Anglo occupation.

Only a few archaeological sites exist which can be attributed to the Historic period, aside from Indian occupations at the several Spanish Colonial missions in southern Texas (Hester 1975a). Historical material remains from those sites external to the missions are scattered and "include glass trade beads and metal projectile points" (Hester 1975a:11; see also Hester 1970b and Mitchell 1974a). The cultural assemblage associated with the mission Indians has been described by Schuetz (1969).

The aboriginal populations living away from the Spanish missions have been described primarily from ethnohistorical accounts rather than from archaeological excavations. Whether or not such information is adequate for cultural descriptions of the native peoples is a question which cannot be satisfactorily resolved at present. Disease and expansionist pressures from the south doubtlessly altered the structure, technology, and subsistence patterns of these populations prior to actual Spanish settlement of south Texas (Campbell 1975).

Newcomb (1961:29) has included the Rio Grande Plain of southern Texas within the Western Gulf culture area. Semi-nomadic hunting and gathering groups, labeled as "Coahuiltecan," occupied the interior region of southern and southwestern Texas. Coahuiltecan, a loosely applied linguistic term which encompasses many smaller distinct groups of both southern Texas and northeastern Mexico, was first used by J. W. Powell in the 1800s (Troike 1962:57).

Until recently, the description of Coahuiltecan culture has generally included all the various subgroups in one larger category. Such a classification obscures specialized adaptation to limited microenvironments. Studies concentrating on the smaller, local groups are now appearing (cf. Campbell 1975).

Briefly, the small bands of Coahuiltecan speakers were semi-nomadic, probably moving with the changing seasons. Large and small mammals, fish, reptiles, and plant materials (especially mesquite and cacti) were obtained when and where available. Other important cultural aspects have been published elsewhere (Newcomb 1956, 1958, 1961; Ruecking 1953, 1954, 1955a, 1955b; Skeels 1972; Troike 1962); these sources should be consulted for more detailed descriptions of these groups. To complicate matters, Nunley (1971) feels that current interpretations of the historic Coahuiltecan are over-generalized, causing erroneous conclusions. Attempts have also been made to reconstruct prehistoric subsistence patterns from contemporary situations (Hill, Holdsworth and Hester 1972).

IV. THE MARIPOSA SITE

Physical Dimensions and Definitions

The Mariposa site (41 ZV 83) parallels the east bank of Turkey Creek on the Chaparrosa Ranch in northwestern Zavala County, Texas (maps 2 and 4). Turkey Creek is a tributary of the Nueces River, one of the major streams draining the Rio Grande Plain. Since Mariposa is located adjacent to a stream channel, it is termed a floodplain site (Hester 1971). In contrast, terrace sites within the same region are situated some distance away from a stream channel and are usually located at a somewhat higher elevation.

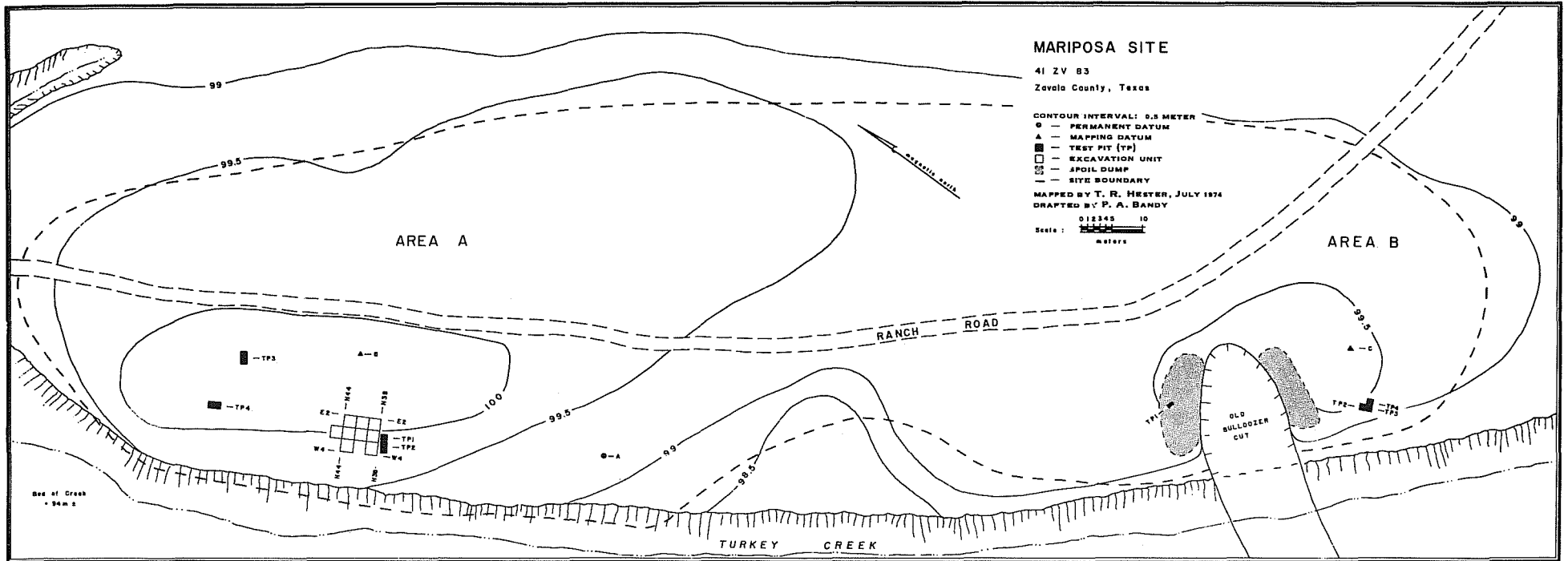
Horizontally, Mariposa encompasses over 200 meters which parallel Turkey Creek in a general north/south line. The site extends eastward away from the creek bank about 30 meters. Overall the horizontal area of Mariposa contains approximately 6,000 square meters.

Taken as a whole, the site is almost level except near the present creek bank along the western edge of the site. Mariposa is located on a long knoll and has two clear areas where sheet erosion and gulying (in the southern part of the site) have exposed cultural debris and artifacts. There is a thick brush area along Turkey Creek and to the east of the site on the floodplain. Vegetation present on the site includes guayacan, granjeno, white brush, allthorns, catclaws, Texas persimmon and guajillo. Woody vegetation, mostly oak and white ash, is prominent on the creek bank. The creek area supports the densest vegetation near Mariposa (Hester n.d.).

Outline of Previous Investigations

Three separate investigations of Mariposa have been made in the span of five years. In 1970, preliminary site testing directed by Hester was achieved by excavating two test pits. Test Pit 1 measured 1 x 1 meter and Test Pit 2 measured 1 x 2 meters--both were located in the west central portion of the site (map 4). Each test pit was shovel excavated by 20 cm levels and all material was screened by passing dirt through 1/4-inch hardware screen. All lithic material (flakes and artifacts), most of the complete snail shell specimens, all mussel shell, all retrievable charcoal, and some burned rock samples were collected and bagged for each unit level. Profiles, along with soil and pollen samples, were obtained from the north wall of Test 2. The 1970 investigations determined that Mariposa contained substantial archaeological debris (burned rock, land snail shells, chert flakes) buried in alluvium to a depth of one meter. Only faint traces of definable stratigraphy were noted. Attempts to analyze the collected pollen samples were not successful, but three radio-carbon dates were secured.

The second investigation at Mariposa (a University of Texas archaeological field course directed by Hester) occurred during the summer of 1974, and initial results of this excavation have been published (Hester 1974c). Nine two-meter squares were opened near the center of the site and carefully excavated in five-centimeter levels. One major objective was to achieve a view of the horizontal



Map 4. Topographic Map of the Mariposa Site, 41 ZV 83.

distribution of cultural remains within the site (adjacent to the earlier Tests 1 and 2). With this in mind, excavation proceeded for the most part with trowel and brush, with all artifacts being mapped prior to removal and bagging. The recorded materials obtained from this investigation form the bulk of the analyzed data of this thesis. One test pit in Area A (TP3) and four test pits in Area B (TP1-TP4) were also completed along with the excavation.

The third and final investigation at Mariposa occurred in July of 1975. The writer, assisted by Charles Moffat and Irma Richie, returned to test another area of the site, TP4. A 1 x 2 meter test pit in Area 4 was excavated to a depth of 60 cm, in 15-cm levels. While there was only sparse evidence of lithic materials, a substantial hearth was revealed at the deepest level of the test (60 cm below the surface). Preliminary analyses of this test pit excavation have been prepared (Montgomery, Moffat and Richie 1975).

Excavation Methodology

Hester (1974c) has presented a statement concerning the excavation methodologies utilized at the Mariposa site. Initial testing in 1970 provided only a brief indication of the archaeological materials present, along with an estimate of the age and cultural affiliation of the site. The 1974 excavations were initiated with two objectives in mind. One objective was the recording and subsequent definition of intrasite artifact patterning. Variability in the archaeological record of spatial patterning could only be recorded by a horizontal excavation orientation. To this end, nine two-meter squares were excavated, each by five centimeter levels. Such a technique would "obtain a view of the horizontal distribution of cultural remains in one portion of the site" (Hester 1974c:19). Each excavation unit retained ten centimeter balks and the southeast corner stake (relative to grid north) was considered the datum for the associated unit. As each five centimeter level was excavated, all materials were left *in situ* and mapped. Small objects (such as small chert chips, fragmentary snail shells, etc.) were bagged and labeled from the appropriate unit level quadrant. This excavation and recording process resulted in a series of "distribution maps" (Hester 1974c) which reflect the spatial relationship among artifacts. Further discussion of these relationships will be presented in "Intrasite Patterns."

A metal pipe (Datum A) was established as a permanent datum point in the middle of the site on the first field day of the 1974 excavations. Datum B, in Area A (see map 4), served as the reference point in constructing a site grid for accurate provenience control. Subsequent to the Datum A placement, the site was cleared of vegetation and a contour map was prepared using a telescopic alidade and plane table.

Vertical provenience was recorded in relation to a datum plane with an assumed elevation of 100 feet. This datum was established at Datum B. Accurate vertical provenience facilitated completion of the excavation's second major objective: projectile point sequence. Hester (1974c) has documented the general results of Mariposa's projectile point sequence.

After field work was completed, the bagged artifacts and materials were stored in San Antonio. This material was then turned over to the author, who cleaned, labeled and cataloged that portion of the site's material which had not been processed. Cataloging and labeling the excavated material followed these procedures:

1. Each quadrant within a level of every separate excavation unit was assigned a unique lot number.
2. All similar materials within one lot (burned rock, gastropod shells, flakes) were grouped together and bagged.
3. Materials within a lot "bag" were labeled with the site number (41 ZV 83), lot number, provenience information, excavation date and material description.
4. All worked artifacts were individually labeled with permanent ink in the following manner:

41 ZV 83
<u>Lot # A #</u>

A separate artifact sheet was maintained for these items, listing all metric attributes, qualitative description, and provenience information. Projectile points were similarly labeled, with a P number instead of an A number. A projectile point sheet was also maintained which recorded pertinent quantitative and qualitative data.

These procedures produced catalog sheets describing all materials recorded for each lot provenience and associated data on all artifacts prior to analysis.

Site Morphology

Two profiles are available from Mariposa for use in this study. In Test 2 (dug in 1970), a profile of the northern wall was prepared. Examination of this profile indicates that four strata can be distinguished. The first 45 cm below the surface, designated Stratum 1, is composed of fine (alluvial) grey-brown, clay-loam soil. Scattered burned rock, flint flakes, mussel shell fragments, gastropod shells, and scattered charcoal occur in this level. Cultural material is densest in the first 20 cm, with two projectile points (*Scallorn* and *Frio*) and one projectile point fragment being recorded (Hester n.d.). From 45 cm to 80 cm below the surface, an increasingly granular and browner clay-loam soil constitutes Stratum 2. Cultural debris such as burned rock and flake fragments increases in comparison to the lower portion of 1. A large charcoal concentration was encountered and a projectile point basal fragment (*Kinney*) was recovered. Indicators of occupation are strongest in the upper part of this stratum. The division between Strata 2 and 3 is ill-defined, with 3 lying generally 80

centimeters to 100 centimeters deep. Lower portions of Stratum 3 exhibit increasing clay content. The depth of Stratum 3 slopes for 90 cm at the western extreme of the profile to 110 cm at the eastern edge. Burned rock, charcoal and scattered flakes occur in this brown granular clay-loam soil stratum. Stratum 4 underlies Stratum 3 and has been recorded to a depth of 140 cm in the eastern half of Test 2. Composed of compact and hard tan clay, this stratum contains a few burned rocks and is considered to be culturally sterile.

Excavations in 1974 produced the other profile from Mariposa. Using the north wall of N38/W2, a slightly different profile picture was obtained (see Fig.1). Here the initial five centimeters were termed Stratum I. This layer of reworked colluvium was laminated at the stratum bottom, with blocky to wind-blown dust occurring above the laminated bottom up to the present surface. Color is light brown to tan when wet and brown-grey when dry. Lying beneath Stratum I to a depth of 50 cm is Stratum II. Stratum II is a layer of silty clay-loam filled with alluvial deposits and organic material. The greatest amount of cultural material in the excavation occurs in this stratum. Stratum II is characteristically grey to grey-brown in color. From 50 cm to 135 cm below the surface, a yellow to tan clay layer is observed. This layer, termed Stratum III, is marked by an increasing clay content with increasing depth and a corresponding decrease in cultural materials. The Stratum II-III boundary is very ill-defined.

The two profiles from Mariposa depict somewhat different conditions concerning the depth of cultural deposits. Test 2 (1970) produced more material at a greater depth than the 1974 profile, as well as more varied stratigraphic relationships (four instead of three strata). However, considering the somewhat obscure boundary between Strata 2 and 3 in the 1970 profile, there is probably no great difference between the profiles.

Diagnostic materials encountered in both profiles indicate both Archaic and Late Prehistoric occupations for Mariposa. The first 30 cm below the surface in the 1974 excavations revealed *Perdiz*, *Seallorn* and *Zavala* points. Both Archaic (*Frio* point) and Late Prehistoric (*Seallorn* point) materials occur in the initial 20 cm of deposit in the Test Pit 2 profile and a possible *Kinney* point fragment (Archaic) was recovered 40 to 60 cm below the surface. Indicators of Archaic occupation at Mariposa are especially strong in Area B, where several Archaic projectile points were recovered from eroded contexts.

As will be stated in the following section, projectile points in south Texas are not concrete time markers. Such being the case, more work at Mariposa will necessarily have to be done before statements can be generated concerning possible Archaic occupation(s) at Mariposa. However, within Stratum 1 of the 1970 profile and Strata I and II of the 1974 profile, a definite Late Prehistoric occupation, concentrated in the upper 30 cm of the deposit, has been demonstrated (Hester 1974c).

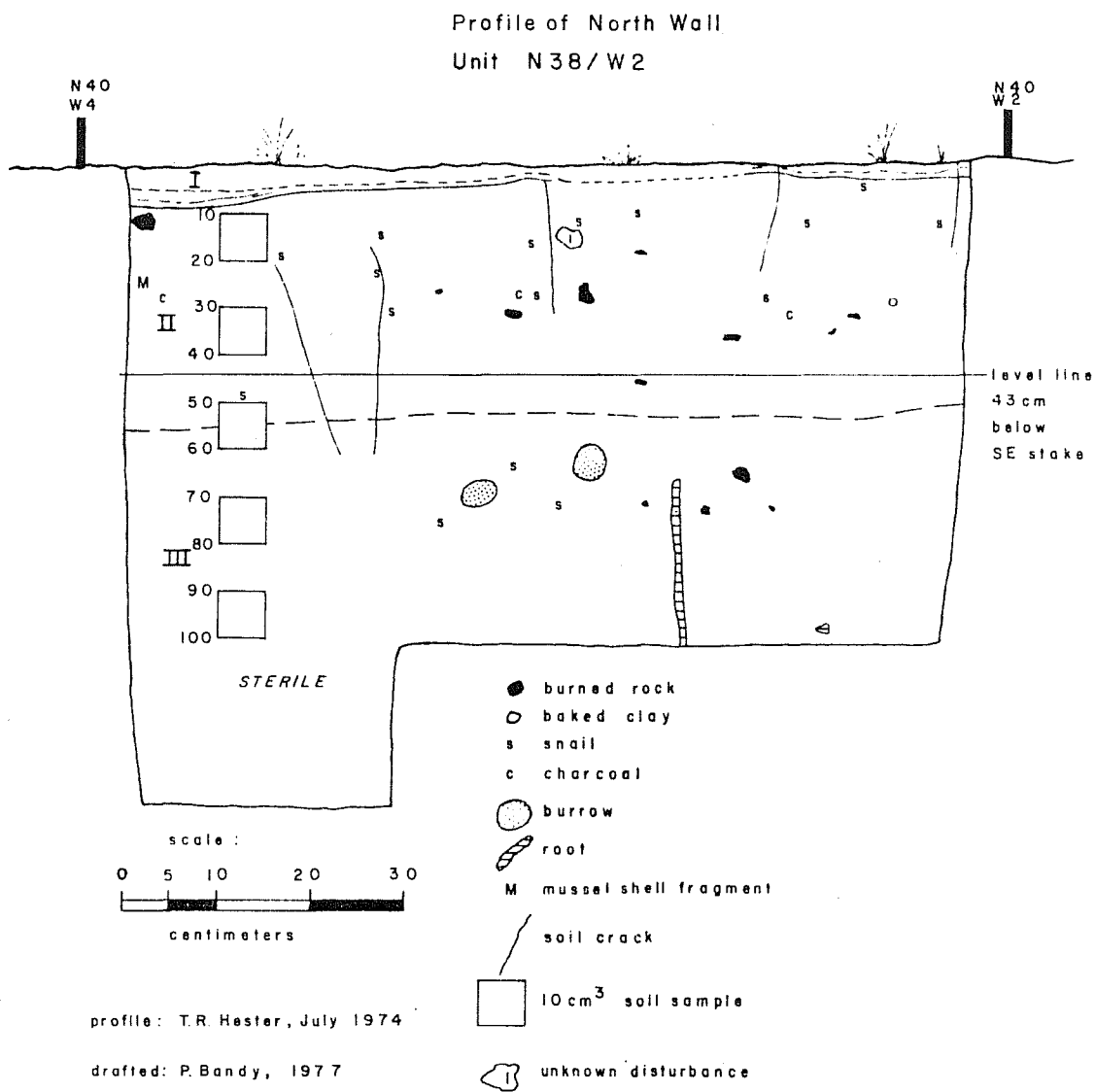


Figure 1. North Wall Profile, Unit N38/W2, 41 ZV 83.

Radiocarbon Analysis

Typological (relative) and chronometric (absolute) dating are the techniques most commonly used for dating sites in south Texas. In the majority of cases, typological comparisons rested upon already established projectile point sequences in central Texas (Hester and Hill 1975b:18). However, recent excavations in southern Texas have cast doubt on cross-dating south Texas projectile points (see Hester and Hill 1975b:18) with similar central Texas projectile points, making necessary the use of other dating methods for more accurate results.

Fortunately, radiocarbon dates are becoming available at many sites in southern Texas. This allows definition of the temporal parameters of many sites, including Mariposa. Hester and Hill (1975b:19) have previously reported the results of radiocarbon dating at Mariposa (41 ZV 83). Level 3 of the site has been dated at A.D. 1430 (sample Tx-1526) and a hearth at the same level was dated to ca. A.D. 1650 (sample UCLA 1821D). Still deeper, at level 4, a date of A.D. 620 (UCLA-1821E) was obtained. These three radiocarbon determinations form the known time limits of the Mariposa occupation(s).

It must be pointed out that the levels used for the radiocarbon dates are not the same levels used in the 1974 excavations. Each level of Test Pit 2 (1970) was 20 cm, while the 1974 excavations proceeded by 5 cm. Implications for this will be explored further in this section.

The earliest occupation of the site can be documented at around A.D. 620 and the latest occupation took place sometime near A.D. 1650 or later. Radiocarbon dates and sample descriptions from the Mariposa site are presented in Table 1.

Recognizing that Mariposa was possibly occupied for approximately 1,000 years (A.D. 620-A.D. 1650) poses some immediate problems. First, the earliest possible occupation of Mariposa falls in the Archaic Period (6000 B.C.-A.D. 1200). Second, the Late Prehistoric dates recovered from Mariposa are stratigraphically deep (40-60 cm below the present surface) and the 1974 excavations did not extensively sample to this depth. The majority of the 1974 excavation units penetrated only 25 cm below the surface. While no estimate of elapsed time has been prepared for the soil deposition between the dated soil level and the excavated, it is possible that the documented occupation of Mariposa may be quite close to historic times. Evidence for European contact, however, was not produced from site excavations.

Data necessary for solving the first problem are not yet available and will not be until excavations penetrate deeper into the site. This necessarily depends on whether or not future excavations are initiated at Mariposa. Resolution of the second problem also cannot be achieved without absolute dates associated with the upper 30 cm in Stratum I and II (1974). Thus, the excavated material from the Mariposa site must be considered to date past A.D. 1430 at this stage of the investigation.

TABLE 1
RADIOCARBON DATES FROM 41 ZV 83 (MARIPOSA SITE)

	Years B.P.	A.D.	Corrected*
TX-1526	430 \pm 60	1520	1430
UCLA-1821D	"not older than 300 years"	1650	1650(?)
UCLA-1821E	1400 \pm 100	550	620

*Corrections added according to Hester and Hill (1975b).

V. THE CLASSIFICATION SCHEME

Before turning to the material excavated from Mariposa, a brief review of the classification scheme will be presented. All lithic and metal materials (except burned rock) which had been altered by human activity (artifacts) were divided into three classes, based on the technological processes which produced them. Artifacts produced by the chipping (flaking) of siliceous materials are classed under chipped stone. This flaking or chipping is a process which results by removing material from the "objective piece by pressure, percussion, indirect percussion or the combination of pressure and percussion" (Crabtree 1972:65).

The second class of materials is also lithic, but these artifacts have been modified by processes of grinding, battering or polishing. Battering is produced by a specific use of the percussion technique, where "overlapping superimposed cones" are sought to shape the material (Crabtree 1972:80). Rubbing an object with abrasive material will, over time, produce either a smoothed or polished surface. If a glossy surface results, the process may be termed polishing. This occurs on only one artifact from Mariposa. Ground stone artifacts are also produced by abrasive action, but the smoothed surfaces of these artifacts do not exhibit gloss or sheen.

The third major class of materials was produced by a metal technology and therefore is probably not aboriginal. Only one such artifact was recovered from Mariposa.

Two of the three material classes of artifacts from Mariposa are divided into artifact groups which fall in each class. Only brief descriptions and reasons for division will be presented here. A more detailed examination of the artifacts is contained in the following chapter. All illustrated artifacts are drawn and photographed on a 1:1 scale. Artifacts were smoked with ammonium chloride before being photographed.

Chipped Stone

A morpho-technological division of these materials is presented graphically in Fig. 2. The first division is technological, separating chipped stone products from chipped stone by-products and from cores.

By-Products

Chipped stone by-products result from the reduction of lithic material to finished tools. The smaller (usually) debris caused by the chipping reduction is called by-products, or flakes and flake fragments. By-products may be altered or unaltered, another technological distinction. Unaltered by-products are composed of identifiable flake forms and flake fragments. Flakes which exhibited typical characteristics (bulb of force, compression rings, etc.) are further classified and subjected to analysis later in this chapter and thesis. Flake fragments were only counted, since they held no identifiable flake characteristics.

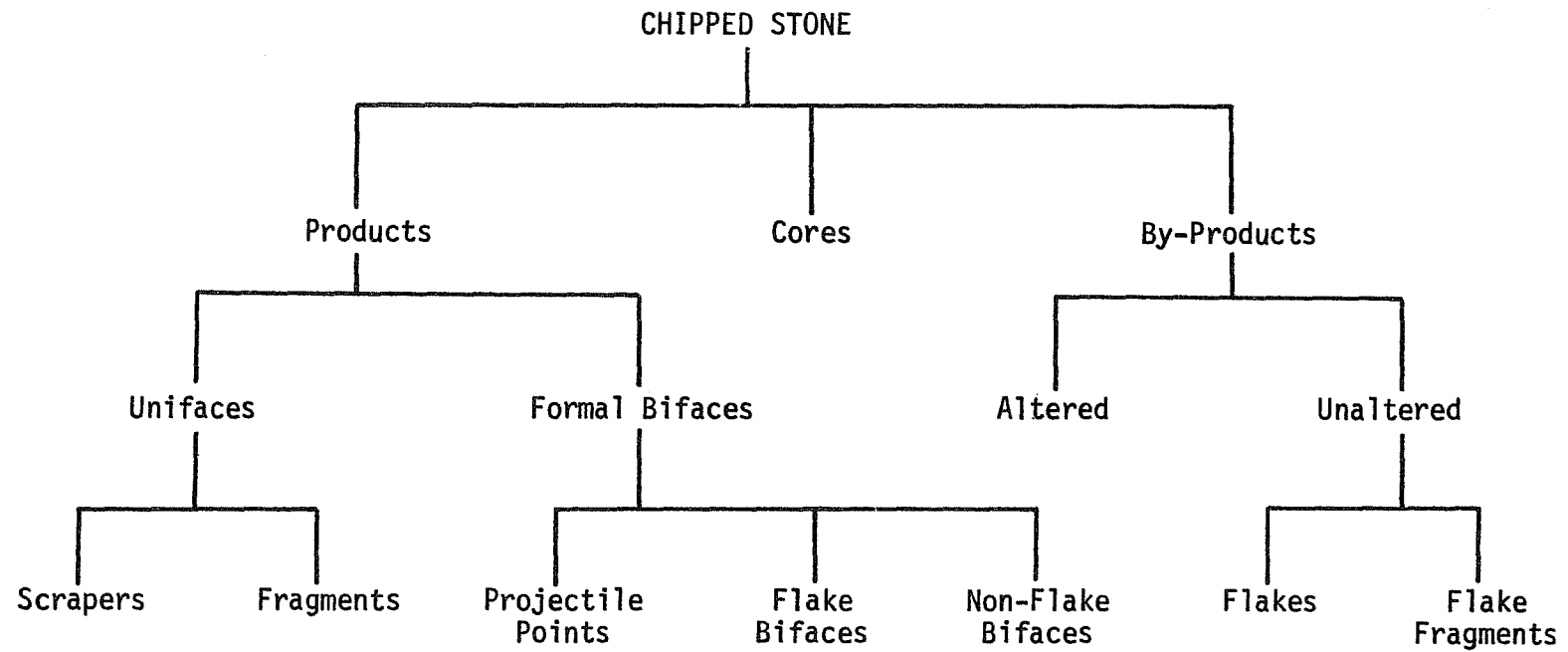


Figure 2. *Chipped Stone Classification Scheme from the Mariposa Site, 41 ZV 83.*

Two forms of alteration may be applied to by-products: utilization and trimming. Each of these technological processes was exhibited on secondary cortex flakes. Descriptions of these lithic processes are given in the following chapter; they do form a definite technological division for altered by-products.

Products

Products are the desired end-result, or artifacts, manufactured by a systematic reduction process. Products may be divided into two large groups: unifaces and formal bifaces. Unifaces are flaked on one face only while formal bifaces are flaked on two faces.

Unifaces may be complete or fragmentary. Fragmentary unifaces were further classified by the amount of cortex remaining on the tool fragment (division not shown in Fig. 2). Complete uniface products all retained steep edge angles and were labeled scrapers for convenience (not by assumed function). There are four classes of scrapers (not shown in Fig. 2), depending on the location of the artifact's worked edges.

Formal bifaces were first classified by the presence or absence of hafting modification. Those artifacts which did retain some form of hafting modification were termed projectile points. Types of projectile points were assigned following the morphological and technological guidelines set forth in Suhm and Jelks (1962) and Hill and Hester (1971). Metric distinctions such as projectile point neck width, weight, maximum width and thickness (cf. Corliss 1972; Fenenga 1953; Jelinek 1967) between dart points and arrow points were informally recognized but not rigorously utilized. Projectile point fragments were classified as distal, medial or basal depending on whether the fragment was the point tip, the middle section or the portion closest to the haft (respectively).

The remainder of the bifaces were classified as flake bifaces or non-flake bifaces. Flake bifaces retained some evidence of being manufactured from a flake. Distal and proximal fragments (not shown in Fig. 2), as well as complete specimens, were recognized.

Non-flake bifaces retain no evidence of being manufactured from a flake. These artifacts were subdivided according to their existing condition (complete or fragmentary). Complete non-flake bifaces were also divided into five morphological and technological categories (not shown in Fig. 2). Fragmentary non-flake bifaces were subdivided into two categories, proximal and distal. Distal fragments were worked to a point or tip. Proximal fragments lacked this feature.

Cores

Cores result from the reduction of parent material by a flaking process. In this study, cores are classed as a separate category from products and by-products, since cores are not prepared to be shaped implements. Cores retain the numerous flake scars caused from by-product removal. No macroscopic edge

wear is present on cores. The direction of flake (by-product) removal and the number and nature of flake platforms were among the attributes used to classify seven groups of cores (not illustrated in Fig. 2). A special core specimen, a core overshoot flake, was recognized (see the following section).

Ground, Battered or Polished Stone

Ground stone was divided into morphological and technological classes, as well as artifact material. Both hematite and sandstone were ground. The abrasive grinding action took the form of localized scratching and grooving. General grinding of sandstone slabs produced smoothed sandstone slabs and smoothed hematite. Limestone was shaped into manos by general grinding action. Mano fragments were also recognized. Polishing was present on only one quartzite pebble. Hammerstones retained evidence of battering at one or more areas along their surfaces. The division of ground, battered or polished stone is presented in Fig. 3.

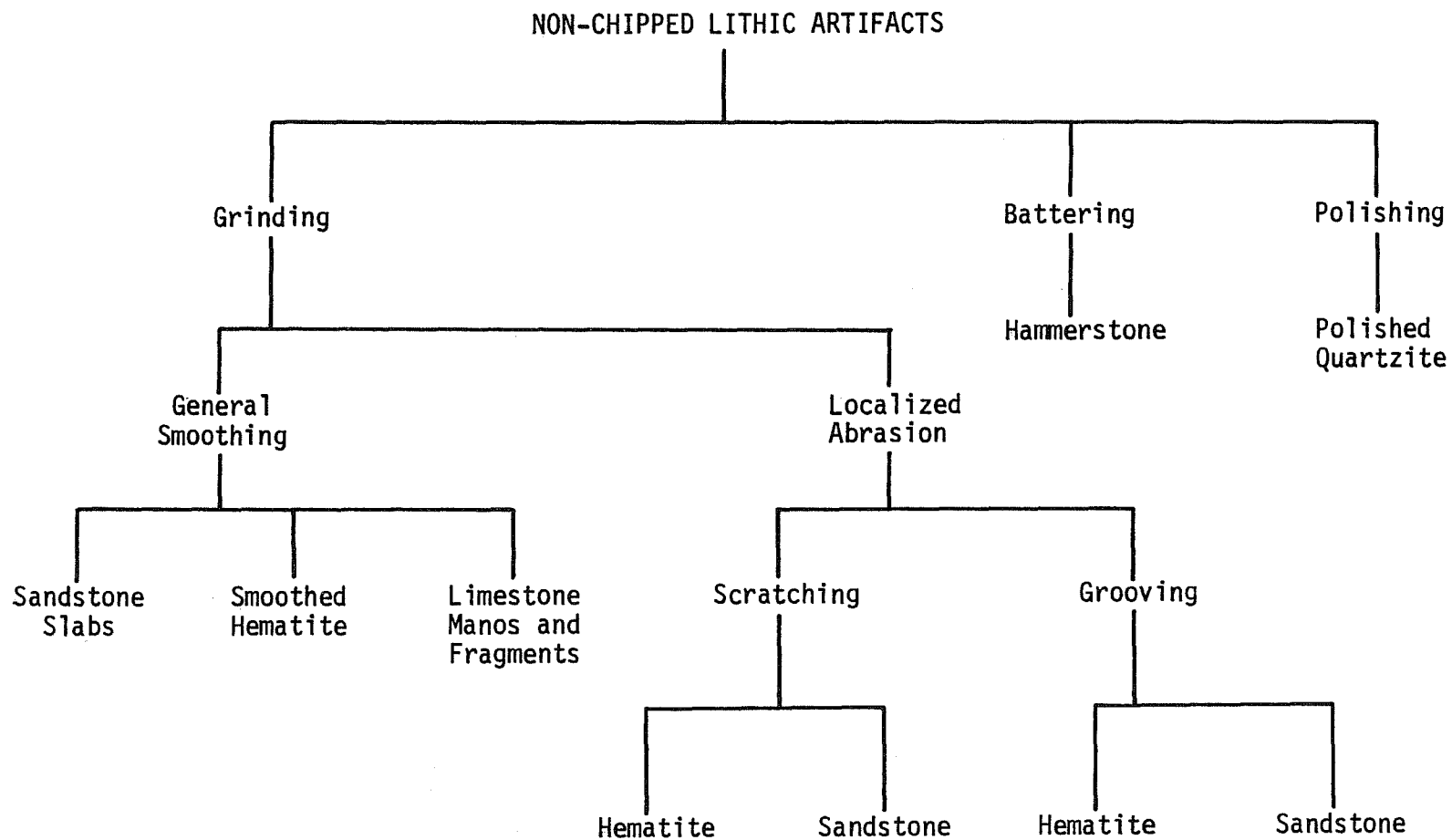


Figure 3. *Ground, Battered and Polished Stone Classification Scheme from the Mariposa Site, 41 ZV 83.*

VI. THE EVIDENCE

Lithic Material

The basis for describing the chipped and ground stone recovered from archaeological contexts at Mariposa has been drawn from many sources. Hester (1975b), Crabtree (1972), Shafer (1969) and Hester and Hill (1972) were considered important publications explaining terminology. Terms needing definition for greater understanding of the lithic descriptions follow:

Beveled Edge: "An edge which has been manufactured to produce the desired edge angle or exposure for the removal of a desired flake or flake series" (Crabtree 1972:38).

Biface: "Artifact bearing flake scars on both faces" (Crabtree 1972:38).

Bulb of Force: "The bulbar part on the ventral side at the proximal end of a flake. The remnant of a cone part, the result of the application of either pressure or percussion force" (Crabtree 1972:48).

Compression Rings: "Ripple rings radiating from the point of force. Can be both positive and negative--positive on the flake and blade; and negative on the core . . . compression rings are generally more prominent with percussion than with pressure" (Crabtree 1972:52).

Denticulation: "Prominence resembling teeth similar to those on a saw. Tooth-like serrating on margins of artifacts" (Crabtree 1972:58).

Dorsal: "Outer surface. Keeled part of blade or flake. For instance, the dorsal side of a blade is the face of the core prior to detachment" (Crabtree 1972:59).

End View: "Perpendicular view of either proximal or distal end" (Crabtree 1972:60).

Exhausted: "Used up. Consumed, either from function wear or by the flint knapper. Adjective applied most often to cores. Exhaustion may occur for the following reasons: steps and hinges, reduction of platform size or angle, lack of material, too small" (Crabtree 1972:62).

Face: "The dorsal or ventral surface of the artifact" (Crabtree 1972:62).

Flake: "Any piece of stone removed from a larger mass by application of force . . . A portion of isotropic material having a platform and bulb of force at the proximal end" (Crabtree 1972:64).

Hinge Fractures: "A fracture at the distal end of a flake or blade which prevents detachment of the flake at its proposed terminal point. A hinge fracture terminates the flake at right angles to the longitudinal axis and the break is usually rounded or blunt" (Crabtree 1972:68).

Lateral Margins: "Margins of flakes, blades and other stone tools on either or both sides of the longitudinal axis" (Crabtree 1972:72).

Lip: "(1) Projection found on core or artifact which results from the bulbar scar. A concavity causing an overhang usually found on the leading edge. (2) Projection found on the proximal ventral surface of some flakes, believed to be associated with soft hammer percussion or pressure" (Crabtree 1972:74).

Longitudinal Lateral Section: "The area of the artifact bounded by the proximal and distal ends and both lateral margins" (Crabtree 1972:74).

Longitudinal Transverse Section: "The thickness of the artifact between the dorsal and ventral side and bounded by the proximal and distal ends" (Crabtree 1972:74).

Percussion Flaking: "A method of striking with a percussor to detach flakes or blades from a core or mass" (Crabtree 1972:80).

Plano-Convex: "Flat on ventral side--curved on dorsal surface. Common to unifacial artifacts" (Crabtree 1972:82).

Platform: "The table or surface area receiving the force necessary to detach a flake or blade. Can be either natural or prepared" (Crabtree 1972:84).

Pot Lid: "A plano-convex flake leaving a concave scar. Pot lids are the result of differential expansion and contraction of isotropic material but are minus the compression rings of force lines usually associated with these conditions. Generally they are a natural occurrence rather than intentional results of man-made flakes" (Crabtree 1972:84-85).

Pressure Flaking: "Process of forming and sharpening stone by removing surplus material--in the form of flakes--from the artifact by a pressing force rather than by percussion" (Crabtree 1972:85).

Primary Retouch: "Removal of irregularities on the artifact by the pressure technique to make the piece ready for the second retouch" (Crabtree 1972:85).

Retouching: "A technique used to thin, straighten, sharpen, smooth and make the artifact more regular in form. Generally involves the use of pressure in one or more stages. Retouching usually follows percussion preforming. Before precision pressure work may be accomplished, one must first remove all irregularities on the objective piece by a primary retouch and then do a secondary retouch" (Crabtree 1972:89).

Serrating: "Indenting the edges by alternating the removal of flakes" (Crabtree 1972:90).

Side View: "The lateral edge or margin of the artifact when it is held horizontal to the viewer" (Crabtree 1972:90).

Sinuous: "Snake-like; alternating or wavy. Margins of artifacts are made sinuous by removing flakes alternately from the lateral edge" (Crabtree 1972:92).

Step Fracture: "A flake or flake scar that terminates abruptly in a right angle break at the point of truncation. Caused by a dissipation of force or the collapse of the flake" (Crabtree 1972:93).

Thermal Treatment: "Method of altering siliceous materials by exposure to controlled heat. This treatment makes the stone more vitreous" (Crabtree 1972:94).

Thinning Flakes: "Flakes removed from a preform either by pressure or percussion to thin the piece for artifact manufacture. Thinning flakes are also removed to thin a biface or uniface. Usually shows special platform preparation" (Crabtree 1972:94).

Transverse: "Crosswise" (Crabtree 1972:95).

Transverse Section: "The area bounded by and between the lateral margins" (Crabtree 1972:95).

Uniface: "Artifact flaked on one surface only" (Crabtree 1972:97).

Ventral: "Plano side or inner surface of flake or blade. The under surface" (Crabtree 1972:97).

Vitreous: "Having the near luster and texture of glass" (Crabtree 1972:98).

Core: "A nodule from which flakes have been removed" (Shafer 1969:3).

Flake: "A chip or spall removed from a nodule (the parent stone) by force" (Shafer 1969:4).

Heavy Percussion Flakes: "Flakes with a rather prominent bulb of (force). They are relatively thick at the bulbar end, and frequently possess cortex somewhere on the dorsal surface or on the striking platform. The dorsal surface may or may not be faceted" (Shafer 1969:4).

Cortex Striking Platform: "The cortex (patinated) surface of a core used without modification as the striking platform" (Shafer 1969:4).

Single Faceted Striking Platform: "The striking platform prepared by a single facet (removing one flake)" (Shafer 1969:4).

Multiple Faceted Striking Platform: "A striking platform with two or more facets" (Shafer 1969:4).

Primary Cortex Flake: Flakes which "have the dorsal surfaces covered with cortex; they represent the initial decortication of a core" (Hester and Hill 1972:46).

Secondary Cortex Flakes: Flakes which "retain some cortex on the dorsal surface, representing further shaping of a core" (Hester and Hill 1972:46).

Interior Flakes: Flakes retaining "no cortex on the dorsal surface, indicating their removal from the interior of a core" (Hester and Hill 1972:46).

Convergent Platform: "Striking platform formed by convergent planes" (Hester 1971:106; Hester and Hill 1972:46).

Crushed (Shattered) Platforms: Flakes which have had their striking platform obliterated during flake removal.

Distal: Farthest from point of attachment for a projectile point. The portion of a biface which morphologically is a point or tip.

Proximal: The base of a projectile point, or the area chipped (modified) for hafting.

Longitudinal: Running lengthwise.

Transverse: Crossing from side to side; crosswise.

Using these terms, a description of the artifacts recorded at Mariposa will be more easily understood.

Artifacts were divided into three major divisions: chipped stone, ground and polished stone, and historic materials. No ceramics or bone tools were collected from testing and excavation activities conducted at Mariposa. Lithic objects culturally modified by chipping activities (Epstein 1962) were placed under the rubric of "chipped stone." Modification may be bifacial or unifacial and the classification presented here was considered most appropriate for the lithic assemblage at Mariposa.

Chipped Stone

Utilized Flakes

Thirty-four flakes are included under this category. Utilization should be distinctly separated from retouch or trimming, another tool category altogether. Mallouf, Fox and Briggs (1973:67) provide an excellent contrast between "utilization" and "retouch":

The term "utilization" is used when referring to random flake edges which exhibit irregular minute scarring. Use of this term is based on the observation that flakes freshly removed from a core often possess unidentified edges suitable for scraping or cutting purposes. Subsequent utilization of such an edge in working non-lithic materials such as antler or wood can, in time, produce a jagged, irregular edge outline.

"Retouch" . . . refers to a process whereby a flake edge is intentionally subjected to modification through the removal of a uniform series of tiny flakes. Retouch may be used as a means of sharpening, shaping, dulling, or otherwise reestablishing a usable edge in place of one which is worn or improperly formed.

Distinguishing between utilization and retouch is not a clear-cut matter, however. A retouch edge can be produced by utilization methods upon unmodified flakes (Mallouf, Fox and Briggs 1973:67). Any separation of these two different lithic modification techniques, then, is always tenuous.

At Mariposa, two types of utilized flakes are recognized: secondary cortex utilized flakes and interior utilized flakes. Secondary flakes, which retain both cortex and flake scars from core preparation, were utilized, as were interior flakes. Interior flakes retain no cortex and are believed to have been struck from the interior of a core nucleus (Mallouf, Fox and Briggs 1973:75).

Utilized Secondary Flakes (Plate 1,a)

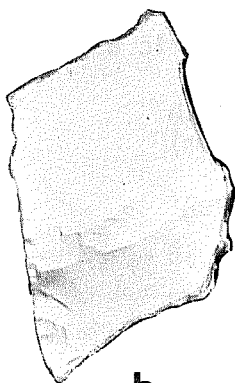
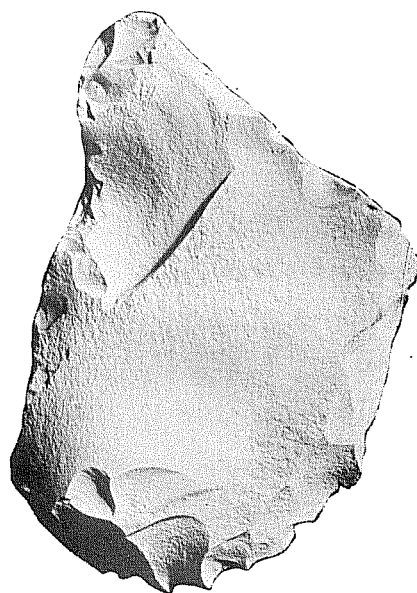
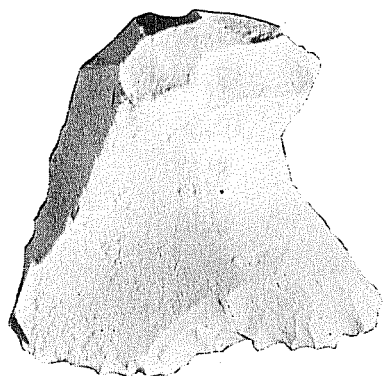
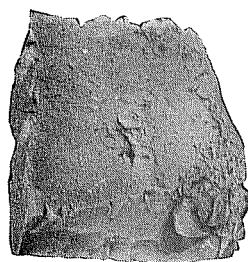
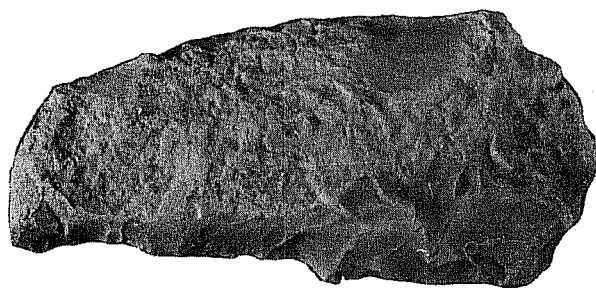
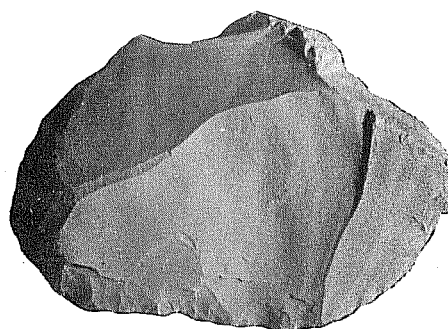
Fourteen utilized secondary flakes were recovered from the 1974 field season. About half of these still retain a bulb of force and platform. Two of the utilized secondary flakes appear to have been burned. Chert is the basic lithic material used to manufacture these tools. Area of utilization, in most cases, is limited in extent to between five and ten millimeters along a lateral edge. Limited utilization area may reflect the physical limits of the flakes manufactured, since many of the flakes are small. Intense utilization did not appear on any of the specimens, implying only limited use and discard. Irregular flake shapes comprise the majority of the artifacts and no selected pattern of flake shape is indicated.

Utilized Interior Flakes (Plate 1,b)

Fifty-nine percent of the utilized flakes (20 of 34 specimens) were manufactured on interior flakes. Again, no particular type of flake shape appears to have been preferred for utilization processes. Only three flakes are burned (A-10, A-11 and A-38) and one flake shows intensive utilization (A-15). One-third of the utilized interior flakes still retained either the bulb of force or the platform (or both). Significantly, 11 of the 18 flakes (61%) were hinge fractured on one or both ends of the flake. Such hinging could have resulted from tool manufacturing "accidents" where bifacial or unifacial reduction blows had been too severe for the material to handle. If such were the case, pieces of rejected or broken tools were obtained for use in different (or similar) activities. Fine-grained quartzite was used as the lithic resource material for one utilized interior flake (A-98) while light tan and brownish chert was used for the remainder of this category.

Metric measurements and provenience data for both categories of utilized flakes are included below.

Plate 1. Utilized Flakes, Trimmed Flakes and Scrapers. a, secondary cortex utilized flake (A-94); b, interior utilized flake (A-1); c, secondary cortex trimmed flake (A-149); d, interior trimmed flake (A-93); e, side scraper, one edge (A-86); f, side scraper, two edges (A-117); g, end and side scraper (A-66).

**a****b****c****d****e****f****g**

Utilized Flake Metric Data

<u>Secondary Cortex Flakes</u>	Length (mm)	Width (mm)	Thickness (mm)	Weight (gm)
A-5	50.15	39.2	18.3	30.5
A-7	42.0	31.55	8.35	13.1
A-8	26.4	8.25	4.5	1.4
A-13	55.0	22.4	9.55	11.25
A-28	37.0	31.25	5.6	6.1
A-30	43.85	25.1	10.0	11.5
A-31	27.5	30.35	9.1	19.8
A-53	20.25	15.35	4.55	1.3
A-54	27.65	26.0	9.35	7.4
A-56	24.15	14.35	4.3	1.65
A-65	58.55	21.8	19.66	15.2
A-72	29.3	28.6	10.5	13.4
A-94	35.0	28.2	6.15	3.5
A-162	24.6	19.6	5.2	4.0

Interior Flakes

A-1	51.0	29.3	9.6	12.1
A-10	26.55	28.0	6.35	5.3
A-11	25.25	17.65	6.65	3.0
A-15	26.55	22.0	5.6	3.1
A-22	23.8	24.05	5.3	3.25
A-23	61.9	35.0	8.8	11.2
A-29	38.15	27.0	9.75	7.1
A-38	24.0	16.1	2.8	1.4
A-43	22.6	20.2	6.45	2.6
A-60	30.7	29.2	4.55	2.8
A-62	21.0	12.3	5.55	1.65
A-67	18.15	15.7	6.6	1.7
A-80	24.75	22.0	5.5	3.1
A-90	32.9	20.55	4.75	2.25
A-98	56.77	46.66	18.0	51.5

<u>Interior Flakes</u>	Length (mm)	Width (mm)	Thickness (mm)	Weight (gm)
A-142	22.75	14.20	13.25	3.7
A-148	44.35	25.55	7.15	7.4
A-151	35.65	24.6	11.4	6.4
A-163	22.8	16.2	5.3	3.4
A-166	29.6	20.9	5.5	5.7

Utilized Flake Provenience

<u>Secondary Cortex Flakes</u>	Level	Unit	Quadrant
A-5	2 (5-10 cm)	N38/W2	NE
A-7	2 (5-10 cm)	N38/W2	SW
A-8	2 (5-10 cm)	N38/W2	SW
A-13	3 (10-15 cm)	N38/W2	SE
A-28	1 (0-5 cm)	N40	SW
A-30	2 (5-10 cm)	N40	NW
A-31	2 (5-10 cm)	N40	NW
A-53	3 (10-15 cm)	N42	NE
A-54	3 (10-15 cm)	N42	SW
A-56	4 (15-20 cm)	N42	SW
A-65	2 (5-10 cm)	N42/W2	SW
A-72	4 (15-20 cm)	N42/W2	SW
A-94	2 (5-10 cm)	N40/E2	SW
A-162	1 (0-20 cm)	Area B	Test 3

Interior Flakes

A-1	1 (0-5 cm)	N38/W2	SW
A-10	3 (10-15 cm)	N38/W2	NW
A-11	3 (10-15 cm)	N38/W2	NW
A-15	4 (15-20 cm)	N38/W2	NE
A-22	7 (30-35 cm)	N38/W2	NW
A-23	7 (30-35 cm)	N38/W2	NW

<u>Interior Flakes</u>	Level	Unit	Quadrant
A-29	1 (0-5 cm)	N40	SE
A-38	1 (0-5 cm)	N42	NE
A-43	2 (5-10 cm)	N42	NE
A-60	1 (0-5 cm)	N42/W2	NW
A-62	1 (0-5 cm)	N42/W2	SW
A-67	2 (5-10 cm)	N42/W2	SE
A-80	1 (0-5 cm)	N42/E2	SE
A-90	1 (0-5 cm)	N40/E2	NE
A-98	2 (5-10 cm)	N40/E2	SE
A-142	3 (30-45 cm)	Test 5	S1/2
A-148	3 (40-60 cm)	Test 4	--
A-151	surface	N42/W2	--
A-163	1 (0-5 cm)	N42/E2	NW
A-166	1 (0-5 cm)	N40/E2	SW

Secondary cortex utilized flakes abundantly appear in levels 2 and 3, where 77% of these specimens were recorded. Of the nine excavation units, N38/W2, N40 and N49 contained most of the secondary cortex utilized flakes. Cultural processes which incorporated the use of secondary cortex utilized flakes may be concentrated in these excavated site areas. Utilized flakes with no cortex (interior flakes) were present in greatest quantities in the upper two levels of the site. N42/W2, N42/E2 and N38/W2 appear to be areas where the deposition of interior utilized flakes was preferred, although flakes in N38/W2 occur in deeper levels.

Combining the provenience data for all utilized flakes indicates that loci of utilization processes occurred in N38/W2, N40, N42/E2, N42 and N42/W2, containing almost one-third of the utilized flake specimens.

Trimmed Flakes (Plate 1,c and d)

Marginally retouched flakes which exhibit no recognizable tool form or which seem to be primarily chipped in a random pattern with no visible intent toward tool manufacture were termed trimmed flakes. All of these artifacts were constructed on chert flakes and were trimmed (retouched) either unifacially or bifacially. Two subclasses of trimmed flakes are described (below) according to the type of flake used in the artifact preparation.

Secondary cortex trimmed flakes form the first subclass. Unifacial trimming is exhibited on eight of the nine artifacts in this subclass and is usually confined to one lateral edge. Three of these flakes still retain original striking platforms and bulb of force. Bifacial trimming on one edge characterizes the other secondary cortex trimmed flake. This artifact (A-64) was burned prior to flake removal.

Five artifacts comprise the second subclass of trimmed flakes: interior trimmed flakes. Artifact A-130 was manufactured from fine grained quartzite, while the other four were made from chert. All of the interior trimmed flakes are unifacially flaked on one lateral edge and irregular in outline. In contrast, most of the secondary cortex trimmed flakes retained a great deal of their original "flake" shape.

Trimmed flakes may represent two lithic stages. First, they may represent the rejected initial stages in a flake-tool manufacturing process. On the other hand, trimmed flakes could also represent easily and quickly manufactured cutting tools which may have been used for a relatively short duration (temporally) and discarded when the tool edge became ineffective. Conclusions concerning these two sequences are hindered by the small sample size encountered at 41 ZV 83.

Metric data and provenience information for the two subclasses of trimmed flakes follows.

Trimmed Flake Metric Measurements

<u>Secondary Cortex</u>	Length (mm)	Width (mm)	Thickness (mm)	Weight (gm)
A-19	46.2	34.1	18.5	26.2
A-58	31.35	28.35	10.6	6.35
A-64	40.0	28.35	13.6	10.4
A-89	42.15	26.6	6.0	7.55
A-111	26.35	33.85	8.0	10.1
A-149	76.0	45.2	17.9	75.45
A-169	38.7	35.6	22.3	44.3
A-172	47.5	35.1	18.3	25.3
A-173	34.6	25.2	16.1	15.6
<u>Interior Flakes</u>				
A-93	54.3	50.6	14.35	31.55
A-130	58.75	26.2	14.45	18.35
A-154	23.15	19.3	3.5	1.85
A-164	15.7	15.1	5.2	3.5
A-165	33.5	32.6	11.4	14.7

Trimmed Flake Provenience

<u>Secondary Cortex</u>	Level	Unit	Quadrant
A-19	5 (20-25 cm)	N38/W2	NW
A-58	4 (15-20 cm)	N42	SE
A-64	2 (5-10 cm)	N42/W2	NE
A-89	3 (10-15 cm)	N42/E2	SE
A-111	2 (5-10 cm)	N38	NE
A-149	3 (10-15 cm)	N42	SE
A-169	3 (10-15 cm)	N42/E2	SW
A-172	5 (20-25 cm)	N42/W2	NE
A-173	5 (20-25 cm)	N42	SW
<u>Interior Flakes</u>			
A-93	2 (5-10 cm)	N40/E2	SW
A-130	1 (0-20 cm)	Area B	Test 3
A-154	surface	N42	--
A-164	3 (30-45 cm)	Test 5	NE extension
A-165	1 (0-5 cm)	N40/E2	SW

Both trimmed flake types occur in levels one through five, although no clustering is readily discernible. Half of the trimmed flakes were recovered from levels two and three at Mariposa.

Unifacial Tools

Excavation and surface collecting at Mariposa produced 21 artifacts which exhibited primary and secondary flaking on one side or face. Classification within this category depended on the finished characteristics of the tool. Marginally flaked unifacial tools which exhibit completeness and a relatively long area of working edge were termed scrapers. Several types of scrapers are represented in the collection, including one-edge side scrapers, two-edge scrapers, end and side scrapers, and scraper fragments. Artifacts lacking distinctive tool finishing were classified as unifacial tool fragments.

Scrapers (Plate 1, e,f,g,). While recognizing that "scraper" as a functional description may not reflect the accurate function of this type of artifact, the term is retained due to its almost universal morphological and technological recognition. Stated another way, scrapers are those artifacts which frequently are made from flakes and are unifacially chipped (marginally or totally) to form steep edge angles. Steep edge angles are assumed to have

performed scraping functions; however, such conclusions cannot be definitely stated without microscopic edge wear analysis and replication experiments. No such studies were attempted, and the artifacts were classified after a macroscopic examination. Eight specimens were excavated during the field season and one specimen was collected from the surface of Area B during the same field season.

The nine specimens were grouped into four classes: side scrapers, one edge and two edge; end-side scrapers; and scraper fragments. According to Crabtree (1972:90), a side scraper is an "implement with beveling on one or more margins of a flake or blade to obtain a strong cutting edge." Three complete scrapers and one scraper fragment can be classified as side scrapers. Two distinct classes of side scrapers can be produced--those with one edge worked and those with two edges worked.

Side Scrapers, One Edge (A-32, A-86, A-112, A-170)--Four examples of this class were excavated at Mariposa, one being a fragment. One specimen (Artifact #32) was manufactured from a large primary cortex flake. Hard-hammer percussion was the technique utilized to produce this flake. Distinct compression rings are seen on the ventral surface, along with a prominent bulb of force. Platform preparation consisted of removing one flake. The bit of the scraper is convex and the tool outline is oval. Another of the one edge side scrapers is a fragment which still retains cortex on the dorsal surface except on that edge where retouching occurred. What exists of the bit appears to be straight. The third one-edged side scraper is irregular in tool outline and appears to have been made from a core. The retouched edges are quite steep. This specimen is made from fine-grained quartzite, whereas the previous two are made from the locally available chert.

Side Scraper, Two Edges (A-117)--Only one specimen was classified in this category. Manufactured from a chert primary cortex flake, the artifact was retouched unifacially on one edge and bifacially on the other lateral edge. Cortex almost covers the dorsal face. The bifacial trimming on one edge may be evidence of either platform preparation for subsequent unifacial retouch or further modification of the edge into a bifacial working edge.

End and Side Scrapers (A-120, A-155, A-66)--Excavation revealed three scrapers classified as end-side scrapers. Bifacial retouch is seen on A-120, along with some edge wear. This specimen's end scraping edges are formed on the dorsal face. Cortex is also present on the dorsal face. The remaining two end-side scrapers (A-155, A-66) are thinner in comparison with A-120 and are generally more oval in outline. Both, like A-120, appear to have been manufactured from chert flakes. Artifact #155 has very steep flaking on the distal end and the overall flaking pattern of the end and two lateral edges is even and marginal. No cortex is present and the scraper retains a hinged fracture on the proximal end. This end exhibits neither retouch nor macroscopic edge wear.

Cortex is present on the proximal end of Artifact #66. As with A-155, pressure flaking has produced a fine working edge on this specimen. In longitudinal cross section, Artifacts #66 and 155 reveal lenticular outlines.

Scraper Fragment--One scraper fragment was recovered at Mariposa. While it appears to have been an end scraper, it is impossible to tell whether one, both or neither of the lateral edges were also marginally flaked in a unifacial fashion to produce a scraper edge. Along with steep edge angles, this artifact also retains cortex on the dorsal face and appears to have been burned.

Metric attributes and provenience for the eight scrapers are given below. Classification divisions are labeled.

Scraper Metric Measurements

<u>Side Scraper One Edge</u>	Length (mm)	Width (mm)	Thickness (mm)	Weight (gm)
A-32	88.6	54.5	2.94	98.5
A-86	32.15	31.8	8.2	11.25
A-112	54.0	32.0	25.65	46.0
A-170	55.6	39.1	13.2	34.0
<u>Side Scraper Two Edge</u>				
A-117	78.0	35.55	14.55	43.4
<u>End-Side Scraper</u>				
A-66	70.0	41.0	9.25	25.2
A-120	62.4	40.0	28.15	51.1
A-155	43.3	35.7	9.7	16.7
<u>Scraper Fragment</u>				
A-27	33.45	28.55	1.1	10.5

Scraper Provenience

<u>Side Scraper One Edge</u>	Level	Unit	Quadrant
A-32	2 (5-10 cm)	N40	NE
A-86	3 (10-15 cm)	N42/E2	NE
A-112	2 (5-10 cm)	N38	SE
A-170	1 (0-5 cm)	N42/W2	NW
<u>Side Scraper Two Edge</u>			
A-117	3 (10-15 cm)	N38	SW

<u>End-Side Scraper</u>	<u>Level</u>	<u>Unit</u>	<u>Quadrant</u>
A-66	2 (5-10 cm)	N42/W2	SW
A-120	0 surface	Area B	--
A-155	2 (5-10 cm)	N42/W2	NE
<u>Scraper Fragment</u>			
A-27	1 (0-5 cm)	N40	NW

Scrapers recovered from excavated contexts were found primarily in levels 2 and 3, where 75% of the specimens were recorded. One distinct concentration can be observed. End and side scrapers were found only in level 2 of N42/W2 and on the surface of Area B. Because N42/W2 is somewhat on the margin of the 1974 excavation area, adjoining unexcavated units need excavation at least to the second level before adequate assessment can be made. It may be that a specialized activity area of unknown dimensions is indicated by end and side scrapers in N42/W2.

Unifacial Tools: Fragments (Plate 2, a and b). A total of 12 unifacial tool fragments were recovered from both surface and subsurface investigations at Mariposa. All but one are marginally chipped both primarily and secondarily. Other than the completely worked unifacial artifact (A-61), which has been formed into a recognizable shape (rectangular), no other tool "forms" or types were recorded. Artifact #61 is actually a fragment, as one end is a hinge fracture. While the two lateral edges and worked end indicate some edge wear and/or utilization, no wear appears on the fractured end.

The remainder of the unifaces are flaked marginally and can be further classified as secondary cortex unifaces or interior unifaces, depending on whether cortex is present or absent on the dorsal face.

Secondary Cortex Unifaces--Since the unifaces recovered were manufactured from flakes, secondary cortex unifaces, like secondary cortex flakes, retain some cortex on their dorsal surface. Presence of cortex on such flakes indicates that the flake has been struck from a partially decorticate core (Mallouf, Fox and Briggs 1973:68). One-half of the unifaces collected fall under this category. All utilize chert as the lithic resource material. One specimen appears to have been burned (A-152). Cortex covers all but the worked areas on the dorsal surface on two of the marginal secondary cortex unifaces, A-39 and A-121. Interestingly, both of these are also hinge fractured on the proximal end. The lateral edges and end of the specimen were worked producing an almost oval working edge. Careful workmanship is lacking on most specimens. Bulbs of force and striking platforms still exist on four of the six specimens (66.6%).

Interior Unifaces--The remaining five marginal unifaces were produced on flakes devoid of nodular cortex. Such flakes are manufactured "subsequent to primary and secondary decortication" (Mallouf, Fox and Briggs 1973:75). Eighty percent

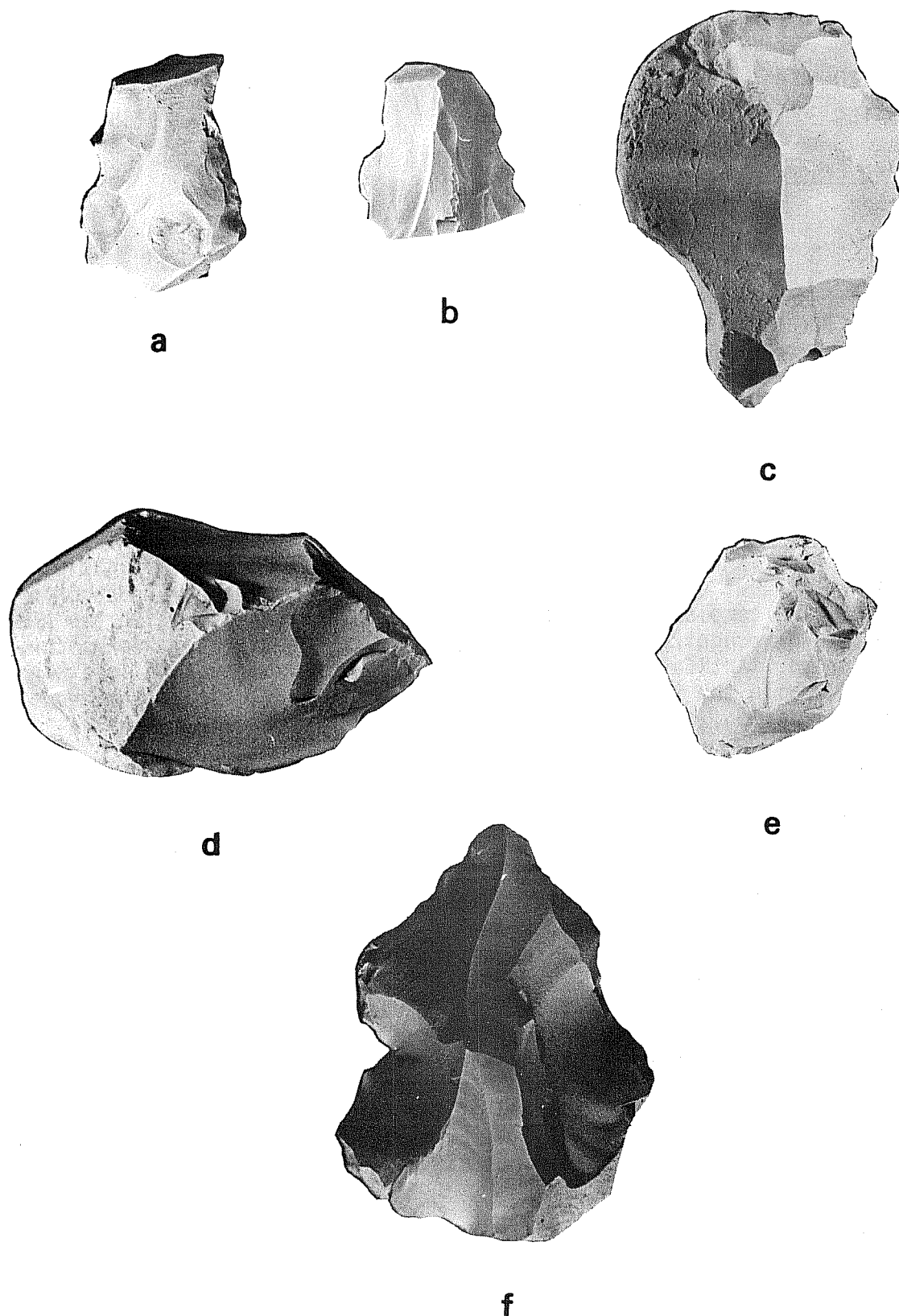


Plate 2. Unifaces and Cores. a, secondary cortex uniface (A-152); b, interior uniface (A-59); c, group II core (A-100); d, group III core (A-12); e, group IV core (A-17); f, group V core (A-44).

(four or five) retain hinge fractures on at least one end. All are irregular in shape and one specimen (A-57) is burned. All are unifacially worked on one lateral edge and two of these still retain their bulb of force and striking platform (all single faceted).

No distinct pattern of unifacial tool manufacture is seen in the Mariposa collection. Instead, a picture of random modification using lithic debris for tools is perceived. Hinging on many of these artifacts may also indicate tool breakage during tool manufacturing processes. Edge wear in the form of small step fracturing can be seen on a majority of the unifaces described above. Describing uniface function would only be speculation without some accompanying microscopic edge analysis and replication. Provenience and metric data are listed below.

Unifacial Tool Metric Data

<u>Uniface Fragment</u>	Length (mm)	Width (mm)	Thickness (mm)	Weight (gm)
A-61	48.15	27.0	8.4	14.45
<u>Secondary Cortex Unifaces</u>				
A-39	39.0	33.0	8.35	11.0
A-103	55.1	35.55	28.3	35.1
A-121	30.0	25.5	8.0	7.1
A-128	66.45	45.65	18.45	46.2
A-145	70.0	39.0	15.25	38.5
A-152	41.0	31.55	15.15	16.9
<u>Interior Unifaces</u>				
A-21	30.6	10.55	7.0	1.5
A-45	22.65	15.0	4.75	2.05
A-57	27.6	23.4	15.0	10.3
A-81	18.6	17.0	5.0	1.8
A-85	37.35	23.55	8.6	6.8

Unifacial Tool Provenience

<u>Uniface Fragment</u>	Level	Unit	Quadrant
A-61	1 (0-5 cm)	N42/W2	SW

Secondary Cortex	Level	Unit	Quadrant
A-39	1 (0-5 cm)	N42	NE
A-103	1 (0-5 cm)	N38/E2	NE
<u>Secondary Cortex Unifaces</u>			
A-121	surface	Area B (1974)	--
A-128	surface	Area B (1975)	--
A-145	1-2 (0-30 cm)	Test 5	NE extension
A-152	3 (10-15 cm)	N42/E2	SW (hearth)
<u>Interior Unifaces</u>			
A-21	6 (25-30 cm)	N38/W2	NW
A-45	2 (5-10 cm)	N42	SW
A-57	4 (15-20 cm)	N42	SE
A-81	2 (5-10 cm)	N42/E2	NW
A-85	3 (10-15 cm)	N42/E2	NW

A large amount (5) of the unifacial tool fragments were recovered from the surface and first excavated level at Mariposa. The remaining seven unifacial tool fragments are concentrated in levels two and three. No single area seems to have been favored for the deposition of these tool fragments since only one unit, N42/E2, contained two unifacial tool fragments in a particular level.

Formal Bifaces

Bifaces which do not exhibit evidence of any hafting modification were classified as "formal bifaces." A total of 24 specimens, including fragments, have been recovered from Mariposa. Further classification of these artifacts depended on one set of characteristics: those bifaces which still retained evidence of being manufactured on flakes (i.e., bulb of force, striking platform, rings of force) were termed "flake bifaces" and those bifaces which did not exhibit such evidence were termed "non-flake bifaces." Subsequent classification of formal bifaces depended on the observable morphological characteristics of the artifacts. All collected bifaces exhibited the characteristic sinuous edge when viewed perpendicular to the faces.

Flake Bifaces. Nine flake bifaces, constituting 37.5% of the formal biface category, were recognized as having some or all flake characteristics still present. Within this category, three groups can be recognized: (a) distal fragments (3); (b) proximal fragments (2); and (c) complete specimens (4).

Distal fragments of the flake bifaces are fairly thin and made of light tan to cream colored chert. All are biconvex in the transverse section and their proximal ends are hinge fractured.

The two proximal flake biface fragments are considerably thicker in cross section than the distal flake biface fragments and are plano-convex in the transverse section. Again, the lithic material is light tan or cream colored chert. Basal edges are straight to slightly concave, and both specimens' lateral edges taper towards the base. Only marginal primary and secondary chipping is seen on the flat side (or ventral face of the original flake).

Triangular or roughly trianguloid outlines are seen in the complete flake bifaces. Marginal chipping is seen on both faces in three of the four specimens. Cortex, which is found on one specimen (A-87), is actually part of the original flake striking platform. Artifact A-150 has been thermally altered prior to flaking activities on its lateral edges and end (opposite original striking platform). Except for the burned specimen, all of the complete flake bifaces are made of light tan to cream colored chert. The distal end of one specimen (A-146) is beveled.

To facilitate some idea of the variation in the metric attributes of length, width, thickness and weight within each category, tables listing this information will be subheaded for each category discussed, both for the flake bifaces and the following non-flake bifaces. Before describing the non-flake formal biface, one should consider where the flake bifaces "fit" into the cores and the artifact manufacturing sequence. Complete flake bifaces recovered here could only have come from relatively large cores, assuming that the representative bifaces in the collection were ultimately derived from flakes approximately twice the size of the flake tool. Only large Group I, II and III cores, and possibly Group IV and V cores (see below), are physically able to produce larger flakes. These flakes might also have to be relatively thick, given the thickness of the proximal flake biface fragments also present in the collection.

Non-Flake Bifaces. Bifaces without both hafting modification and still present flake attributes are classified as non-flake bifaces. Numerous subgroups appear within the 15 non-flake bifaces (62.5% of the formal biface category). Two subcategories of completed bifaces, oval and triangular, together with proximal and distal fragments, a burinated biface, "thick" bifaces, and "core-tools" combine to form the category non-flake formal bifaces.

Both proximal and distal fragments are represented in the sample. The three proximal (basal) fragments are hinge fractured and are made of light tan to cream chert. Artifact A-140 exhibits straight edges, while the other two (both are larger and thicker than A-140) have slightly convex lateral edges. Cortex is present on one face of A-140 (a very large specimen) and all of the proximal fragments are biconvex in transverse outline. Extensive primary and secondary flaking is seen on these specimens.

Four distal fragments of non-flake bifaces are fairly thick and exhibit primary and secondary flaking. Half of these specimens are cream colored, while the remaining two appear to have been heat treated. No pattern of preferred morphological shape appears, aside from the fact that all are shaped to produce a

point (or tip). Biconvex transverse sections occur in all specimens. Fine secondary flaking is exhibited by one of the thermally altered specimens (A-25), while rough flaking (random) characterizes the remainder of the distal fragments.

Complete specimens were grouped by their morphological and technological attributes. Of the smaller and completely chipped specimens, two basic shapes appear: ovoid and triangular. The ovoid specimen (A-45) exhibits sinuous edges with primary and secondary flaking on both faces. No edge wear is apparent (macroscopically); however, step fractures are seen on one face. While the ovoid non-flake biface is made of pink chert with grey splotches, the triangular specimen is cream-colored chert. Edges of this artifact (A-138) are slightly convex and the distal tip is not well formed. Rough primary and secondary flaking is seen on all of the edges (lateral and basal). In the transverse section, both the ovoid and triangular non-flake bifaces are roughly biconvex.

One of the bifaces (A-109) is a special specimen, thus forming its own category. Basically subtrianguloid in shape with rough primary and secondary flaking on one lateral edge, the unique attribute of the artifact is seen on the other lateral edge. Apparently this biface was used to produce a burin spall, as evidenced by the long longitudinal flake scar forming the lateral edge (see Fig. 4). Only this one artifact, termed a "burinated biface," appears from the Mariposa assemblage. This artifact was subjected to extensive wear (i.e., "nibbling" or small step fractures) on one of the edges produced by the detachment of the burin spall.

The remaining five non-flake formal bifaces can be divided into two categories: "core tool" and thick bifaces. Two "core tools" were identified, primarily on the basis of clearly observable edge wear. Without this characteristic edge wear, such "bifaces" would probably have been classified as Group VII cores (bidirectional cores). Fine grained quartzite and chert were used for manufacturing these bifaces. The function of this category of tools can only be guessed; the heavy abrasional evidence may indicate heavy chopping. Cortex remains on the faces of both specimens.

Finally, two "thick bifaces," one of light tan chert, the other a vitreous purple (heat treated), form their own category. Rough primary and secondary flaking have produced sinuous edges. The flaking dominates one face of each specimen and some cortex is still remaining on the artifacts. Both are ovoid in shape and thickly plano-convex in the transverse section.

Formal Biface Metric Data

FLAKE BIFACES

<u>Distal Fragments</u>	Length (mm)	Width (mm)	Thickness (mm)	Weight (gm)
A-16	23.25	15.0	3.2	1.0
A-47	27.15	26.65	4.4	3.5
A-105	23.25	18.6	4.55	2.1

<u>Proximal Fragments</u>	Length (mm)	Width (mm)	Thickness (mm)	Weight (gm)
A-69	33.2	19.6	8.0	5.8
A-131	40.65	34.0	8.5	15.05
<u>Complete</u>				
A-4	33.35	27.9	5.6	4.6
A-87	44.35	28.4	5.25	5.45
A-146	70.6	33.55	9.55	24.4
A-150	35.4	24.0	7.6	6.25
NON-FLAKE BIFACES				
<u>Distal Fragments</u>				
A-9	29.5	28.25	7.75	5.7
A-25	46.0	27.8	6.5	11.6
A-59	43.55	38.35	9.0	12.65
A-143	43.25	20.7	7.0	4.5
<u>Proximal Fragments</u>				
A-126	33.6	34.25	9.8	12.65
A-129	59.0	54.2	8.1	23.4
A-140	24.4	13.25	3.2	0.8
<u>Complete, Ovoid</u>				
A-46	47.0	37.0	10.65	17.3
<u>Complete, Triangular</u>				
A-138	73.2	36.0	8.2	25.2
<u>Burinated Biface</u>				
A-109	62.55	33.4	15.5	37.2
<u>Core Tools</u>				
A-127	87.65	58.65	29.7	192.45
A-141	74.7	26.45	30.6	48.5
<u>Thick Bifaces</u>				
A-136	58.0	52.0	22.0	57.2
A-137	62.0	41.6	22.5	54.7

Formal Biface Provenience Data

FLAKE BIFACES	Level	Unit	Quadrant
<u>Distal Fragments</u>			
A-16	4 (15-20 cm)	N38/W2	SW
A-47	2 (5-10 cm)	N42	SW
A-105	1 (0-5 cm)	N38/E2	NE
<u>Proximal Fragments</u>			
A-69	3 (10-15 cm)	N42/W2	NW
A-131	1 (0-20 cm)	Area B	Test 3
<u>Complete</u>			
A-4	2 (5-10 cm)	N38/W2	NW
A-67	2 (5-10 cm)	N42/W2	SE
A-146	(0-60 cm)	Test 5	SE Extension
A-150	3 (10-15 cm)	N42	SE
NON-FLAKE BIFACES			
<u>Distal Fragments</u>			
A-9	2 (5-10 cm)	N38/W2	SW
A-25	10 (60 cm)	N38/W2	N1/2
A-59	5 (20-25 cm)	N42	NW
A-143	1-2 (0-30 cm)	Test 5	NE Extension
<u>Proximal Fragments</u>			
A-126	surface	Area B	--
A-129	1 (0-10 cm)	Area B	Test 2
A-140	1 (0-15 cm)	Test 5	N1/2
<u>Complete, Ovoid</u>			
A-46	2 (5-10 cm)	N42	SE
<u>Complete, Triangular</u>			
A-138	2 (20-40 cm)	Area B	Test 3
<u>Burinated Biface</u>			
A-109	2 (5-10 cm)	N38/E2	SW

<u>Core Tools</u>	<u>Level</u>	<u>Unit</u>	<u>Quadrant</u>
A-127	surface	Area B	--
A-141	3 (30-45 cm)	Test 5	N1/2
<u>Thick Bifaces</u>			
A-136	1 (0-20 cm)	Area B	Test 3
A-137	1 (0-20 cm)	Area B	Test 3

Combining provenience information for the flake and non-flake bifaces, 16 of 23 (or 70%) of the specimens were recovered from Area A (all excavation units and test pits). Considering only flake bifaces, 89% (8 of 9) were found in Area A. On the other hand, only 57% (8 of 14) of the non-flake bifaces were located in Area A. Flake bifaces were found primarily in levels two and three, with some specimens much deeper. Four excavation units--N38/W2, N42, N38/E2 and N42/W2--and one test pit contained flake biface specimens in Area A. Non-flake bifaces excavated in Area A were evenly divided between lower contexts (greater than 15 cm below the surface) and upper contexts (0 to 15 cm below the surface). Level two exhibited more formal bifaces than any other single level, however. Three of the nine excavation units (N38/W2, N38/E2 and N42) and Test 5 were the Area A grid proveniences at Mariposa where non-flake bifaces were present. Half of the non-flake bifaces were found in Area A and half were found in Area B at Mariposa. The majority (83%) from Area B were recorded on the surface to a depth of 20 cm.

Lack of flake bifaces in Area B at Mariposa is an important point to remember. The fact that projectile points recovered from Area B context typologically date to Archaic times (see section on projectile points) combined with the lack of flake bifaces may possibly indicate that different lithic technologies were occurring at different times at Mariposa. Much more research must be sustained, however, before this possibility can be verified.

Cores

The process of removing one or more flakes from a suitable cobble or nodule necessarily forms a core. Usually this reduction process is intended to produce either flakes destined to be further worked into flake tools or the process can be one of reducing the core itself into a tool (core-tool). These two processes can be divided into separate industries if the tool reduction process has not obliterated distinctions which exist in the initial stages of the two processes.

One objective of this study is to determine, if possible, which lithic process (flake-tool or core-tool) can be associated with those peoples who inhabited the Mariposa site. Great care, therefore, in distinguishing the different types of cores present is a necessary step in deciding which industry occurred. Previous work (Hester 1975b) makes this aspect appreciably easier.

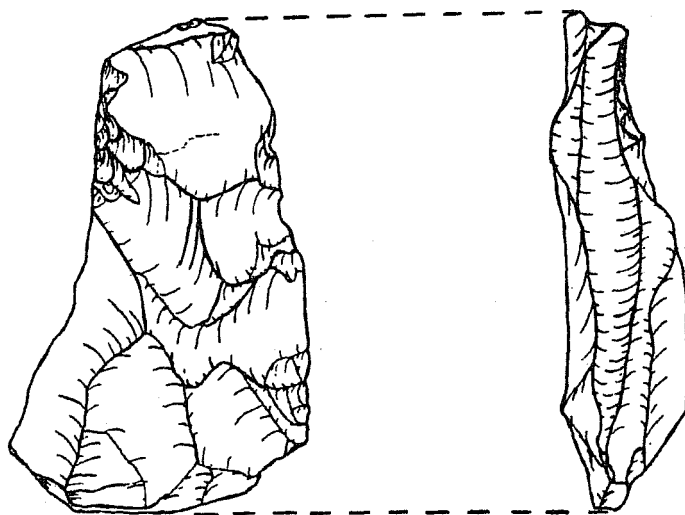


Figure 4. *Burinated Biface, A-109.*

Four criteria or attributes are recognized as being important in core classification: (1) direction of flake removal; (2) number of preparation platforms; (3) amount of suitable lithic material existing on the core; and (4) the physical "suitability" of the core (cores with step fractures and flaws--hinging fracture--are not perceived as "suitable").

Recognizing evidence that two industries (flake-tool and core-tool) existed in the Late Prehistoric context, Hester (1975b) constructed a preliminary model for lithic industries on the Rio Grande Plain. Each industry, theoretically, produces characteristic core and tool types. For the flake industry, several core types are possible: (1) roughly conical polyhedral cores, flaked unidirectionally; (2) multi-faceted (two or more flake removals form the platform) with "horizontal" platforms (sides form an 80-degree angle); (3) multi-faceted with "oblique platforms" (sides form angles between 50 and 60 degrees); (4) "ovate bifacial" cores characterized by either apparent bifacial reduction or random multi-directional flaking; and (5) cores which are flaked from natural or unprepared platforms (Hester 1975b:215-217).

Tool forms produced on flakes detached from these cores are usually small projectile points, scrapers, graters and perforators. Marginally trimmed flakes were also produced as tools. Regional Late Prehistoric sites commonly exhibit materials associated with the flake tool industry, although flake tools and cores also occur in Archaic contexts (Hester 1975b:217).

Following Hester (1975b:217), the other lithic industry "involves the manufacture of tools through the bifacial reduction of cobbles, and can be termed either a core-tool or cobble industry." Tool by-products of this industry include larger projectile points, chopping tools (core choppers) and knives. Cores associated with this industry are not well defined, but thin, tabular cores are believed necessary as the initial core morphological type (Hester 1975b:217). Data from Mariposa indicate such to be the case. Three subsequent cores have also been recognized. Using the relatively flat surface of the tabular core, flakes may be peeled off unidirectionally, forming a downward peak on the flaked face. Tabular cores may also be angularly struck on one end to prepare a platform. Subsequent reduction would peel off flakes by striking perpendicularly the prepared face. Finally, striking the initially tabular core on both ends at acute angles to the end would bifacially reduce the core (similar to flake-tool core type above).

Admittedly, the core-reduction sequence is similar to the flake-tool industry's core. Core thickness does, to some degree, indicate the relative thickness of the initial core. Those cores associated with the core-tool industry are thinner, comparatively speaking, than those produced by the flake tool industry.

Both industries can be recognized from the recovered cores collected at Mariposa. More significant, the two industry sequences can be related to each other to form one lithic core process (see Fig. 5). Prior to describing the overall process, each type of core will be briefly discussed.

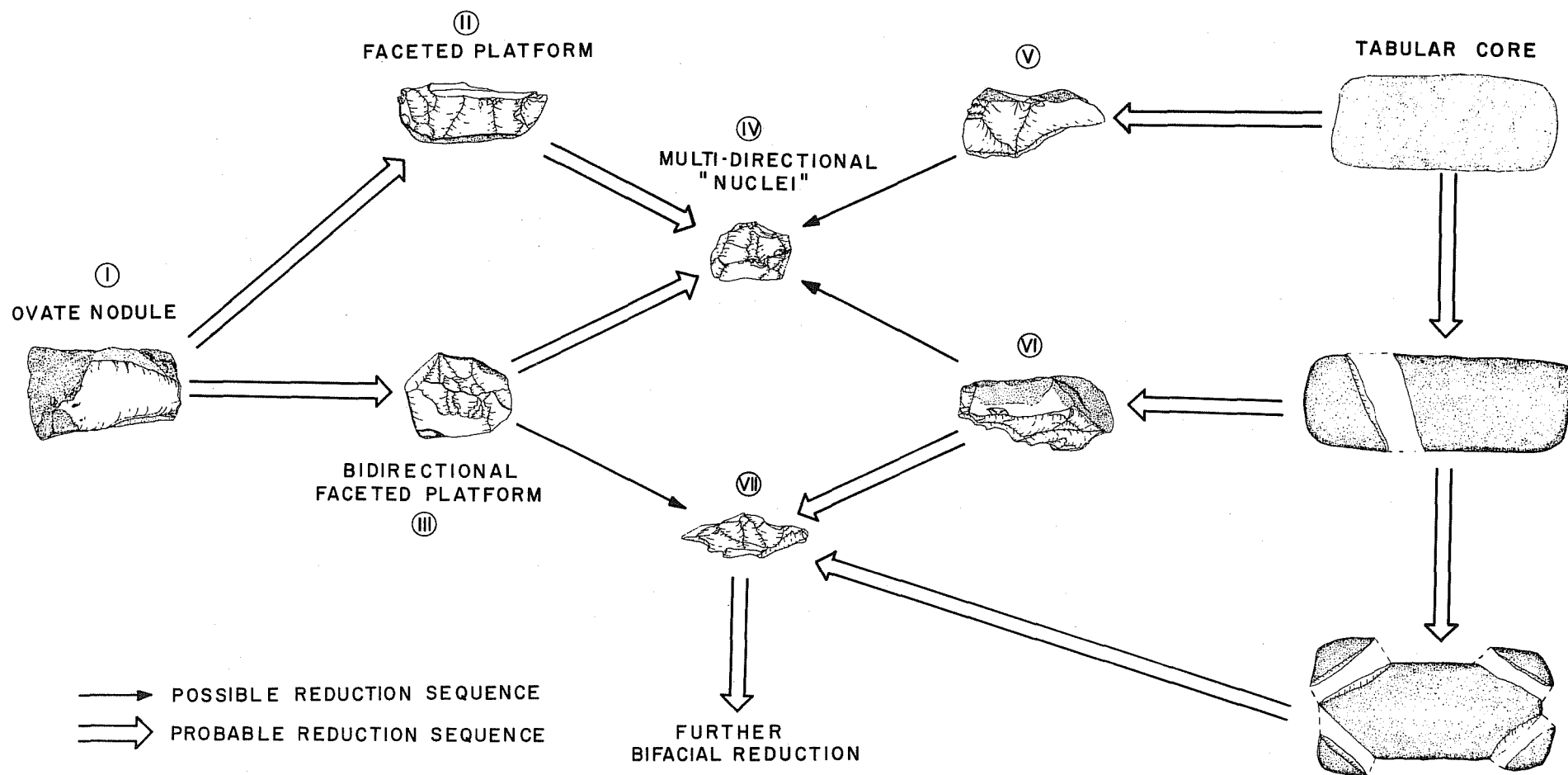


Figure 5. Core Reduction Sequence at the Mariposa Site, 41 ZV 83.

Group I Cores (one specimen, 3.2% of core sample)

This is a thickly olate core with one flake detached indicating core testing or platform preparation. Since no further work on the core exists, it is probable that a flaw in the material was detected, with the core being rejected. The flake produced could have been formed into a small tool. Group I cores are quite similar to Hester's 5 (above).

Group II Cores (Plate 2,c. Five specimens, 16.1% of core sample)

Platforms are formed by the removal of one flake (single-faceted) and subsequent flakes are detached unidirectionally and perpendicular to the single-faceted platform. All are somewhat oval in outline and retain cortex on the face opposite the platform. These are morphologically similar to Hester's 2 (above).

Group III Cores (Plate 2,d. Two specimens, 6.5% of core sample)

These cores are faceted in two directions. Sinuous edges and denticulate outlines characterize the working edge. Cortex is present opposite the edge which was flaked. Both specimens exhibit roughly oval outlines.

Group IV Cores (Plate 2,e. 13 specimens, 41.9% of core sample)

Multi-faceting and multi-directional flake removal characterize Group IV cores. Many of the cores are faceted in four or more directions. Roughly angular outlines predominate. Artifact A-71 is a fine-grained quartzite, while the remaining five specimens are made of chert. Cortex is relatively absent.

Group V Cores (Plate 2,f. Three specimens, 9.7% of core sample)

Unidirectional flake removal on a natural (cortex) platform shapes these cores. Both utilize chert as the lithic resource material. A pyramid shape is indicated, with the peak being formed at the point where many flake scars converge. These cores lie flat on the cortex face, indicating a tabular shape prior to flake removal.

Group VI Cores (Plate 3,a. Two specimens, 6.5% of core sample)

Platforms of Group VI cores are single-faceted subsequent to flake removal, oblique to perpendicular with respect to platform. Flake removal can proceed on either face or both. One specimen has been greatly reduced (A-104), and both are made of chert. Group VI cores are identical to Hester's 3 (above).

Group VII Cores (Plate 3,b. Two specimens, 16.1% of core sample)

The last category of cores is formed by bifacial reduction of tabular core material. Artifact #24 has been thermally altered. Bifacial reduction of these cores follows a multi-directional pattern which may be random or symmetrical at acute angles to the sides. This type of core is Hester's 4 (above).

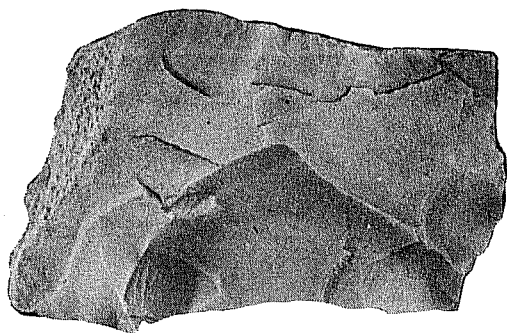
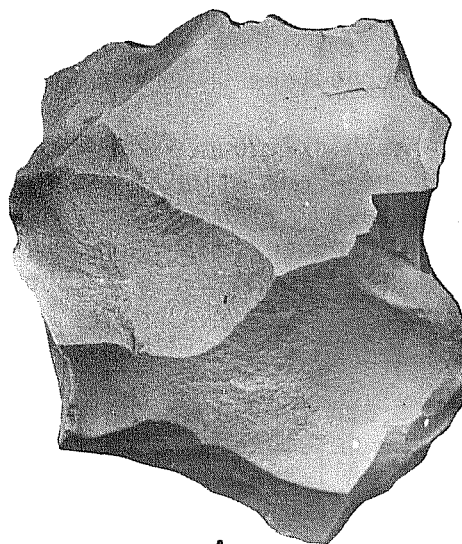
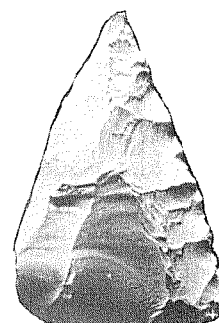
**a****b****c****d****e****f****g****h**

Plate 3. Cores and Projectile Points. a, group VI core (A-52); b, group VII core (A-33); c, distal fragment (P-28); d, medial fragment (P-46); e, basal fragment (P-44); f, preform (P-4); g, *Langtry* fragment (P-35); h, *Tortugas* point (P-31).

Core Overshot Flake

One core overshot flake (A-119) was recognized at Mariposa. This unique form of flake resembles (morphologically) biface overshot flakes "in which the thinning flake unintentionally carries across the biface and detaches a portion of the opposite edge" (Hester 1975b:218; see also Skinner 1971). The large size (relative to biface thinning overshot flakes), its degree of cortex coverage (including the striking platform), and prominent bulb of force all point to the fact that this specimen is the result of the reduction of a core which bears one edge of the original core. Gentle curvature of the remaining original core edge indicates a nodular core was the initial core shape.

Core Metric Data

	Length (mm)	Width (mm)	Thickness (mm)	Weight (gm)
<u>Group I</u>				
A-107	69.75	56.55	38.8	266.45
<u>Group II</u>				
A-18	67.55	48.2	44.65	147.1
A-74	53.0	40.7	18.0	50.85
A-100	66.0	44.1	26.0	81.9
A-135	49.7	34.65	22.4	43.1
A-144	42.0	22.65	19.0	22.0
<u>Group III</u>				
A-12	67.0	45.55	36.15	144.0
A-55	60.65	39.4	32.4	58.35
<u>Group IV</u>				
A-17	32.8	32.15	24.6	34.3
A-37	30.4	17.6	17.7	8.2
A-68	56.4	48.7	34.65	68.4
A-71	47.55	50.0	33.6	10.92
A-88	47.7	29.65	25.35	22.15
A-96	45.4	33.15	22.25	37.5
A-101	38.25	23.65	16.0	10.7
A-108	49.55	39.6	41.65	121.5
A-110	27.65	13.15	11.2	6.3
A-113	56.2	39.15	27.25	105.45
A-114	40.2	27.45	16.0	17.6
A-118	72.75	46.1	47.25	152.6
A-160	51.9	37.4	26.7	38.9

<u>Group V</u>	Length (mm)	Width (mm)	Thickness (mm)	Weight (gm)
A-44	63.6	47.6	27.1	74.2
A-123	65.35	51.35	30.8	76.1
A-161	59.6	42.4	26.6	82.4
<u>Group VI</u>				
A-33	64.3	38.2	26.4	82.3
A-104	68.0	34.0	20.55	42.4
<u>Group VII</u>				
A-24	55.6	40.75	15.75	35.9
A-52	70.5	49.7	27.0	110.2
A-116	45.65	29.4	15.25	21.5
A-125	74.55	66.65	16.6	99.2
A-139	70.25	68.25	38.7	180.3
<u>Core Overshot Flake</u>				
A-119	71.0	70.25	33.75	130.8

Core Provenience Metric Data

Artifact	Level	Unit	Quadrant
<u>Group I</u>			
A-107	1 (0-5 cm)	N38/E2	SE
<u>Group II</u>			
A-18	4 (15-20 cm)	N38/W2	SW
A-74	5 (20-25 cm)	N42/W2	NE
A-100	3 (10-15 cm)	N40/E2	NE
A-135	1 (0-20 cm)	Test 4	Area B
A-144	1-2 (0-30 cm)	Test 5	NE Extension
<u>Group III</u>			
A-12	3 (10-15 cm)	N38/W2	SW
A-55	4 (15-20 cm)	N42	NE

<u>Group IV</u>	Level	Unit	Quadrant
A-17	4 (15-20 cm)	N38/W2	SW
A-37	5 (20-25 cm)	N40	SW
A-68	2 (5-10 cm)	N42/W2	SE
A-71	3 (10-15 cm)	N42/W2	NE
A-88	3 (10-15 cm)	N42/E2	NE
A-96	2 (5-10 cm)	N40/E2	SW
A-101	3 (10-15 cm)	N40/E2	NE
A-108	2 (5-10 cm)	N38/E2	NW
A-110	2 (5-10 cm)	N38	NE
A-113	3 (10-15 cm)	N38	NW
A-114	3 (10-15 cm)	N38	NE
A-118	3 (10-15 cm)	N38	SW
A-160	3 (30-45 cm)	Test 5	N1/2
<u>Group V</u>			
A-44	2 (5-10 cm)	N42	NE
A-123	surface	Area B (1974)	--
A-161	1 (0-10 cm)	Test 2 Area B	--
<u>Group VI</u>			
A-33	2 (5-10 cm)	N40	SW
A-104	1 (0-5 cm)	N38/E2	NE
<u>Group VII</u>			
A-24	8 (35-40 cm)	N38/W2	NW + NE
A-52	3 (10-15 cm)	N42	NW
A-116	3 (10-15 cm)	N38	NE
A-125	surface	Area B (1974)	--
A-139	1 (0-20 cm)	Test 4 (1974)	--
<u>Core Overshot Flake</u>			
A-119	3 (10-15 cm)	N38	SW

Taken together, the cores (Groups I-VII) excavated at Mariposa are primarily from Area A and occur most frequently in levels two and three, where 55% of the specimens were recovered. This trend is best illustrated in the 13 Group IV core specimens, all but two of which occur in levels two and three. Group IV cores also represent the most prevalent core type recovered. Examination of core proveniences indicates that most cores are equally distributed in seven of the nine excavation units at Mariposa. Possible clusters of Group IV cores may be in N42/W2 and N38, but the specimen sample size is presently not adequate for definite statements. The clustering in N38, however, is especially strong. This unit may have been a locus for the deposition (discard) of exhausted Group IV core nuclei. These cores represent specimens which are physically not functional as core material (i.e., for the manufacture of appropriately sized flakes). Indirectly, since this unit seems to be a favored core discard area, a core preparation or use area may be located in the similar or adjacent areas.

All seven groups of cores can be technologically related in such a way as to describe the core reduction sequence practiced by the aboriginal inhabitants of Mariposa (see Fig. 4). The two different arrows indicate the (hypothetical) strength of association between core groups. This sequence has not been demonstrated to occur by replication; core group relationships are presented on the basis of inferred sequential core modifications. Two general morphological types of core resource material are available, nodular (or round) and tabular. Reduction of either type of core produced large flakes capable of use as tools (utilized, trimmed, uniface, biface, projectile point). Thus flakes were produced by the reduction of Group I (nodular) cores into either Group II and/or Group III cores and by the reduction of tabular resource material into Group V, VI and/or Group VII cores. Core overshoot flakes, such as the one excavated, are also possible by-products.

Further reduction of Groups II, III, V, VI and VII cores would produce smaller cores as one end product, as well as flakes, though these flakes would be smaller than flakes initially produced. If large enough, generated flakes from this reduction could have possibly been trimmed into or utilized as tools. They also could have been finished into flake tools (unifaces and bifaces). Reduction of Group II and Group III cores would result in Group IV cores. Group VII cores will be produced from the continued reduction of Group VI cores, although they also could have been reduced into Group IV cores as well.

Certain cores (III, VII) could have easily been reduced into bifacial tools. It seems probable that most other cores were directed toward the manufacture of flakes and, ultimately, flake tools. Moving toward the center of Fig. 5 indicates that more and more smaller flakes are being removed from cores. The net result of this process is the generation of multi-directional core nuclei (Group IV cores). Physical conditions here also dictate that the smaller cores will produce smaller flakes, and the centrally located Group IV cores are the smallest core group based on their recorded metric attributes. Core nuclei were discarded when it became physically impossible to extract flakes large enough for tool production.

Projectile Points

Artifacts bifacially worked into thin specimens with hafting modification are classified as projectile points. Fragments presumed to be included within this category are done so based on observable (and predictable) attributes which the classifier readily recognized, based on field and laboratory experience. From Mariposa, a total of 47 projectile points and fragments were excavated.

Point Fragments (Plate 3,c,d,e,f). Of the total collected sample, 12 specimens (28.6%) were fragments which could not be classified as to type with any degree of certainty. In most cases (six specimens) the fragment was the extreme distal fragment of a point. Two specimens were identified as medial fragments. Cortex is present on approximately 10% of one side and one lateral edge of a barb. While the specimen is essentially triangular in outline, it seems that attempts to thin the artifact into a final "point" form failed and the artifact was rejected. It is also apparent that on one lateral edge, an indentation or "grooved area" shows signs of utilization.

In addition to the distal and medial fragments previously noted, four basal fragments were identified as probable portions of projectile points (Points 13, 20, 24 and 37). These fragments are all thin and well worked by secondary re-touch pressure flaking. All show hinge fractures on their distal end. Parallel thinning by longitudinal flakes is seen on two of the fragments. Point 13 shows evidence of being burned, probably subsequent to manufacture. Three of these fragments are plano-convex in transverse section; the other is roughly biconvex. Longitudinally, all are plano-convex. Chert was used as the lithic raw material for these artifacts.

Provenience of Projectile Point Fragments

Point	Level	Unit	Quadrant
4	2 (5-10 cm)	N40	SW
6	1 (0-5 cm)	N42	SW
7	1 (0-5 cm)	N42	SE
12	3 (10-15cm)	N42	NE
13	3 (10-15 cm)	N42	NW
14	1 (0-5 cm)	N42/W2	SW
20	2 (5-10 cm)	N42/E2	SE
21	3 (10-15 cm)	N42/E2	NE
24	1 (0-5 cm)	N38/E2	SE
28	1 (0-5 cm)	N38	NW
33	surface		south end of site
37	3 (10-15 cm)	N38/W2	NW

Dart Points (Plate 3, g,h. Plate 4,a). Of the recovered points, five specimens were readily identified as belonging to the general category of dart points. Temporally, these artifacts are usually associated with the Archaic Period, but can persist into later Neo-American occupations. All but two of the specimens were recovered from the surface near the gully cut in Area B of CH-28. Due to this unique spatial distribution, it is assumed that these three dart points have eroded from the lower level of the gully cut. Additionally, all three dart points recovered from this area are basal fragments. Dart points are recognized to be morphologically distinct from arrow points (larger, heavier).

These three basal fragments are identified as specimens of the Langtry type (see Plate 3,g), as described by Suhm and Jelks (1962). The shoulders of the specimens are well defined, the stems contract slightly, and the bases are concave. All are made from chert which ranges in color from greyish-brown to pinkish-brown. Workmanship as a whole is not well refined and the distal hinge fracture on all of the fragments indicates that the points were broken during the latter stages of the manufacturing sequence and subsequently discarded.

Another dart point was excavated within the confines of the controlled test excavation number four at a depth of 20 to 40 cm below the present surface. This specimen is a complete *Tortugas* (see Plate 3,h) made of light tan chert with a rose strip along one lateral edge. As is characteristic of the *Tortugas* type (Suhm and Jelks 1962:249), this point is stemless with a triangular blade, straight to slightly convex edges, and a straight base. Alternate beveling combined with fine secondary retouch pressure flaking on the edges has produced a very "striking" artifact. In cross section, this point exhibits a plano-convex outline and, due to the beveling, a triangular form is seen in the transverse section. The base has been thinned on only one face by removal of one longitudinal flake. Dimensions of the *Tortugas* point follow:

Length mm - 45.2
Width mm - 16.8
Thickness mm - 2.60
Weight gm - 1.3

According to Suhm and Jelks (1962:249), this type of dart point is "a major type . . . of the Falcon Focus, continuing into the Mier Focus" and is "a minor type of the Aransas Focus, the Edwards Plateau Aspect and the Pecos River Focus." While frequently occurring with Neo-American materials, the *Tortugas* dart point is usually associated with the Archaic and has been dated at 4000 B.C. to A.D. 1000 (Suhm and Jelks 1962:249).

The remaining dart point is the smallest one in terms of overall size and weight and was recovered from the first level of Unit N38/E2 (NE quadrant) (Plate 4,a). This translucent grey point is a corner-notched, triangular point which has been fashioned from a flake. In the transverse section, the point exhibits a thick, roughly plano-convex outline, and longitudinally it shows asymmetric biconvexity. While not a "large point," this specimen does have thick, wide edges which are slightly concave and a concave base. One face of this point is almost flat and on the other face both edges have been beveled.

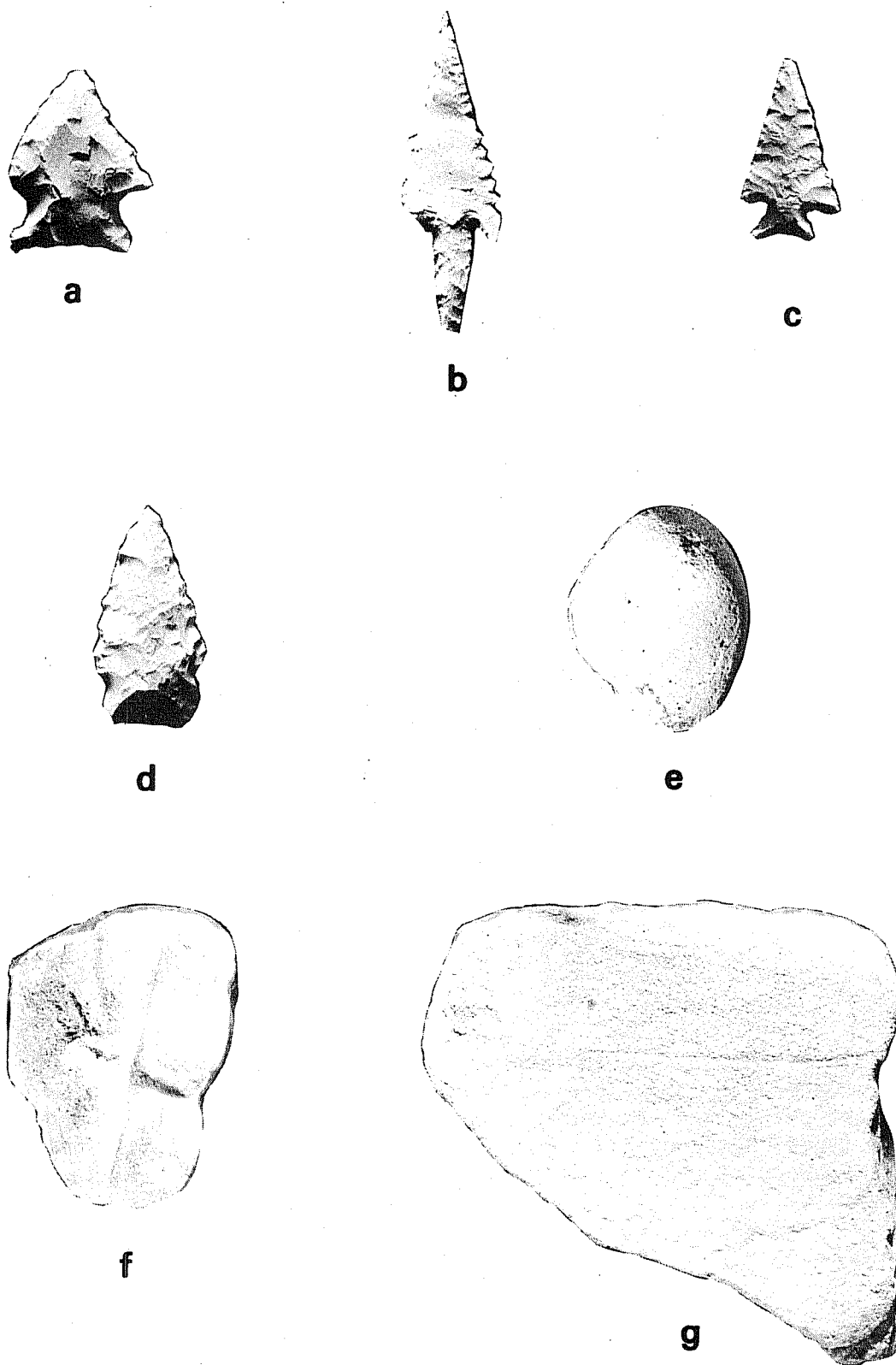


Plate 4. Projectile Points, Battered Stone and Ground Stone. a, *Edgewood* point (P-23); b, *Perdiz* point (P-40); c, *Scallorn* point (P-5); d, *Zavala* point (P-3); e, hammerstone fragment (A-26); f, grooved sandstone (A-102); g, scratched sandstone (A-106).

Both faces show extensive flaking. Interestingly, one edge has been retouched with pressure flaking while the other edge reveals multiple step fractures occurring in the same direction. Edge reworking (reshaping) may account for this.

Morphologically, the described point could be an *Ellis* or *Edgewood*. Due to basal convexity, this specimen was classified as an *Edgewood* point (Suhm and Jelks 1962:183). *Edgewood* has been noted to occur in components of the East Texas Aspect, Archaic Stage, and less consistently, in the Edwards Plateau Aspect. *Edgewood* types have been dated to the later stages of the Archaic period in Texas, around A.D. 1 (Suhm and Jelks 1962:183).

Metric data concerning this one point are:

Length mm - 27.0
Width mm - 17.0
Thickness mm - 50.0
Stem Width mm - 18.3
Stem Length mm - 7.4
Weight gm - 3.3

Provenience of Dart Points

Point	Level	Unit	Type
23	1 (0-5 cm)	N38/E2; NE1/4	(Suhm and Jelks 1962) <i>Edgewood</i>
31	2 (20-40 cm)	Test 4	<i>Tortugas</i>
34	surface	Area B, Gully	<i>Langtry</i> , Basal fragment
35	surface	Area B, Gully	<i>Langtry</i> , Basal fragment
43	surface	Area B	<i>Langtry</i> , Basal fragment

Arrow Points. Dominating the recovered projectile point category are arrow points. Generally, these projectile points appear in archaeological contexts after dart points and are indicators of the Late Prehistoric (temporal) period. Several types, most notably *Perdiz*, *Scallorn* and *Zavala* points, form the bulk of the arrow point category. Twenty-five specimens (59.5% of the total sample) were typed following descriptions published by Suhm and Jelks (1962) and Hester (1971). These will be described under the appropriate subheadings (types) and provenience data will follow the descriptions.

Perdiz Points (Plate 4,b)--Eight projectile points and fragments were classified according to the published criteria of Suhm and Jelks (1962) as *Perdiz*. One point appears to be resharpened, since it is very small. From CH-28, the *Perdiz* points have generally slender, triangular blades with straight concave edges.

Barbs are prominent on almost all of the points. The characteristic contracting stem of *Perdiz* points is present and the stem edge is straight or convex. Serrated blade edges are quite distinct on two of the specimens.

Plano-convex and biconvex longitudinal sections predominate the sample; where the point was plano-convex, it could be determined that the point was prepared from a flake. One of the specimens exhibiting plano-convexity in the longitudinal section appears to be burned (cf. Hester and Collins 1974) and was recovered in two fragments. This specimen, Point 40, was burned after manufacture, perhaps being left in a kill and "cooked" with the meat. In the transverse cross section, biconvex outlines formed the majority, while plano-convex outlines were associated with those points manufactured from flakes.

Point 32 possesses some unique characteristics. In addition to having the longest blade of the *Perdiz* specimens (4.52 mm), the edges in transverse section change from plano-convex in the basal portion to bi-triangular on the distal end, due to alternate beveling. This specimen exhibits bifacial pressure secondary retouching on both edges and the stem has been broken. On the remaining points, the degree of secondary retouch varies from extensive to nil. The smaller points probably have been resharpened.

According to Suhm and Jelks (1962:283), the *Perdiz* projectile point type is dated from A.D. 1000 to A.D. 1560 and has been associated with many Late Prehistoric complexes in Texas. Geographically, *Perdiz* points have been found in most areas of Texas. Metric data for these eight points will be summarized in table form (see next page) and their respective proveniences follow.

Scallorn Points (Plate 4,c)--A total of ten arrow points and fragments, 21% of the total projectile point sample, were recognized as belonging to the *Scallorn* type. More than 70% (seven of ten) of the *Scallorn* sample were at least 90% complete. Within this category, a fairly wide range of morphological variation was encountered. Two of the points (numbers 30 and 36) have been extensively reworked/reshaped to produce very small points.

Scallorn points are characterized by "[broad] to slender triangular blades with edges straight to convex, occasionally concave" (Suhm and Jelks 1962: 285). These corner-notched points exhibit various barb shapes and notch angles. One of the collected points exhibits serrated lateral edges. Some of the stem bases are concave or slightly concave (four of ten), while straight bases are present on the majority of the points.

Point 19 is another example of a burned arrow point. Potlids are present on both faces and color is a translucent dark red-brown. The base of Point 19 has been thinned on both faces. One edge of the stem, as well as the distal end (tip), is missing from this artifact specimen.

Morphologically, a majority of the *Scallorn* specimens are plano-convex in longitudinal section, while some are biconvex. There is a slight curvature when examined longitudinally, indicating that many of these points were manufactured from flakes. Two general outlines are seen in these specimens when viewed in transverse section: plano-convex and biconvex. Technologically,

Perdiz Points Metric Data

Point	Length mm	Width mm	Thickness mm	Stem Width mm	Stem Length mm	Weight gm
8	17.0	13.2	2.4	5.0	3.2	0.35
10	18.2	15.1	2.6	17.7	---	0.55
16	25.7	19.7	3.4	6.0	8.6	1.1
25	27.8	16.4	5.0	6.6	4.4	1.55
32	45.2	16.8	2.6	---	---	1.3
38	27.6	12.6	3.0	4.0	4.7	0.7
39	34.7	20.0	3.8	7.6	4.6	1.35

Perdiz Points Provenience

Point	Level	Unit	Quadrant
8	2 (5-10 cm)	N42	NW
10	2 (5-10 cm)	N42	SE
16	2 (5-10 cm)	N42/W2	SE
25	1 (0-5 cm)	N38/E2	SE
32	surface	N40/W2	Northern 1/2
38	3 (10-15 cm)	N38/W2	NE
39	3 (10-15 cm)	N38/W2	SE
40	2 (5-10 cm)	N40	NW
47	4 (15-20 cm)	N40	NE

Scallorn examples all present secondary retouch flaking. All but one of the points (number 17) show good workmanship, with controlled flaking on all faces.

Chert was utilized (in flake form) as the lithic material for all the artifacts examined. Color of the specimens varies from shades of light grey to pink with one dark red-brown specimen (the burned point mentioned above).

The *Scallorn* projectile point is a Late Prehistoric point which shows strong relationships (cultural?) to the Central Texas Aspect as well as Late Prehistoric foci of other Texas areas (Henrietta and Rockport Foci) (Suhm and Jelks 1962:285). Chronologically, Suhm and Jelks (1962:285) place the *Scallorn* before the occurrence of *Perdiz* points; they believe that the occurrence of *Scallorn* points in Texas spans 700 years, from A.D. 500 to A.D. 1200. Metric measurements and provenience data for the *Scallorn* points are included on the next page.

Zavala Points (Plate 4,d)--Relatively recent work in south Texas has revealed the presence in the Neo-American horizon of a small "stubby" dart-like point (Hester and Hill 1975b). A typological name, *Zavala*, has been given to this projectile point. It is still unclear whether the *Zavala* actually functioned as a dart point or an arrow point. Morphologically, this type seems to fall somewhere between dart points and arrow points. First, its length is generally smaller than dart points, but its thickness and rough flaking cast some doubt on whether it can be classified as an arrow point. Temporally, this point is found both in Neo-American and Late Archaic contexts. *Zavala* points, as a group, are manufactured on flakes and are side notched. Base edges range from slightly convex to straight and to slightly concave. Basal thinning has been noted for many specimens.

A very similar point from the Trans-Pecos area has been described by Johnson (1964:36). At Devil's Mouth, 61 *Figueroa* points were recovered whose dimensions are very similar to the *Zavala* type. Johnson's (1964:37) qualitative observations reveal other similarities:

The small size of these points may indicate that they were used as arrowheads, although they show the typical attributes of most dart points, *viz.*, relative great thickness and crude percussion chipping.

Concerning the geographical and temporal boundaries, Johnson (1964:37) felt that his *Figueroa* was a major point type of the Late Archaic in a large portion of central and west-central Texas.

From the Mariposa site, seven specimens of the *Zavala* type were excavated. Two of these points (Point 18 and Point 27) are burned. These points have all three types of bases, with one being basally notched (Point 22). As mentioned above, *Zavala* points are roughly trianguloid with straight to convex blade edges. Expanding stem types form the majority of the excavated sample. Three of the specimens are basally thinned, and all of the points show secondary retouch flake scars of the expanding variety. Seen in the longitudinal section, five specimens are roughly biconvex in outline and two are plano-convex. One of the *Zavala* points exhibits a plano-trianguloid outline in the transverse section; the rest are biconvex to rough biconvex.

Scallorn Points Metric Data

Point	Length mm	Width mm	Thickness mm	Stem Width mm	Stem Length mm	Weight gm
5	27.0	15.4	2.6	10.2	5.7	1.0
9	17.6	13.6	3.2	12.5	2.0	0.65
14	20.0	13.1	2.4	7.6	4.6	0.50
17	25.7	17.8	4.6	11.7	4.3	1.80
19	22.0	11.8	2.9	8.7	6.3	0.75
29	27.0	15.4	4.4	13.4	5.0	1.50
30	18.7	15.3	3.8	13.7	5.4	1.0
36	17.0	13.7	3.5	13.3	4.3	0.60
41	27.6	16.2	3.8	8.1	4.3	1.40
47	23.6	15.4	3.7	7.6	2.4	

Scallorn Points Provenience

Point	Level	Unit	Quadrant	Point	Level	Unit	Quadrant
5	1 (0-5 cm)	N42	NW	29	2 (5-10 cm)	N38	NW
9	2 (5-10 cm)	N42	NW	30	1 (0-20 cm)	Area B	Test 3
14	1 (0-5 cm)	N42/W2	SW	36	2 (5-10 cm)	N38/W2	SE
17	3 (10-15 cm)	N42/W2	SE	41	3 (10-15 cm)	N40	NW
19	2 (5-10 cm)	N42/E2	NE	47	4 (15-20 cm)	N40	NE

Zavala Points Metric Data

Point	Length mm	Width mm	Thickness mm	Stem Width mm	Stem Length mm	Weight gm
2	41.6	18.4	8.1	16.6	7.0	5.7
3	33.3	17.0	5.9	14.6	8.3	3.4
18	34.6	28.3	5.0	15.2	7.2	3.2
22	31.5	16.8	5.0	17.0	5.4	2.7
26	24.2	16.7	6.7	15.6	6.3	2.65
27	30.4	20.7	7.3	18.0	5.0	4.1
42	34.6	17.0	6.8	15.0	6.3	4.3

Zavala Points Provenience

Point	Level	Unit	Quadrant
2	5 (20-25 cm)	N38/W2	SW
3	6 (25-30 cm)	N38/W2	NW
18	3 (10-15 cm)	N44	SE
22	1 (0-5 cm)	N38/E2	NE
26	2 (5-10 cm)	N38/E2	NE
27	1 (0-5 cm)	N38	NW
42	3 (10-15 cm)	N40	SE

As can be noted from the provenience table on page 86 *Zavala* points occur in almost all levels, with the smaller specimens occurring in the upper two levels. The preceding metric information indicates the variability present in the *Zavala* sample.

The majority of dart points recovered from Mariposa were confined to the surface of Area B and in deep levels of Area A. Only one example occurred in the upper level of an Area A excavation unit. On the other hand, only one (of 25) arrow point, a *Scallorn* occurred in Area B. It is immediately obvious that this dichotomy has important implications. Area B seems to be an Archaic locality, temporally distinct from Area A. The Mariposa site seems to have been a favored occupation area from at least Archaic times through the Late Prehistoric. Elaboration of the nature of the Archaic occupations at Mariposa cannot be presented until lower levels of the site are more completely revealed. Both the surface evidence in Area B and the deep hearth in Test 5 (Area A) indicate that Mariposa probably embodies an Archaic component in addition to the recorded Late Prehistoric component.

Perdiz points are present in great frequency in the upper three levels (and surface) of Mariposa, as 89% of the sample are recorded there. Six of the nine excavated units contained *Perdiz* points, with N42 and N38/W2 having more than one specimen in a level. As for *Scallorn* points, a similar 89% of these projectile points are situated in the upper three levels of the site. Of the six excavation units containing *Perdiz* points, four also contained *Scallorn* points. While the majority (71%) of *Zavala* points present at Mariposa occurred in levels one through three, two examples were recovered from much deeper contexts. However, since only two excavation units penetrated at least six levels, one cannot say that this pattern is useful for the entire site. Both examples from levels five and six occur in N38/W2. The fact that *Zavala* points occur in quite different excavation units than both *Perdiz* and *Scallorn* may be significant.

In summary, *Perdiz* and *Scallorn* projectile points occur with quite similar frequencies in the upper three levels of Mariposa. *Zavala* points, while occurring in similar archaeological contexts as both *Perdiz* and *Scallorn*, seem to appear before these types. This picture is quite in line with data from other Late Prehistoric sites in the vicinity of Mariposa (Hester and Hill 1975b). Due to the late C-14 determination for Mariposa, the temporal parameters for the existence of these point types must be expanded, at least to A.D. 1650.

Ground, Battered, and Polished Stone

Analysis concerning this category of lithic artifacts offered surprising results. While most Late Prehistoric sites in this area contain numerous hammerstones (Hester and Hill 1975b:9), very few (two) were recovered from Mariposa, and one of these is a fragment (A-26; Plate 4,e). Smoothed sandstone slabs, not usually reported from south Texas sites, were relatively frequent. Five specimens were excavated from Mariposa. One of these specimens, Artifact #41, consisted of three fragments, two of which fit together. All four of these fragments were located in level 1 (0-5 cm) of the southwestern quadrant of Unit N42. Well-worn corners are evident on the two fragments which

could be joined. One unidentified ground stone with rounded corners was recorded from the same provenience.

Artifact #106 is smoothed on both faces and one face exhibits a longitudinal scratch. The artifact is stained with a dark black substance (unknown origin).

Scratches and grooving occurred on four hematite specimens and six sandstone rocks. Taken together, these artifacts form the largest class of ground stone materials. Generally, such grooves and scratches (the majority of which are longitudinal) are associated with arrow shaft straightening activities (Hester and Hill 1975b:9); these implements may also have been used to grind and prepare platforms on artifacts for ease of manufacture (see Plate 4, f and g).

Four fragmentary manos and one complete mano were also found at Mariposa. All faces and edges are uniformly worn. Limestone was the favorite working material for these grinding implements, as all but one of the manos (a fragment) consisted of this material. Interestingly, the one mano fragment which was not limestone was made of quartzite and stained with hematite (see Plate 5).

Polished stone was rare, with only one quartzite fragment (polished on one face) being recovered (Artifact #97).

All of the artifacts described above were excavated during the 1974 field season. In 1975, testing at Mariposa revealed the presence of a large hearth located approximately 60 cm below the surface (Montgomery, Moffat and Richie 1975). A hearth at such a deep level is significant in itself but careful observations revealed additional information. Nine incised stones, all located in the central portion of the hearth and relatively close in proximity to each other, were recorded in the field and were removed for further examination.

All but one of the specimens are incised on one face only. Incising on the majority of the sandstone artifacts consisted of longitudinal lines running roughly parallel. As few as two and as many as five lines were present. In a few cases, the longitudinal lines were crossed by a perpendicular transverse line. On one specimen, Artifact #159-8, a longitudinal incision was crossed by four transverse lines. While most of the specimens had parallel longitudinal incised lines, no other recurring pattern persists in the sample. Approximately half of the sandstone artifacts are rectanguloid in outline, while the remainder of the sample are irregular. Some of the specimens are quite large (e.g., A-159-8) but a few are significantly smaller (e.g., A-159-1).

Problems associated in determining the function of incised stone are numerous (Hester and Hill 1975b:13). Compounding these problems at Mariposa is the fact that sandstone rocks rather than limestone cobbles were used as raw material and that such incised rock appears in an oriented pattern within the deep hearth. Such circumstances as those at Mariposa have yet to be reported from other sites.

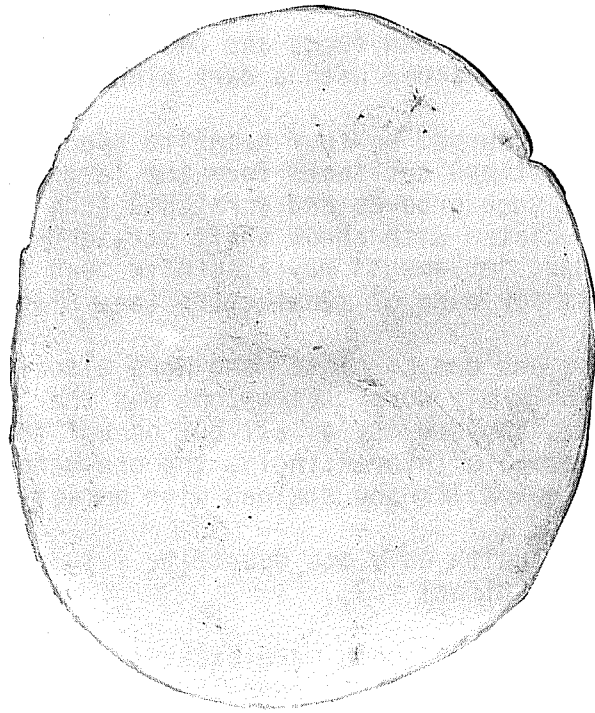
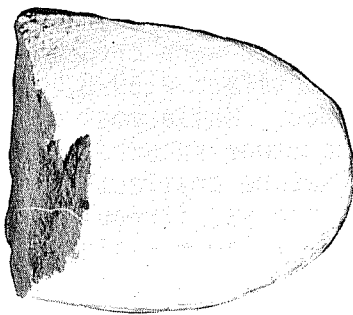
**a****b**

Plate 5. Ground Stone. a, limestone mano (A-20); b, mano fragment (A-171).

Ground, Battered or Polished Stone
Metric Data

Artifact	Length (mm)	Width (mm)	Thickness (mm)	Weight (gm)
<u>Hammerstones</u>				
A-25	33.75	27.15	20.7	20.4
A-78	52.6	40.4	58.0	224.4
<u>Smoothed Sandstone Slabs</u>				
A-36	69.6	57.5	24.6	152.1
A-40	6.8	13.35	16.4	5.1
A-41 (3)	47.7	29.65	16.7	33.85
	63.3	57.7	17.4	74.9
	33.0	28.0	16.3	25.3
A-106	87.15	67.3	28.75	132.25
A-153	115.0	98.4	37.65	626.6
<u>Scratched and Grooved Sandstone</u>				
A-73	46.45	29.55	22.55	26.75
A-79	19.55	13.25	3.25	1.2
A-83	57.4	30.0	35.65	76.45
A-84	52.85	38.65	14.45	42.55
A-102	43.45	28.0	36.2	45.1
A-115	71.5	62.0	43.35	269.7
<u>Polished Stone Quartzite</u>				
A-97	34.0	20.35	21.35	15.0
<u>Manos and Mano Fragments</u>				
A-20	86.0	72.7	42.1	385.1
A-34	43.2	36.75	37.85	68.75
A-99	57.0	44.0	19.9	55.8
A-124	74.55	38.0	45.55	182.1
A-171	60.2	25.7	36.9	77.1
<u>Smoothed Hematite</u>				
A-156	18.0	17.3	6.7	3.1

Artifact	Length (mm)	Width (mm)	Thickness (mm)	Weight (gm)
<u>Grooved and Scratched Hematite</u>				
A-50	44.0	30.6	16.6	48.6
A-157	48.4	39.9	20.5	50.5
A-158	20.2	19.4	12.0	6.6

Ground, Pecked, or Polished Stone
Provenience

Artifact	Level	Unit	Quadrant
<u>Hammerstones</u>			
A-25	10 (55-65 cm)	N38/W2	N1/2
A-78	4 (15-20 cm)	N44	SW
<u>Smoothed Sandstone Slabs</u>			
A-36	5 (20-25 cm)	N40	SW
A-40	1 (0-5 cm)	N42	SW
A-41	1 (0-5 cm)	N42	SW
A-106	1 (0-5 cm)	N38/E2	SE
A-153	surface	Area B	West of Excavations

Scratched and Grooved Sandstone

A-73	4 (15-20 cm)	N42/W2	SE
A-79	1 (0-5 cm)	N42/E2	SW
A-83	2 (5-10 cm)	N42/E2	NE
A-84	2 (5-10 cm)	N42/E2	SE
A-102	3 (10-15 cm)	N40/E2	SW
A-115	3 (10-15 cm)	N38	NE

Polished Stone Quartzite

A-97	2 (5-10 cm)	N40/E2	SE
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Manos and Mano Fragments

A-20	5 (20-25 cm)	N38/W2	NE
A-34	2 (5-10 cm)	N40	SW
A-99	2 (5-10 cm)	N40/E2	SE
A-125	surface	Area B (1974)	--
A-171	2 (5-10 cm)	N42	SW

Artifact	Level	Unit	Quadrant
<u>Smoothed Hematite</u>			
A-156	4 (15-20 cm)	N38/W2	SE
A-20	5 (20-25 cm)	N38/W2	NE
A-34	2 (5-10 cm)	N40	SW
A-99	2 (5-10 cm)	N40/E2	SE
A-124	surface	Area B	--
<u>Grooved and Scratched Hematite</u>			
A-50	2 (5-10 cm)	N42	SE
A-157	6 (25-30 cm)	N38/W2	NW
A-158	2 (5-10 cm)	N40	NE

All nine excavation units at Mariposa contained some form of ground or polished stone. Most of these artifacts were obtained from the surface of the site to the third excavation level. Both of the hammerstones came from deeper contexts (levels four and ten). Smoothed sandstone slabs came mainly from the first level and surface of the site, with N42 containing two specimens in the first level. Scratched and grooved sandstone frequency is highest in the first three levels of the site, and levels one and two of N42/E2 contained half of the site's specimens. Smoothed hematite as well as grooved and scratched hematite occurs in upper contexts, especially in level two and in lower levels (levels four, five and six). Several units (N38/W2, N40, N42, N40/E2) contained four or more specimens of various types of ground stone. Those artifacts in N38/W2 were recovered primarily from deeper contexts.

Historic Materials

A single lead bullet, Artifact #133, represents the only historic material recovered from Mariposa. The bullet (probably .45 caliber) measures 16.2 mm in length, the width and thickness are both 11.2 mm, and it weighs 13.6 gm. Provenience of the artifact indicates that it came from the first level of a test pit (Test 4) in Area B. Since Area B has been the focus of recent road-cutting operations and erosional processes, the lead bullet is undoubtedly intrusive.

Flake Analysis

Analysis of the unmodified (unaltered) flake material from Mariposa provides insight into many aspects of prehistoric behavior. Theoretically, flake analyses help determine the kinds of tool manufacturing activities at a site, the "structure" or the outlined model of reduction techniques, and temporal changes in technology. Where the data exist, comparison of technologies can

also be undertaken. The data herein are the outcome of reviewing the literature concerning debitage analysis with and near the Rio Grande Plain. Definition of terms generally follows Shafer's (1969) study at Robert E. Lee Reservoir Basin (in west central Texas) along with work of Hill and Hester (1971), Hester and Hill (1972) and Hester (1975b) in south Texas.

Those flakes which are completely covered with cortex on the dorsal surface are termed Primary Cortex Flakes. Technologically, the attribute of complete cortex coverage indicates that these flakes result from the initial decortication of a core (Hester and Hill 1972:46). Subsequent reduction of a core produces flakes which retain some dorsal cortex. These are termed Secondary Cortex Flakes. Further core reduction yields Interior Flakes which are devoid of cortex on the dorsal surface.

In addition to the three types of flakes manufactured as by-products of core reduction, another type of flake can be readily identified. Lipped flakes, or bifacial thinning flakes, are, as the second name implies, evidence for the bifacial reduction technique. Thought to be produced by soft hammer percussion (Epstein 1964:64; Shiner 1970:31), bifacial thinning flakes have attributes which consistently occur. According to Shiner (1970:32), these attributes are:

- 1) Oval platform; 2) platforms between about 40 and 60 degrees to bulbar surface; 3) faceted platform; 4) diffuse bulb without the tiny flake near the center of the bulb; 5) a narrowing and thinning of the flake before it widens out and sometimes thickens again; 6) a curvature of the flake itself.

The overhanging "lip" on the ventral surface is the easiest attribute to observe on these flakes. Flake specimens which lack an identifiable striking platform or bulb of percussion are categorized as flake fragments.

Concomitant with the study of flake attributes, classification of platforms reinforces statements concerning lithic technology. Five platform types are most commonly recognized (cf. Hester and Hill 1972). These are: (1) cortex platforms, whose striking platform has been unmodified; (2) single faceted platforms, formed by removal of one flake to prepare the striking platform; (3) multifaceted platforms constructed by the detachment of several faceting flakes; (4) convergent platforms (Λ -shaped), caused by removing flakes lying relative to each other in convergent planes (Hester 1971:106,5), and (5) crushed (shattered) platforms (Hester and Hill 1972:46-48).

Analysis of the Mariposa flake sample follows the lines of Hester and Hill (1972). Separate tabulation of flake types and flake platform types both in number and in relative frequency are prepared for the overall sample by level and in each unit of each level respectively. Metric dimensions are not included. Hester and Hill (1972:48) have prepared range dimensions of length, width and thickness for the four main types of flakes (primary cortex, secondary cortex, interior, and biface thinning flakes).

Flake Types

As stated above, five flake types were recorded from materials excavated at Mariposa. These are presented, by unit and level provenience, in Table 2. Similar information, obtained from less exact methods (i.e., Test Pits), are provided in Table 3. This information is summarized, by level, in Table 4 where relative percentage is the quantity recorded (this is only for 1974 excavations).

Centering on material excavated in 1974, an overall statement of the flake types represented at Mariposa can be formulated. Here, all levels and units are combined to show the following breakdown, by number and percent, of the five flake types:

	Number Recovered	Percentage of Flake Category
Primary Cortex Flakes	45	2.0
Secondary Cortex Flakes	319	13.9
Interior Flakes	289	12.6
Biface Thinning Flakes	247	10.8
Flake Fragments	1,397	60.8
Total	2,297	100.0

If one removes the flake fragment category from the above information, the following numbers of specimens, and their relative frequency, by type, are generated:

	Number Recovered	Relative Percentage
Primary Cortex Flakes	40	4.4
Secondary Cortex Flakes	321	35.7
Interior Flakes	291	32.3
Biface Thinning Flakes	248	27.6
Total	900	100.0

Secondary cortex flakes, interior flakes, and biface thinning flakes contribute 95% of the identifiable flake types, with secondary cortex flakes being the most frequent. Interior flakes occur the second most frequently, followed by biface thinning flakes. Ramifications for these results are discussed in Chapter VIII (Lithic Technology).

The other attributes observed on flakes recovered from Mariposa may be grouped as flake striking platform types. Five categories here were also analyzed: single facet platforms, multi-facet platforms, crushed or shattered platforms, cortex platforms and convergent platforms. For the sake of brevity, all the data have been compiled in Table 5. Here each platform type is quantified by

TABLE 2
FLAKE PROVENIENCE AND COUNT: EXCAVATED UNITS
(1974) MARIPOSA SITE

FLAKES	N38/W2												N40				
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5
Primary Cortex Flakes	--	3	1	2	--	2	1	--	--	--	--	--	1	2	3	3	1
Secondary Cortex Flakes	4	10	8	9	13	4	7	4	1	4	1	1	5	26	10	16	14
Interior Flakes	8	11	6	7	3	2	8	2	2	1	1	1	3	10	10	9	13
Biface Thinning Flakes	2	3	7	5	4	7	7	1	1	--	4	1	4	12	5	3	4
Flake Fragments	13	63	42	29	45	34	33	20	5	--	9	4	9	56	23	32	53

TABLE 2 (continued)

FLAKES	N42						N42/W2					N44				
	1	2	3	4	5	6	1	2	3	4	5	1	2	3	4	5
Primary Cortex Flakes	--	1	3	--	--	--	--	--	--	--	1	1	--	--	--	--
Secondary Cortex Flakes	9	7	5	9	--	1	5	7	5	3	9	7	7	4	2	3
Interior Flakes	11	10	11	11	6	1	9	13	10	8	9	4	2	2	2	2
Biface Thinning Flakes	4	4	7	4	--	1	4	4	3	7	12	5	5	3	3	10
Flake Fragments	37	57	52	35	21	4	15	31	29	40	32	17	20	8	12	12

TABLE 2 (continued)

FLAKES	N42/E2			N42/E2			N42/E2			N38			TOTAL
	1	2	3	1	2	3	1	2	3	1	2	3	
Primary Cortex Flakes	2	2	--	3	--	2	2	1	--	2	1	2	40
Secondary Cortex Flakes	4	12	6	5	13	6	16	7	5	6	20	3	321
Interior Flakes	7	10	3	6	8	7	9	9	3	4	11	6	291
Biface Thinning Flakes	5	12	4	7	7	7	12	11	9	7	14	8	248
Flake Fragments	30	58	31	37	49	35	41	53	37	17	102	27	1,409

TABLE 3

FLAKE PROVENIENCE AND COUNT: TEST PITS
MARIPOSA SITE

FLAKES	Test 1 1970					Test 2 1970							Test 2 1974 Area B			Test 3 1974 Area B
	1	2	3	4	5	1	2	3	4	5	6	7	1	2	3	1
Primary Cortex Flakes	2	--	--	--	1	1	2	--	--	--	--	--	--	--	--	--
Secondary Cortex Flakes	3	5	3	2	2	18	12	5	4	5	1	--	4	1	--	--
Interior Flakes	18	5	4	2	4	31	11	6	6	2	1	--	--	--	2	2
Biface Thinning Flakes	4	3	1	1	--	6	3	3	1	--	--	--	5	2	1	--
Flake Fragments	32	16	12	6	9	52	29	22	13	8	--	1	19	10	1	16

TABLE 3 (continued)

FLAKES	Test 4 1974 Area B	Test 1 1974 Area B			Test 5 1975 Area A				NE Exten- sion		SE Exten- sion	TOTAL
		1	2	3	1	2	3	4	1-2	3-4	1	
Primary Cortex Flakes	--	--	--	--	2	--	--	--	1	--	--	9
Secondary Cortex Flakes	--	--	2	--	4	2	4	1	12	4	1	103
Interior Flakes	4	1	1	--	3	5	4	1	8	2	2	125
Biface Thinning Flakes	5	2	3	--	9	7	8	2	15	2	--	83
Flake Fragments	33	3	3	1	33	37	40	8	63	16	1	484

TABLE 4
FLAKE TYPE RELATIVE PERCENTAGE BY
EXCAVATION LEVEL (1974)

	Primary Cortex Flakes	Secondary Cortex Flakes	Interior Flakes	Biface Thinning Flakes
Level 1	6	33.3	33.3	27.3
Level 2	3.6	39.6	30.5	26.2
Level 3	6.9	28.9	33.5	30.6
Level 4	4.9	37.9	35.9	21.4
Level 5	0	38.2	32.4	29.4
Level 6	11.1	27.8	16.7	44.4
Level 7	4.3	30.4	34.8	30.4
Level 8	0	66.7	33.3	0
Level 9	0	33.3	66.7	0
Level 10	0	66.7	16.7	16.7
Level 11	0	16.7	16.7	66.7
Level 12	0	33.3	33.3	33.3

TABLE 5
FLAKE STRIKING PLATFORM TYPE RELATIVE
PERCENTAGE BY LEVEL

	Single Facet Platform	Multi-Facet Platform	Crushed/ Shattered	Convergent	Cortex
Level 1	44	31.9	7.1	3.8	13.2
Level 2	51.3	27.3	7.3	3	11.3
Level 3	46.4	35.5	6.6	0.6	10.8
Level 4	47.1	28.4	8.8	5.9	9.8
Level 5	47.4	31.6	8.4	2.1	10.5
Level 6	33.3	44.4	5.6	5.6	11.1
Level 7	13	43.5	30.4	8.7	4.3
Level 8	66.7	0	16.7	0	16.7
Level 9	66.7	33.3	0	0	0
Level 10	50	16.7	16.7	0	16.7
Level 11	16.7	66.7	0	0	16.7
Level 12	50	50	0	0	0

showing relative percentage of each type in each level. Table 6 presents data compiled for all excavation levels and units initiated in 1974 and assumed to represent the overall site assemblage. Each flake striking platform type is quantified and then converted to relative percentage. Results of this brief analysis are detailed in Chapter VIII (Lithic Technology).

TABLE 6
NUMBER RECOVERED AND RELATIVE PERCENTAGE OF
FLAKE STRIKING PLATFORMS FROM
THE MARIPOSA SITE

	Number Recovered	Relative Percentage
Single Facet Platform	416	46.2
Multi-Facet Platform	285	31.7
Crushed/Shattered Platform	72	8.0
Cortex Platform	100	11.1
Convergent Platform	<u>27</u>	<u>3.0</u>
TOTAL	900	100.0

One note of caution: below level five at Mariposa, the flake sample becomes quite small in quantity, making inferences concerning flake attributes below this level highly suspect.

Uniface Retouch Flakes

Flakes which "possess remnants of unifacially trimmed edges" (Shafer 1970:480) were provided a special category: uniface retouch flakes. Following Shafer (1970), morphological attributes of flake removal from the original uniface provide a convenient classification of these flakes. The first attribute consists of flake removal from the uniface by striking a lateral edge parallel to the uniface's ventral surface. Another attribute is the apparent removal of the flake by striking the uniface "on the ventral surface near the" tool "edge" (Shafer 1970:480). A third removal technique, striking the uniface on the dorsal surface near the edge, also removes a uniface retouch flake. Removal of the uniface tool edge ("retouching") is considered to be functionally useful, since it removes worn, steep beveled edges which probably hinder maximum tool efficiency (Shafer 1970:480-481). Detailed information concerning this process may be found in Shafer (1970).

Two uniface retouch flakes (10.5% of the category) were produced by the lateral edge striking method. Flakes removed from unifaces by the second method, ventral blows, accounted for 26.3% (five of nineteen specimens) of the Mariposa sample. These flakes also tended to be smallest in overall size. Twelve uniface retouch flakes (63.2% of the sample) were produced by striking the dorsal

surface of the uniface near the edge. Dorsal struck uniface retouch flakes tended to be larger than the ventral struck flakes. Metric dimensions and provenience information are given below.

Uniface Retouch Flakes Metric Dimensions

Artifact	Length (mm)	Width (mm)	Thickness (mm)	Weight (gm)
<u>Laterally Struck</u>				
A-21	30.6	10.55	7.0	1.5
A-180	33.1	10.6	8.2	5.0
<u>Ventrally Struck</u>				
A-174	20.0	18.0	7.9	4.3
A-175	20.6	15.5	4.4	3.4
A-177	15.7	10.5	3.7	2.6
A-178	14.6	12.2	3.2	2.4
A-179	17.1	14.6	6.3	2.8
<u>Dorsally Struck</u>				
A-167	17.7	16.0	8.7	4.0
A-168	19.5	12.1	5.0	2.8
A-176	17.5	15.4	5.0	2.8
A-184	19.6	16.1	4.6	2.8
A-186	21.2	13.0	7.7	3.5
A-187	16.5	10.6	2.9	2.2
A-188	21.4	20.9	5.7	3.6
A-189	19.5	14.0	4.5	--

Uniface Retouch Flakes Provenience

Artifact	Level	Unit	Quadrant
<u>Laterally Struck</u>			
A-21	6 (25-30 cm)	N38/W2	NW
A-180	4 (15-20 cm)	N40	NE

Artifact	Level	Unit	Quadrant
<u>Ventrally Struck</u>			
A-174	1 (0-20 cm)	Test 3	Area B
A-175	5 (20-25 cm)	N42/W2	SW
A-177	2 (5-10 cm)	N42	NE
A-178	2 (5-10 cm)	N42	NW
A-179	2 (5-10 cm)	N42	NW
<u>Dorsally Struck</u>			
A-167	4 (15-20 cm)	N44	SW
A-168	2 (5-10 cm)	N38/E2	SW
A-176	1 (0-5 cm)	N40/E2	SE
A-184	3 (10-15 cm)	N42	SW
A-186	1 (0-5 cm)	N42	NE
A-187	5 (20-25 cm)	N42	NE
A-188	3 (10-15 cm)	N40/E2	NW
A-189	2 (5-10 cm)	N38/W2	SW

Over half (52.6%, 10 of 19) of the uniface retouch specimens occur in the upper three levels of Mariposa. More significantly, a distinct clustering of ventrally struck uniface retouch flakes was found in the second level of excavation unit N42. This appears to be a locus for uniface rejuvenation activities, i.e., where worn or dull steep uniface bevels were removed to prepare more efficient tools (Shafer 1970).

Burned Rock

All examples of burned rock were collected during the 1974 excavations. This material was recorded and cataloged for each quadrant of every excavation unit. The majority (numerically) of the burned material was sandstone, but occasional specimens of quartzite and flint were recovered. Both the number of burned rock recorded in each excavation unit and the total weight (in grams) of the collected burned rock (again in each excavation unit) are presented in Tables 7 and 8, respectively. Combining the information provided by these two tables gives the number of grams per burned rock for each excavation unit level (Table 7). An "average" burned rock weight for each level is also indicated in Table 8. Because no other quantitative information was undertaken in the burned rock analysis, no idea of the variability in the burned rocks can be presented. Tables 7 and 8 provide an initial view of the average variability

between the first three excavated levels and present the variability of quantity and weight of recovered burned rocks per level between excavation units.

Examination of Table 7 shows that the number of burned rocks is highly variable both between excavation units in particular levels and between levels. Levels six through twelve are not discussed since less than five excavation units penetrated these levels. Levels two and five showed the highest number of burned rocks per level. The third level contained the lowest number of burned rocks. These data may indicate the levels (two and five) most heavily used or occupied at Mariposa, if one assumes that scattered burned rocks reflect intensity of occupation. Two separate occupations may have also occurred. Within the first five excavated levels at Mariposa, some excavation units consistently provided either high or low burned rock counts. N44, through the initial five levels, contained uniformly low numbers of burned rocks. High burned rock counts are observed in excavation units N42 and N42/W2. This pattern is also seen in Table 8, where the data are weight rather than number of burned rocks. Again, N44 has low values through the first five levels, but here N38/W2 and N40 contained the highest weights (instead of N42 and N42/W2). Turning to Table 9, one gains an idea of the relative size (here measured as average grams per rock) of the burned rock recovered. Level three shows the largest values, with levels four and five (11.6 grams/rock and 12.0 grams/rock, respectively) also containing large values. Inspection of the individual excavation units indicates a different pattern from the previous tables. Low values, probably indicative of "smaller" burned rocks, are obtained consistently from two excavation units--N42 and N42/W2. Highest values are seen in N40 and N38/E2, while the overall level itself averaged the lowest values compared to the remaining upper four levels.

Conclusions from the above burned rock information must remain tenuous. While nine excavation units were cleared to three levels (15 cm below the surface), only five were excavated to five levels and two to level six. Excavation unit N38/W2 was the only unit which was excavated greater than six levels. Consequently, valid inferences concerning the significance of variability between levels and between excavation units within levels can only be proposed for those units excavated to five levels. If one assumes that number of burned rocks is an indicator of site usage, then this evidence from Mariposa points to maximum occupational activity at level two and level five. This same possibility arises when one considers the weight of burned rock recovered. While many areas revealed strong indicators of hearth activity, in one specific area--excavation unit N44--unusually low values were recorded from the first two tables. However, the significance of this focus of low activity is not clear. This uncertainty is compounded further when one considers the third table (Table 9). Here the low values of number of burned rocks and weight of burned rock are combined and indicate relatively fewer but larger burned rocks.

Overall, the recording of burned rock recovered from the 1974 excavations at Mariposa reflects that the density of burned rocks is greatest in two levels, when one considers the number and weight of burned rocks. One unit which recorded low amounts of number and weight of burned rocks at the same time had relatively large pieces of burned rock within it.

TABLE 7

NUMBER OF BURNED ROCKS RECOVERED

	N38/W2	N40	N42	N42/W2	N44	N42/E2	N40/E2	N38/E2	N38	Average	Total
Level 1	103	99	166	96	106	63	115	192	125	118.3	1065
Level 2	237	156	193	172	82	186	167	146	271	178.9	1610
Level 3	107	82	147	148	29	97	103	71	213	110.8	997
Level 4	121	184	203	248	39	---	---	---	---	159.0	795
Level 5	175	224	249	315	79	---	---	---	---	208.4	1042
Level 6	161	---	49	---	---	---	---	---	---	105.0	210
Level 7	145	---	---	---	---	---	---	---	---	145.0	145
Level 8	146	---	---	---	---	---	---	---	---	146.0	146
Level 9	20	---	---	---	---	---	---	---	---	20.0	20
Level 10	48	---	---	---	---	---	---	---	---	48.0	48
Level 11	161	---	---	---	---	---	---	---	---	161.0	161
Level 12	44	---	---	---	---	---	---	---	---	44.0	44
TOTAL	1468	745	1007	979	335	346	385	409	609	122.0	6283

TABLE 8

GRAMS OF BURNED ROCK RECOVERED

		N38/W2	N40	N42	N42/W2	N44	N42/E2	N40/E2	N38/E2	N38	Average	Total
Level	1	789.6	1,561.3	1308.2	371.5	610.8	536.0	787.9	2518.0	938.1	1046.8	9,421.4
Level	2	2,608.0	1,800.8	1402.3	1545.5	505.9	1630.8	2638.7	1675.1	3241.4	1894.3	17,048.5
Level	3	2,819.2	1,217.6	820.8	1585.2	544.2	1339.4	2286.8	1278.8	2949.7	1649.1	14,841.7
Level	4	1,644.9	2,625.6	1623.7	2287.7	509.9	---	---	---	---	1738.4	8,691.8
Level	5	3,507.4	3,237.1	1338.4	2954.7	838.1	---	---	---	---	2375.1	11,875.7
Level	6	2,146.0	---	115.2	---	---	---	---	---	---	1130.6	2,261.2
Level	7	3,257.3	---	---	---	---	---	---	---	---	3257.3	3,257.3
Level	8	2,287.0	---	---	---	---	---	---	---	---	2287.0	2,287.0
Level	9	630.7	---	---	---	---	---	---	---	---	630.7	630.7
Level	10	1,071.2	---	---	---	---	---	---	---	---	1071.2	1,071.2
Level	11	4,850.8	---	---	---	---	---	---	---	---	4850.8	4,850.8
Level	12	1,213.5	---	---	---	---	---	---	---	---	1213.5	1,213.5
TOTAL		26,825.6	10,442.4	6608.6	8744.6	3008.9	3506.2	5713.4	5471.9	7129.2	1928.7	77,450.8

TABLE 9

GRAMS PER BURNED ROCK RECOVERED

	N38/W2	N40	N42	N42/W2	N44	N42/E2	N40/E2	N38/E2	N38	Average	Total
Level 1	7.7	15.8	7.9	3.9	5.8	8.5	6.9	13.1	7.5	8.6	77.1
Level 2	11.0	11.5	7.3	9.0	6.2	8.8	15.8	11.5	12.0	10.3	93.1
Level 3	26.3	14.8	5.8	10.7	18.8	13.8	22.2	18.0	13.8	16.0	144.2
Level 4	13.6	14.3	8.0	9.2	13.0	--	--	--	--	11.6	58.1
Level 5	20.0	14.5	5.4	9.4	10.6	--	--	--	--	12.0	59.9
Level 6	13.3	--	2.4	--	--	--	--	--	--	7.9	15.7
Level 7	22.5	--	--	--	--	--	--	--	--	22.5	22.5
Level 8	15.7	--	--	--	--	--	--	--	--	15.7	15.7
Level 9	31.5	--	--	--	--	--	--	--	--	31.5	31.5
Level 10	22.3	--	--	--	--	--	--	--	--	22.3	22.3
Level 11	30.1	--	--	--	--	--	--	--	--	30.1	30.1
Level 12	27.6	--	--	--	--	--	--	--	--	27.6	27.6
TOTAL	241.6	70.9	36.8	42.2	54.4	31.1	44.9	42.6	33.3	18.0	597.8

Non-Lithic Material

Faunal Remains

Almost all levels and units excavated at Mariposa contained bone materials. The vast majority of these were unidentifiable fragments. Levels one and two retained the lowest amount of bone, while higher numbers were recovered in the remaining levels, especially level three. Faunal remains are conspicuously absent from the first three levels of N40, N42/W2 and N40/E2.

Identifiable remains are limited to a calcaneus first and second phalange of the white-tailed deer (*Odocoileus virginianus*). Four second phalanges and a third phalange (claw) attributed to a medium size mammal (coyote?) were all excavated from level five of N40, in the northwest quadrant. A possible human lower lateral incision was also recorded from this provenience.

Identification of the faunal remains was aided by Gilbert (1973) and Bass (1971). Further statements concerning the bone remains at Mariposa are hindered by a general lack of identifiable material, although several bone fragments were burned to charred.

Invertebrate Remains

Remains of both freshwater and land gastropods, along with freshwater mussels, were recovered from excavation at Mariposa. Land gastropods from the site include *Rabdotus* sp. and *Polygyra* sp. *Helisoma* sp. were the freshwater gastropods recovered from archaeological contexts at Mariposa, and *Unio* sp. represent the freshwater mussels present at the site. Statements concerning areal environments and possible aboriginal subsistence preferences are usually applied to the invertebrate fauna associated with archaeological sites (Suhm 1957; Clark 1973; Allen and Cheatum 1961; Hester 1975d; Hester and Hill 1975a, 1975b), although other applications have been suggested (cf. Allen and Cheatum 1961).

Preferred habitats of the land gastropods recovered from Mariposa reflect present environmental conditions. *Rabdotus* sp. gastropods are at home in semi-arid climates where brush exists and *Polygyra* sp. gastropods are commonly found in either sparsely wooded areas or deep woodlands (Allen and Cheatum 1961:294-295). Permanent streams with vegetation, whose flow may be sluggish to rapid, are the preferred habitat of *Helisoma* sp. All these conditions--semi-arid climate, brush, wood-lined creeks with permanent water--occur today at Mariposa, and the presence of these gastropods in archaeological contexts strongly suggests that the present environmental conditions at Mariposa have not radically changed since Late Prehistoric occupations at the site. In addition to environmental statements, possible subsistence patterns have been postulated by various investigators to account for the large amounts of recovered gastropod material (Suhm 1957; Hester 1975d; Hester and Hill 1975a, 1975b).

Of the 5,182 gastropod specimens recovered from Mariposa, 4,983 were identified as *Rabdotus* sp. *Rabdotus* sp. accounts for 96% of the collected gastropods. Considering the large number of *Rabdotus* sp. specimens present and the fact that

many of these were large adult specimens, it is highly probable that these gastropods represent a food item exploited by the Late Prehistoric occupants. Since practically none of the *Rabdotus* sp. shells were burned, extraction after boiling may have occurred (Hester and Hill 1975a). Ethnographic accounts referring to gastropod exploitation by Indian groups in southern Texas strengthen arguments that these invertebrates were an aboriginal food item in the past.

Examination of Table 10 points to the fact that maximum deposition of *Rabdotus* sp. occurred in levels two and three of Mariposa. Similar conclusions can be reached when considering all gastropod remains excavated at the site (see Table 11). Level one of Mariposa contains the lowest number of recovered gastropods. Some loci of intense *Rabdotus* sp. utilization appear to center in excavation units N42, N40/E2 and N38 of levels two and three. In levels two and three, relatively small numbers of *Rabdotus* sp. specimens occur in N40 and N42/E2. Areas of Mariposa appear to have been differentially utilized with respect to the deposition of *Rabdotus* sp. The relatively small number of excavated *Polygyra* sp. and *Helisoma* sp. specimens does not allow safe inferences concerning their depositional characteristics. More information concerning possible spatial patterning of gastropods will be discussed in a later section. Recorded quantity and provenience of *Rabdotus* sp., *Polygyra* sp., and *Helisoma* sp. gastropods are given in Tables 10, 12, and 13 respectively. Combined totals and associated provenience are presented in Table 11.

Freshwater mussels of the *Unio* sp. variety were also recorded at Mariposa. These bivalves represent a food source readily accessible in Turkey Creek. *Unio* sp. may have been extracted for food or as ornamental items (Hester and Hill 1975b) by aboriginal populations. Only *Unio* sp. fragments, most of them quite small, were recovered from archaeological contexts. Table 14 illustrates *Unio* sp. fragment quantity and associated provenience at Mariposa.

Of the 338 excavated fragments, 70% (235) were situated in levels two and three. Large numbers of fragments, possibly representative of *Unio* processing loci, are seen at N38/E2 in level one. Level two, which contained the largest level count, contained four excavation units exhibiting over 20 recovered fragments: N38/W2, N42/E2, N32/E2 and N38. Counts of 20 or more fragments in level three occur in N42/E3 and N40/E2. In level four, N38/W2 represents a loci of possible *Unio* sp. utilization. No excavation unit illustrated high counts through all excavated levels; N42/E2 and N38/E2 tended to have high numbers of fragments in levels two and three. The fragments of *Unio* sp. indicate that loci of possible processing are randomly scattered, temporally, with no preferred location being utilized during the aboriginal occupation(s). However, in level two, the *Unio* sp. fragments occur in greatest quantity in four contiguous excavation units forming the southern margin of the 1974 excavation area. Further excavations must be awaited before assessing the significance of this pattern.

Features

Four hearths and one burned rock concentration were recorded during the 1974 excavation and the 1975 testing of Mariposa. The burned rock concentration

TABLE 10

RABDOTUS SP. SPECIMENS RECOVERED BY UNIT LEVEL

	N38/W2	N40	N42	N42/W2	N44	N42/E2	N40/E2	N38/E2	N38	Average	Total
Level 1	37	8	58	38	12	7	4	43	14	18.4	221
Level 2	90	91	204	56	105	88	161	150	241	98.8	1186
Level 3	206	24	179	102	54	71	181	135	237	99.1	1189
Level 4	179	96	236	162	133	--	--	--	--	161.2	806
Level 5	204	186	325	155	106	--	--	--	--	195.2	976
Level 6	113	--	46	--	--	--	--	--	--	79.5	159
Level 7	118	--	--	--	--	--	--	--	--	118.0	118
Level 8	137	--	--	--	--	--	--	--	--	137.0	137
Level 9	54	--	--	--	--	--	--	--	--	54.0	54
Level 10	32	--	--	--	--	--	--	--	--	32.0	32
Level 11	60	--	--	--	--	--	--	--	--	60.0	60
Level 12	45	--	--	--	--	--	--	--	--	45.0	45
TOTAL	1275	405	1048	513	410	166	346	328	492	71.5	4983

TABLE 11
LAND GASTROPODS RECOVERED BY UNIT LEVEL

	N38/W2	N40	N42	N42/W2	N44	N42/E2	N40/E2	N38/E2	N38	Average	Total
Level 1	39	8	66	39	14	7	4	44	15	26.2	236
Level 2	93	96	221	56	108	95	163	162	261	139.4	1255
Level 3	212	24	189	103	54	77	191	141	242	137.0	1233
Level 4	182	96	247	162	133	--	--	--	--	164.0	820
Level 5	208	186	338	163	106	--	--	--	--	200.2	1001
Level 6	114	--	46	--	--	--	--	--	--	80.0	160
Level 7	120	--	--	--	--	--	--	--	--	120.0	120
Level 8	137	--	--	--	--	--	--	--	--	137.0	137
Level 9	59	--	--	--	--	--	--	--	--	59.0	59
Level 10	38	--	--	--	--	--	--	--	--	38.0	38
Level 11	71	--	--	--	--	--	--	--	--	71.0	71
Level 12	52	--	--	--	--	--	--	--	--	52.0	52
TOTAL	1325	410	1107	523	415	179	358	347	518	102.0	5182

TABLE 12

POLYGYRA SP. SPECIMENS RECOVERED BY UNIT LEVEL

	N38/W2	N40	N42	N42/W2	N44	N42/E2	N40/E2	N38/E2	N38	Average	Total
Level 1	1	--	1	--	--	--	--	--	--	0.2	2
Level 2	1	3	--	--	1	3	1	6	11	2.9	26
Level 3	2	--	2	--	--	2	4	5	2	1.9	17
Level 4	1	--	9	--	--	--	--	--	--	2.0	10
Level 5	2	--	12	7	--	--	--	--	--	4.2	21
Level 6	--	--	--	--	--	--	--	--	--	--	--
Level 7	1	--	--	--	--	--	--	--	--	1.0	1
Level 8	--	--	--	--	--	--	--	--	--	--	--
Level 9	2	--	--	--	--	--	--	--	--	2.0	2
Level 10	6	--	--	--	--	--	--	--	--	6.0	6
Level 11	11	--	--	--	--	--	--	--	--	11.0	11
Level 12	7	--	--	--	--	--	--	--	--	7.0	7
TOTAL	34	3	24	7	1	5	5	11	13	3.2	103

TABLE 13

HELISOMA SP. SPECIMENS RECOVERED BY UNIT LEVEL

	N38/W2	N40	N42	N42/W2	N44	N42/E2	N40/E2	N38/E2	N38	Average	Total
Level 1	1	--	7	1	2	--	--	1	1	1.4	13
Level 2	2	2	17	--	2	4	1	6	9	4.8	43
Level 3	4	--	8	1	--	4	6	1	3	3.0	27
Level 4	2	--	2	--	--	--	--	--	--	0.8	4
Level 5	--	--	1	1	--	--	--	--	--	0.4	2
Level 6	1	--	--	--	--	--	--	--	--	0.5	1
Level 7	1	--	--	--	--	--	--	--	--	1.0	1
Level 8	--	--	--	--	--	--	--	--	--	--	--
Level 9	3	--	--	--	--	--	--	--	--	3.0	3
Level 10	--	--	--	--	--	--	--	--	--	--	--
Level 11	--	--	--	--	--	--	--	--	--	--	--
Level 12	--	--	--	--	--	--	--	--	--	--	--
TOTAL	14	2	35	3	4	8	7	8	13	1.2	93

TABLE 14

UNIO SP. FRAGMENTS RECOVERED BY UNIT LEVEL

	N38/W2	N40	N42	N42/W2	N44	N42/E2	N40/E2	N38/E2	N38	Average	Total
Level 1	--	--	2	1	--	1	--	10	1	1.7	15
Level 2	23	--	7	7	3	22	6	44	33	16.1	145
Level 3	9	4	15	2	2	21	20	13	4	10.0	90
Level 4	36	1	2	--	--	--	--	--	--	7.8	39
Level 5	19	--	20	1	2	--	--	--	--	8.4	42
Level 6	2	--	--	--	--	--	--	--	--	1.0	2
Level 7	3	--	--	--	--	--	--	--	--	3.0	3
Level 8	--	--	--	--	--	--	--	--	--	--	--
Level 9	1	--	--	--	--	--	--	--	--	1.0	1
Level 10	--	--	--	--	--	--	--	--	--	--	--
Level 11	1	--	--	--	--	--	--	--	--	1.0	1
Level 12	--	--	--	--	--	--	--	--	--	--	--
TOTAL	94	5	46	11	7	44	26	67	38	4.2	338

was excavated from the first level (0-5 cm below the surface) of unit N42. Lying in the southeast quadrant of the excavation unit, this small concentration of burned rock contained four snails associated with a few flakes and a baked clay lump. No associated charcoal was recorded (see Montgomery, Moffat and Richie 1975).

Level two (5-10 cm below the surface) contained two hearths in two excavation units. In N38/E2, a small ovate hearth with burned spall fragments *in situ* was observed in the southwest quadrant of the unit (Plate 3). A more substantial hearth containing significant quantities of charcoal was recorded in the southwest quadrant of N42/E2, also in level two.

Test 4 in the 1974 investigations at Mariposa encountered a probable hearth situated 50.5 cm beneath the present ground surface. A charcoal sample was collected from this hearth, and a sketch map prepared. Three large hearth stones (burned) were situated in a roughly 25 x 35 cm concentration of charcoal. A *Tortugas* point (Plate 3) was recovered from the overlying level of Test 4.

In 1975, Test 5 at Mariposa revealed a large hearth 60 cm deep. Charcoal, burned rock, gastropod shells, flint flakes and nine incised burned rocks were obtained once the hearth was cleared. Information gathered from this hearth and test has been prepared (Montgomery, Moffat and Richie 1975).

The features recorded above are distinct locations of prehistoric hearth activity, which are separate from the scattered burned rocks found in every excavation unit at the site. While the scattered burned rocks recovered from Mariposa are indicators of past occupational activities, the features allow one to make more concrete statements concerning the nature of such activities. At Mariposa, the features recorded in the upper two levels of the site are small, tightly clustered hearth foci. Charcoal was recovered from one of these loci. An ovate outline is also seen in one of the hearths. In contrast, the two deepest features, assumed to be earlier (temporally) quite large concentrations of burned rock and charcoal, were recorded. Based on the significantly higher concentration of charcoal in one of these hearths and the higher density of burned rock seen in the second hearth, possible differences in function/usage of the features may be postulated.

The earlier features may represent hearths which were possibly maintained for long periods of time, while the smaller hearths from the upper levels may indicate overnight camps and/or hearths maintained only a few times (maybe only once). Without further information, the above proposition cannot be verified. This should, however, be tested at other south Texas sites.

VII. INTRASITE PATTERNS

Introduction

Careful field recording of artifacts, flint flakes, burned rocks, and faunal remains (snail shell concentrations, mussel shell concentrations, and faunal bone fragments) allows one to prepare horizontal "distribution" maps for each excavated level at Mariposa. Such maps, it was hoped, would generate significant cultural patterns as expressed by the depositional provenience of the archaeological specimens mentioned previously. During the 1974 field season, nine excavation units were opened to at least three levels. While several units were excavated much deeper, the upper three levels were chosen for analysis here. This was done to achieve the most reliable results, since patterns will probably be most evident in those levels containing the greatest amount of horizontally cleared spatial areas. It would not be logical to attempt analyses of artifact depositional patterns in a two-meter-square area as compared to a horizontal area encompassing 18 square meters.

The analysis attempted here must also rely on the recorded field data only. While a number of artifacts and faunal remains were recovered on the 1/4-inch screen during excavations (or retrieved during the subsequent cataloging process), their exact horizontal provenience cannot be reconstructed, except to a 2 x 2 meter square, five centimeters deep. Those artifacts and faunal materials located *in situ* were recorded on grid paper in a field notebook for each unit and level. All unit maps within a level were connected into a larger grid map which utilized all excavation units. These maps formed the basis for the maps presented as Maps 5 through 16. In order to express the data most clearly, maps of four categories--artifacts, flakes, burned rock, and faunal material--were individually prepared for each of the first three levels. Thus we have 12 maps to consider for analysis.

Visual interpretation of the distribution maps will be employed. Time did not permit more quantitative spatial analyses employing rigorous statistical tests of association. Such analyses, which include nearest neighbor analysis, spatial analysis of variance, trend analysis, and others, should be employed in future and more specialized archaeological studies in the area (see Whallon 1973, 1974; Dacey 1973; Feder 1976). No attempt will be made to defend the visual interpretation when compared to the other types of spatial analyses. Such being the case, conclusions reached from this analysis must remain tentative until other methods are used on this kind of data.

The following analysis will proceed by individual levels. Within each level, distribution maps of artifacts, flakes, burned rock, and faunal material will be described. An overall statement of the level will provide a brief summary and possible correlations in depositional characteristics between the four types of data.

Level One

(0-5 centimeters below the surface)

Artifacts (Map 5)

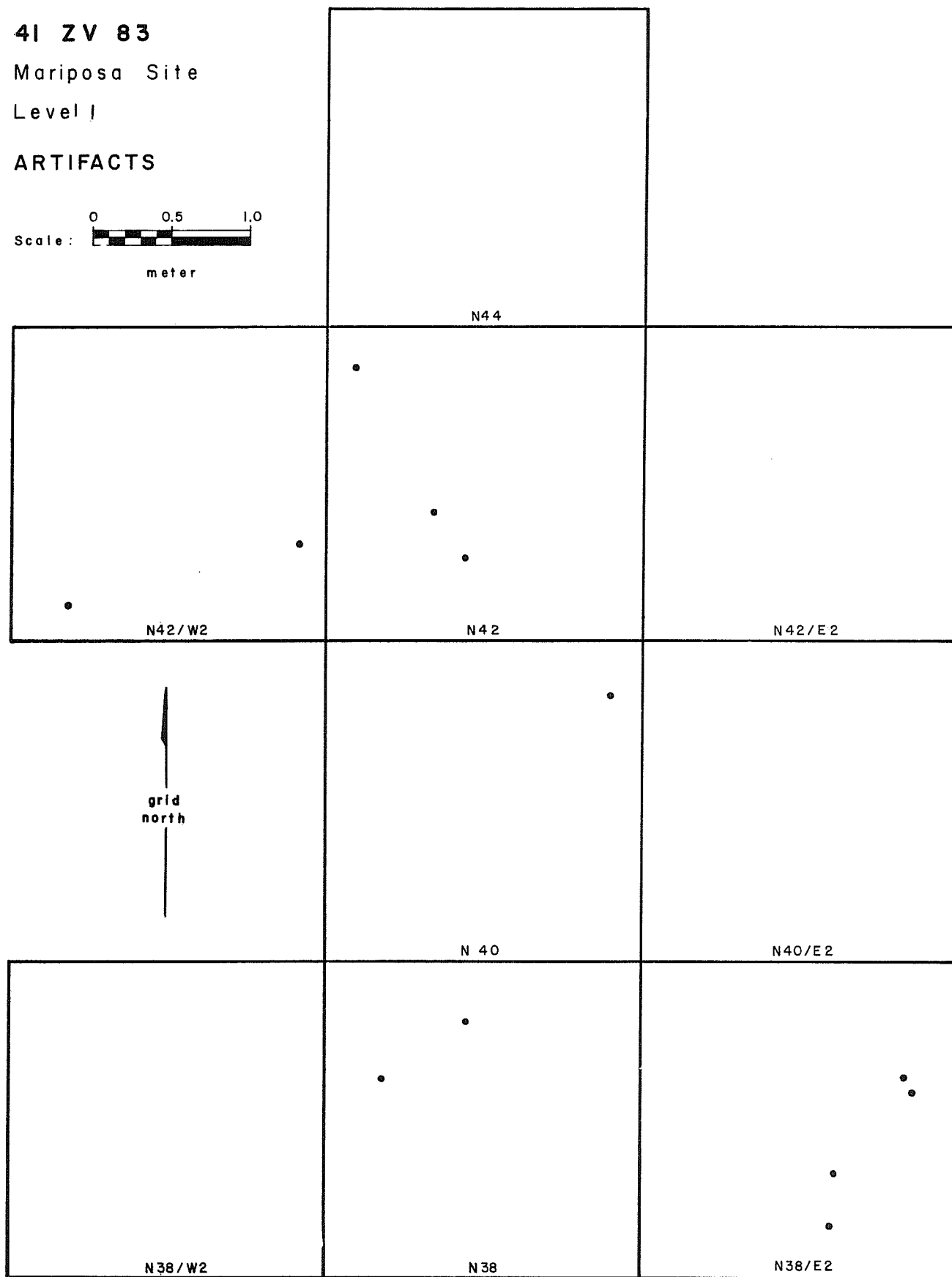
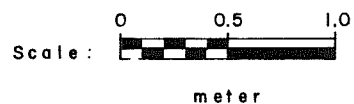
Of the 12 artifacts recorded in the field, most are scattered somewhat evenly over the nine excavation units. Two concentrations of artifacts were

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Mariposa Site

Level I

ARTIFACTS



Map 5. Distribution Map of Artifacts, Level One.

recognized. The first lies in the eastern half of N38/E2, where four artifacts were recovered. The western half of excavation unit N42 contained three artifacts, two of which were located in the southwest quadrant of the unit. Both clusters (or concentrations) were arrow points.

Flakes (Map 6)

Except for the southwest quadrant, unit N38/E2 appears to be a distinct cluster of flake material. The central portion of N40 also seems to be a locus of flake deposition. Less intensive clusters are noted in N42/W2, N42/E2, and the northeast quadrant of N38/W2. All these areas were probably foci for lithic manufacturing activities.

Burned Rock (Map 7)

Clusters of burned rock, probably indicative of past hearths, can be observed in almost all excavation units to some degree. Relatively concentrated remains are indicated in N38/E2, N38, and N42. Some clustering is possible in N40 and N42/W2. Small discrete clusters, composed of five to eight burned rocks, appear in N42, N42/W2, and N38/W2. N44 is removed from hearth activity, as is the southwest quadrant of N38/W2 and the northwest quadrant of N42/W2. Charcoal recovered from this level lies at the extreme northeastern corner of N38/E2 and is a likely indicator of a hearth in that unit.

Faunal Remains (Map 8)

Land gastropods are tightly clustered in N38/E2. Vertebrate and invertebrate remains are also concentrated together in the northern half of N42. Outside these areas, isolated bone fragments and scattered remains of all fauna occur, seemingly at random.

Summary

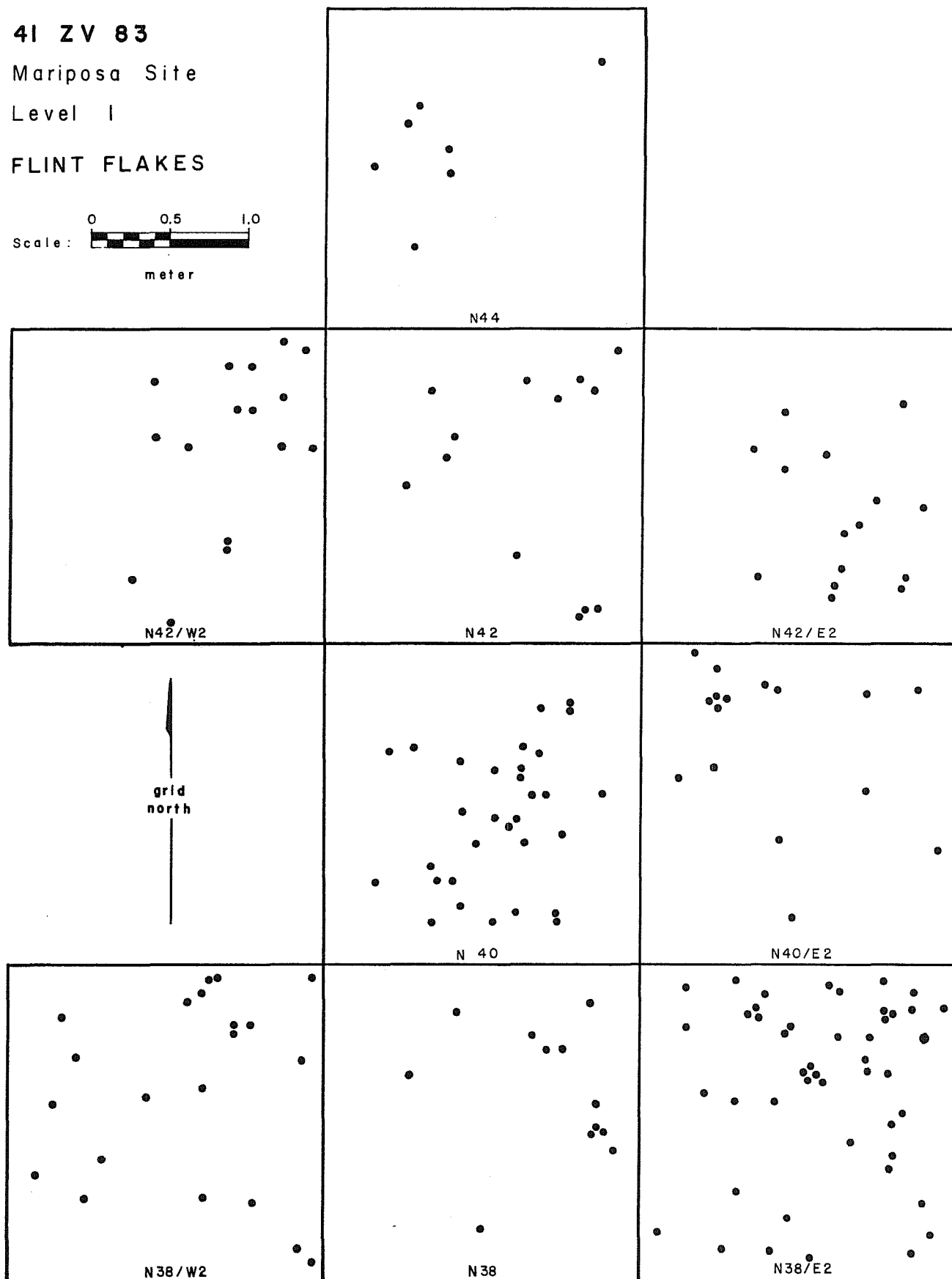
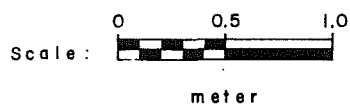
Excavation unit N44 appears to be removed from lithic manufacturing and subsistence activities. Burned rock and artifact concentrations are associated in N38/E2, N42, and N38. Flakes and burned rock occur together only in N38/E2. Co-occurrence of burned rock with faunal materials is seen in N38/E2 and N42. N38/E2 also represents the area where faunal remains occur with flake materials. Faunal material and artifacts occur together in N38/E2, N42, and N38. Lithic manufacturing materials and finished products (flakes and artifacts) co-occur only in N38/E2. Excavation unit N38/E2 seems to have contained a hearth where subsistence remains and lithic activities both occurred together. Flakes tended to be removed from the depositional areas of artifacts, but they seem to occur more frequently with burned rock concentrations. Burned rock and faunal remains tended to be correlated as did artifacts and faunal remains.

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Mariposa Site

Level 1

FLINT FLAKES



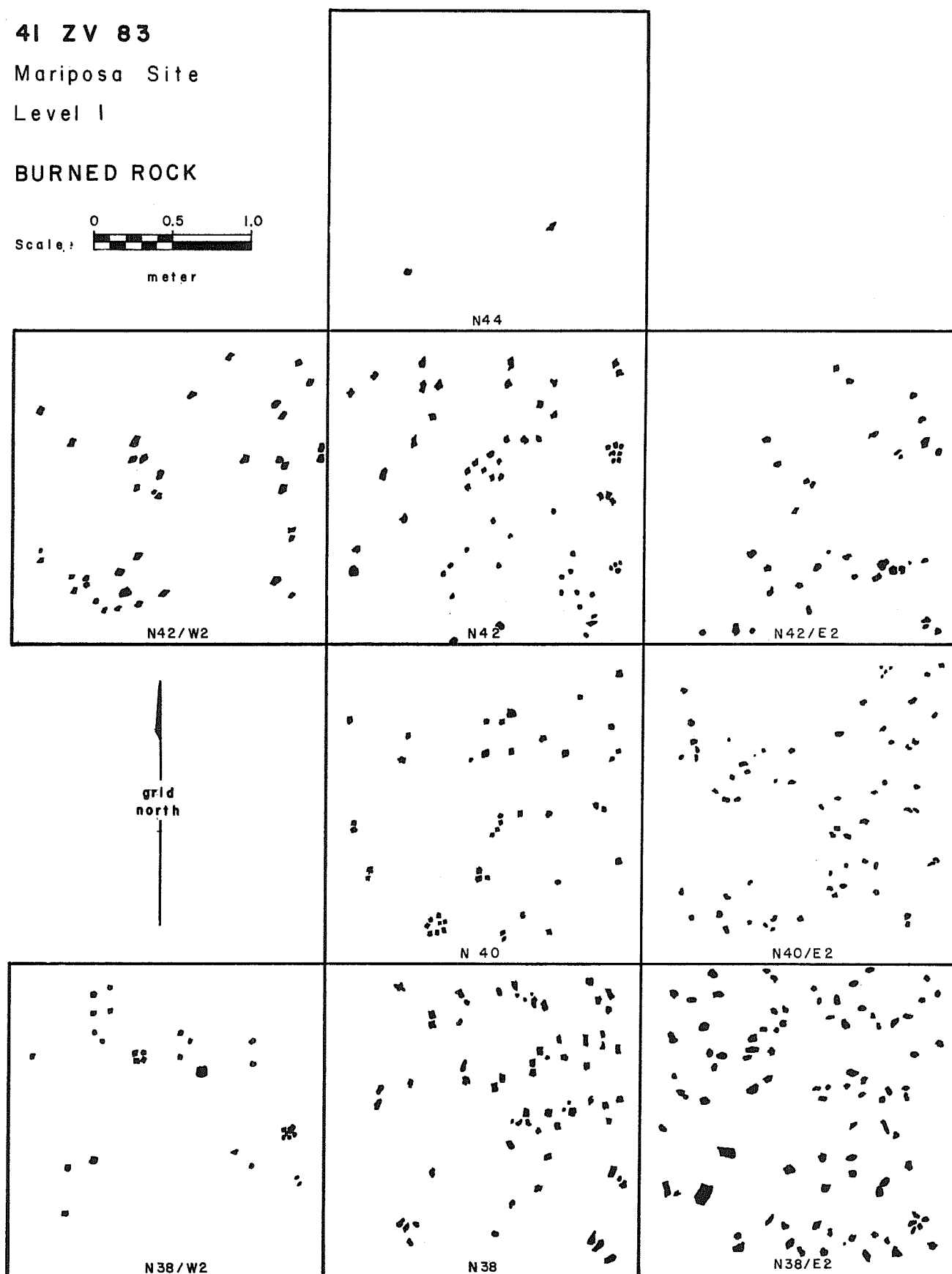
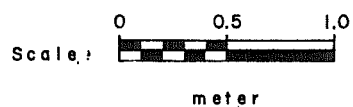
Map 6. Distribution Map of Flakes, Level One.

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Mariposa Site

Level 1

BURNED ROCK



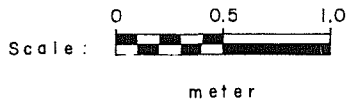
Map 7. Distribution of Burned Rock, Level One.

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Mariposa Site

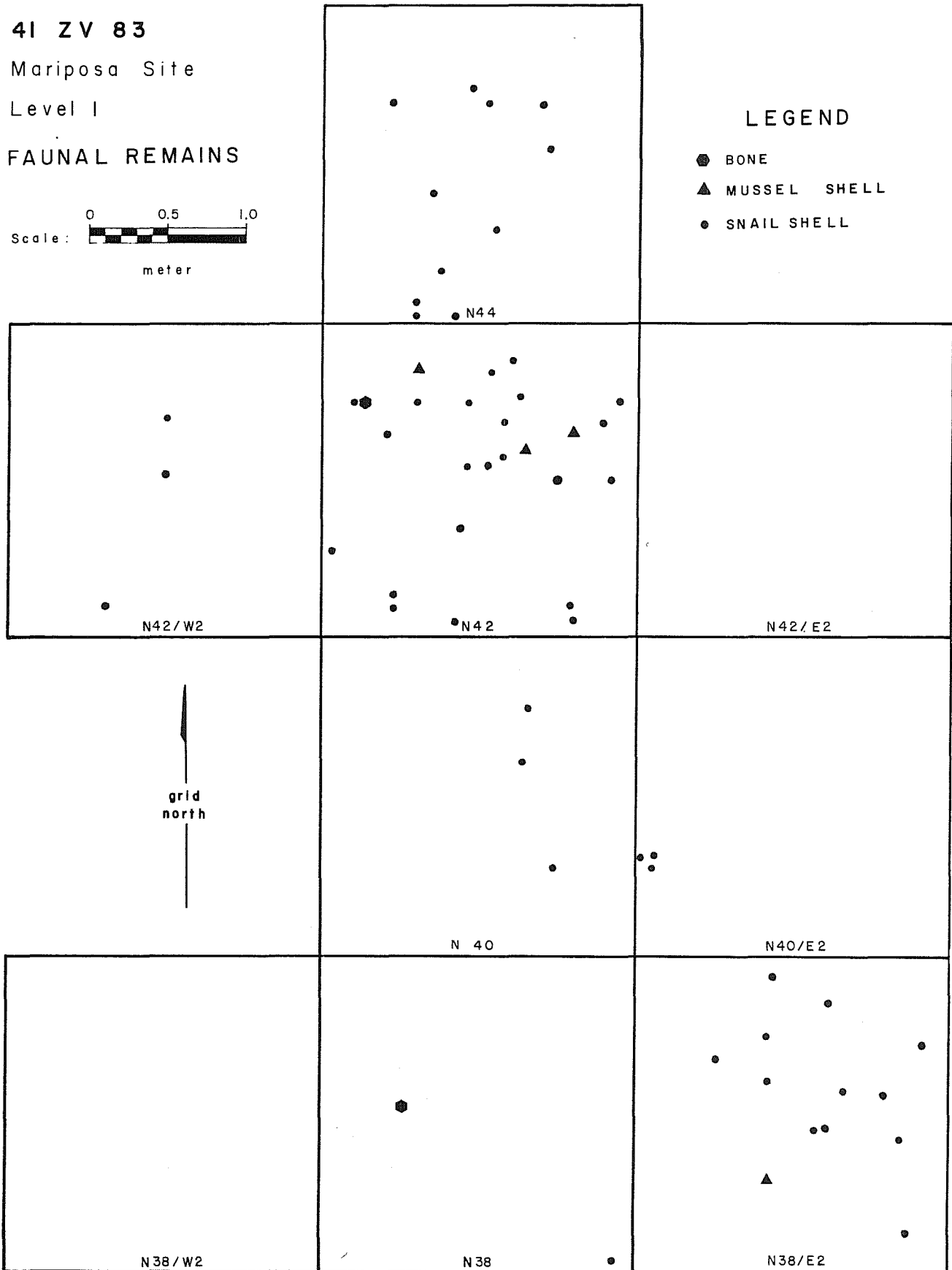
Level I

FAUNAL REMAINS



LEGEND

- BONE
- ▲ MUSSEL SHELL
- SNAIL SHELL



Map 8. Distribution Map of Faunal Remains, Level One.

Level Two

(5-10 centimeters below the surface)

Artifacts (Map 9)

Significant concentrations of artifactual material are seen in the western half of the excavated area, especially in unit N42. A faint, semi-circular pattern may be located by combining excavation units N42/W2, N42, N40, and N38/W2. One artifact or less occurs in the remaining units.

Flakes (Map 10)

Towards the middle of the site and especially in excavation unit N40, flake concentrations occur. Smaller, more discrete clusters are preceived in N38, N38/E2, and N42/W2. N44 contained a very insignificant number of flakes.

Burned Rock (Map 11)

Depositional patterns for burned rock were very strong in this level. Major concentrations occur in units N42/E2, N42/W2, N40/E2, N38, and the western half of N38/E2. Possible clustering (hearth?) on a smaller scale is seen in N38/W2. Excavation unit N40, which contained a significant flake concentration, revealed only a few, randomly scattered burned rocks. The idea that the major concentrations noted in N42/E2 and N38/E2 are possible hearths is reinforced by the presence of charcoal. Charcoal was associated with only the largest examples of burned rock. A minimum of two hearths is suggested by the evidence, but more hearths could have functioned in the other significant burned rock remains noted for this level.

Faunal Remains (Map 12)

Strong clustering is suggested by inspecting the recorded faunal remains for this level. Snail remains are tightly clustered in N40/E2, the southeast quadrant of N38, and in N40. Four distinct clusters are evident in N40, with the two largest clusters occurring in that unit's northwest quadrant. The 16 square-meter area encompassed by excavation units N40, N40/E2, N38 and N38/E2 contains most of the snail shell concentrations recorded from level 2. A snail processing activity area can be seen for this general area (four contiguous excavation units or 16 square-meters), with discrete individual areas being pinpointed by the actual clusters themselves.

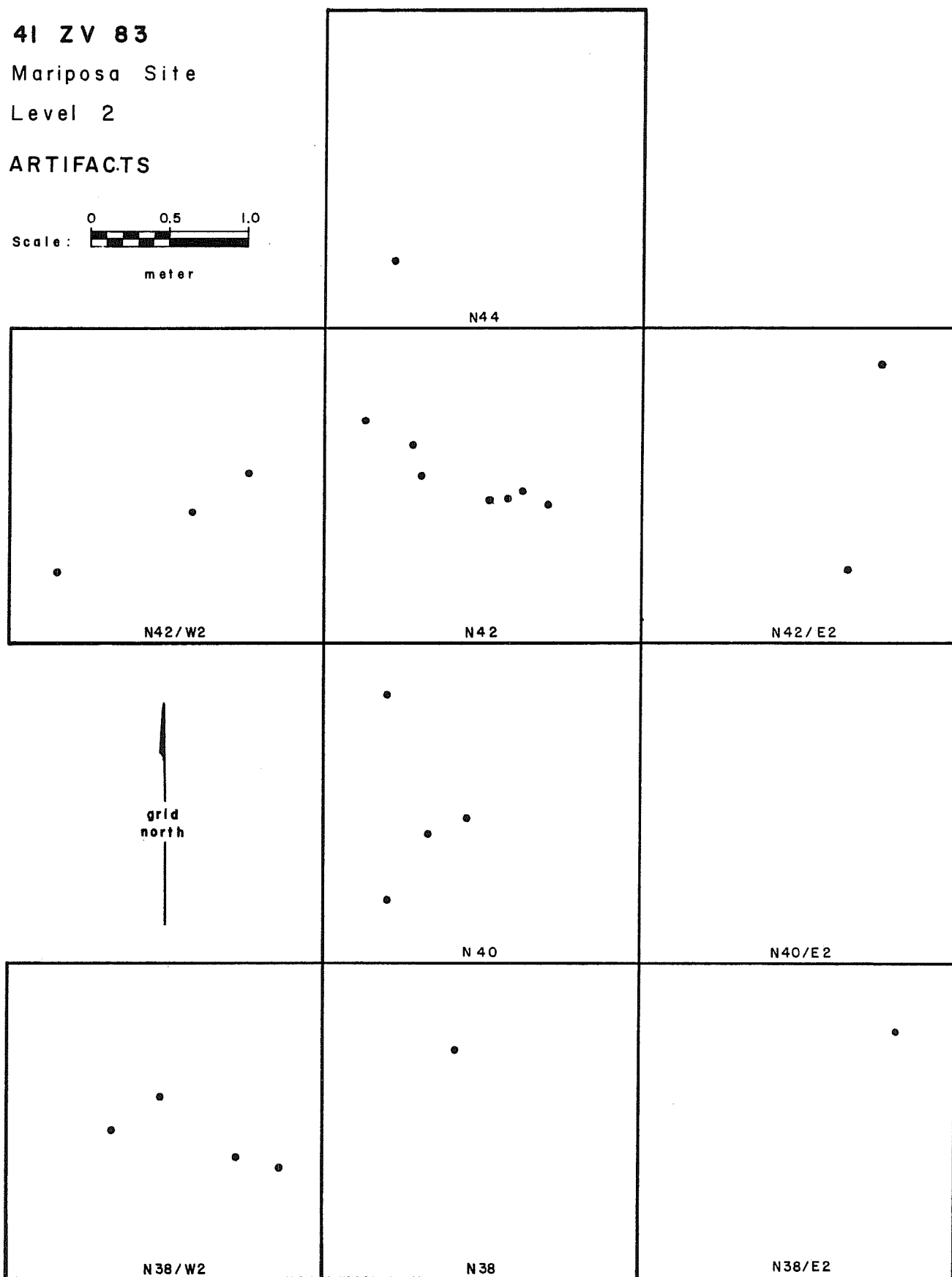
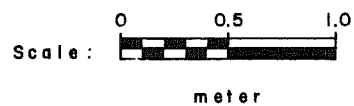
Mussel shell remains are associated with snail shells in N38/E2. A major depositional area for mussel shell is indicated for excavation units N42 and N42/E2. This area appears to be a river mussel processing area, the area where the inedible shells were deposited after excavation of the animals for food. In N38, a small cluster of bone fragments, snail shells, and mussel shells is indicated, probably indicating that all these subsistence items can be processed together, as well as individually.

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Mariposa Site

Level 2

ARTIFACTS



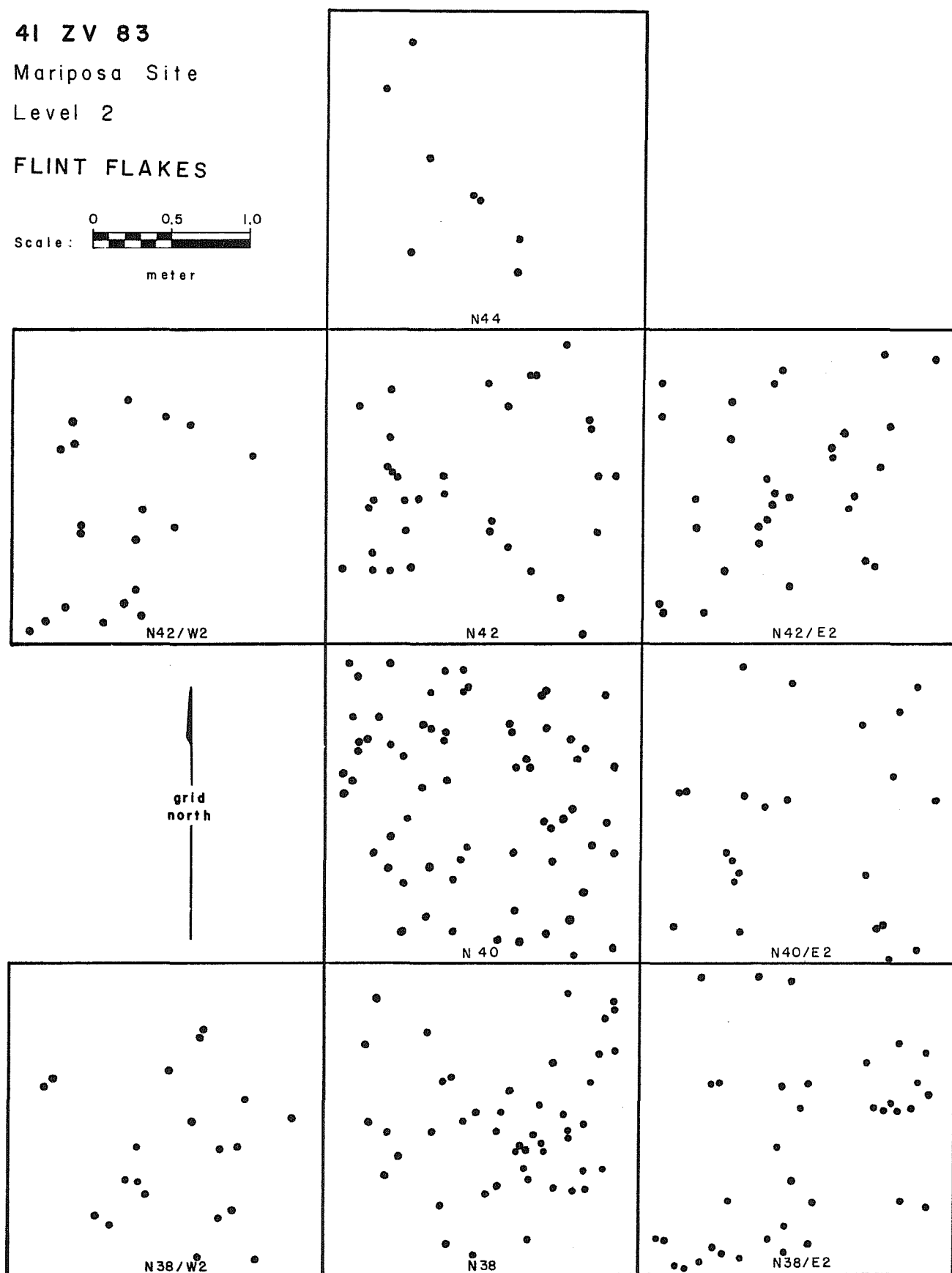
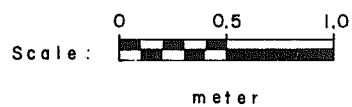
Map 9. Distribution Map of Artifacts, Level Two.

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Mariposa Site

Level 2

FLINT FLAKES



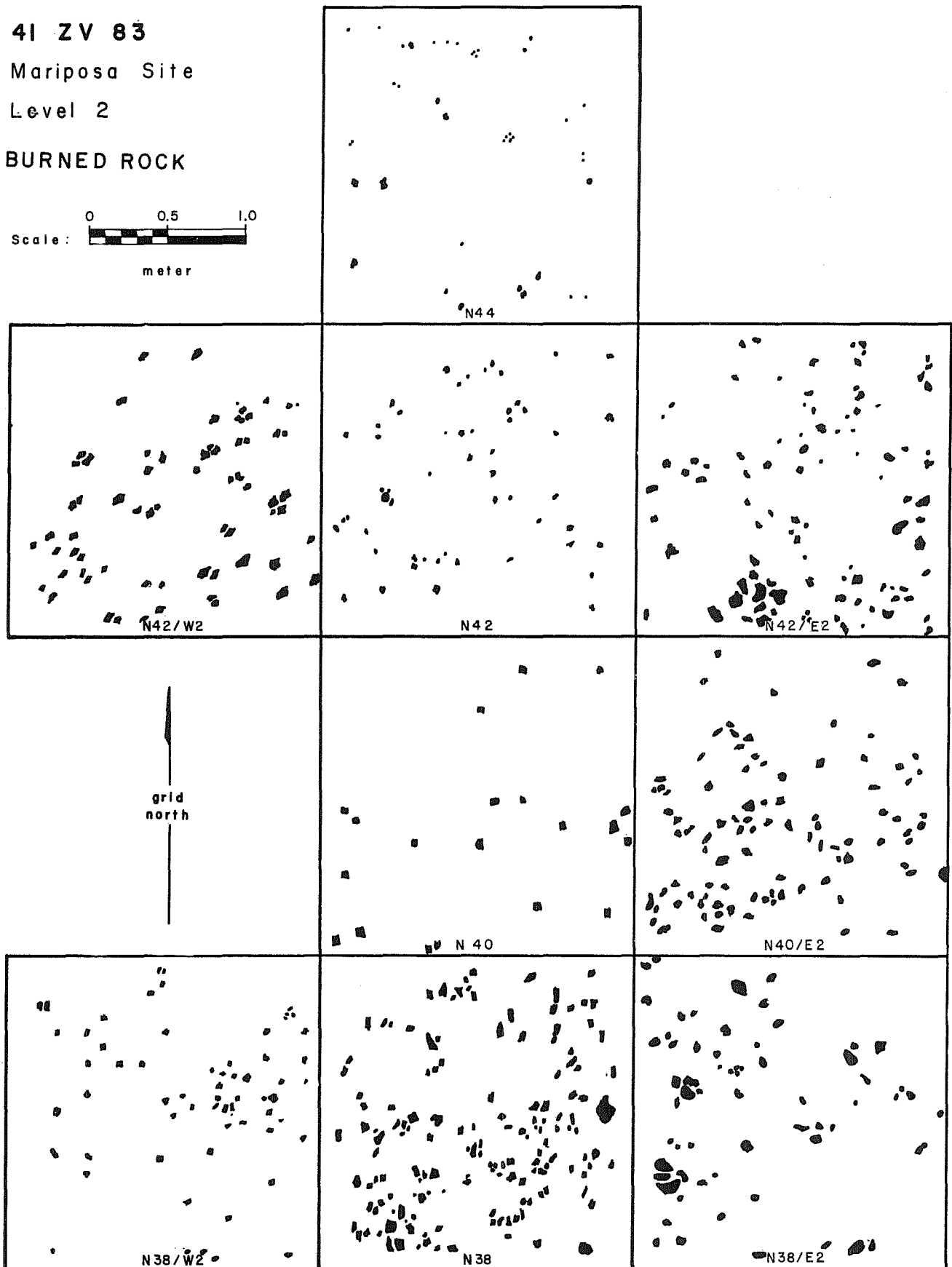
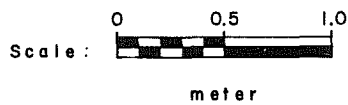
Map 10. Distribution Map of Flakes, Level Two.

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Mariposa Site

Level 2

BURNED ROCK



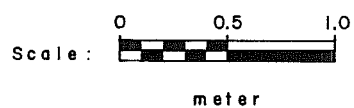
Map 11. Distribution Map of Burned Rock, Level Two.

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Mariposa Site

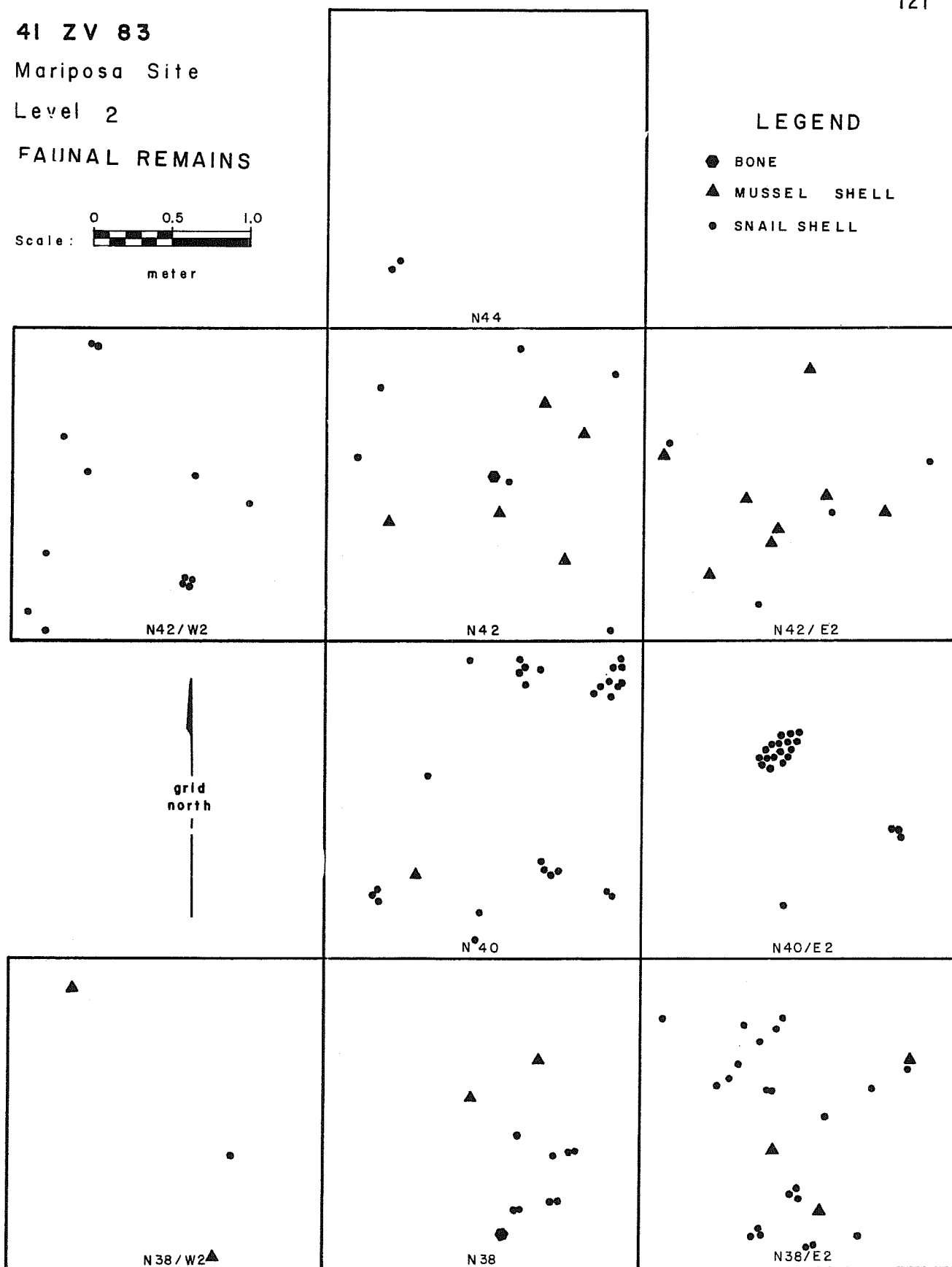
Level 2

FAUNAL REMAINS



LEGEND

- BONE
- ▲ MUSSEL SHELL
- SNAIL SHELL



Map 12. Distribution Map of Faunal Remains, Level Two.

Summary

Burned rock concentrations are entirely removed from artifact clusters. At the same time, burned rock and flake concentrations co-occur in N38/E2 and in N38. There is a major concentration of flakes in N40 but little burned rock. This pattern is also discerned in N42/W2. A possible hearth (large burned rock) in N42/W2 has a cluster of flakes to the east. Burned rock and faunal remains are closely associated with possible hearths in N42/W2, N38, and N32/E2. Mussel remains are particularly associated with burned rock in N42/W2. However, many of the snail concentrations and occurrences of fauna are not directly tied to the clustering of burned rock. Examination of the maps for co-occurrence of flakes with faunal material shows both negative and positive results. Flakes occur with snails in N40, as well as in N40/W2 (western half). Bone, mussels, and snails were deposited together with flakes in N38 and N38/E2. Again, the significant snail cluster in N42/E2 was not correlated with any flake concentrations. The relationship between artifacts and faunal remains is quite strong in N42, which may indicate that this was a prime processing area for materials necessitating use of artifacts. No burned rock or hearth activity is seen here, however. Flakes and artifacts show no positive association in any area of the site.

Some general patterns are clearly being developed in the first two levels. Lithic debris (flakes) and finished lithic products (artifacts) do not occur together. It may well be that the primary tool manufacturing areas at Mariposa were not excavated. Burned rock concentrations, which are probably hearth loci, show positive association with faunal materials and flakes but not artifacts. Flake and artifact depositional areas (especially artifact areas) tend to occur away from hearth areas. Separate subsistence activity areas (hearths) and lithic activity areas (flakes and artifacts) seem to be indicated.

Level Three

(10-15 centimeters below the surface)

Artifacts (Map 13)

No strong clustering patterns are observed. Artifacts were not recorded in N38/E2 and N40/E2. The most intensive areas of deposition seem to be in N40 and N38/W2.

Flakes (Map 14)

Flake deposition is centered primarily in N40, essentially in the middle of the excavation area. The remainder of the flakes recorded from this level seem to be randomly scattered.

Burned Rock (Map 15)

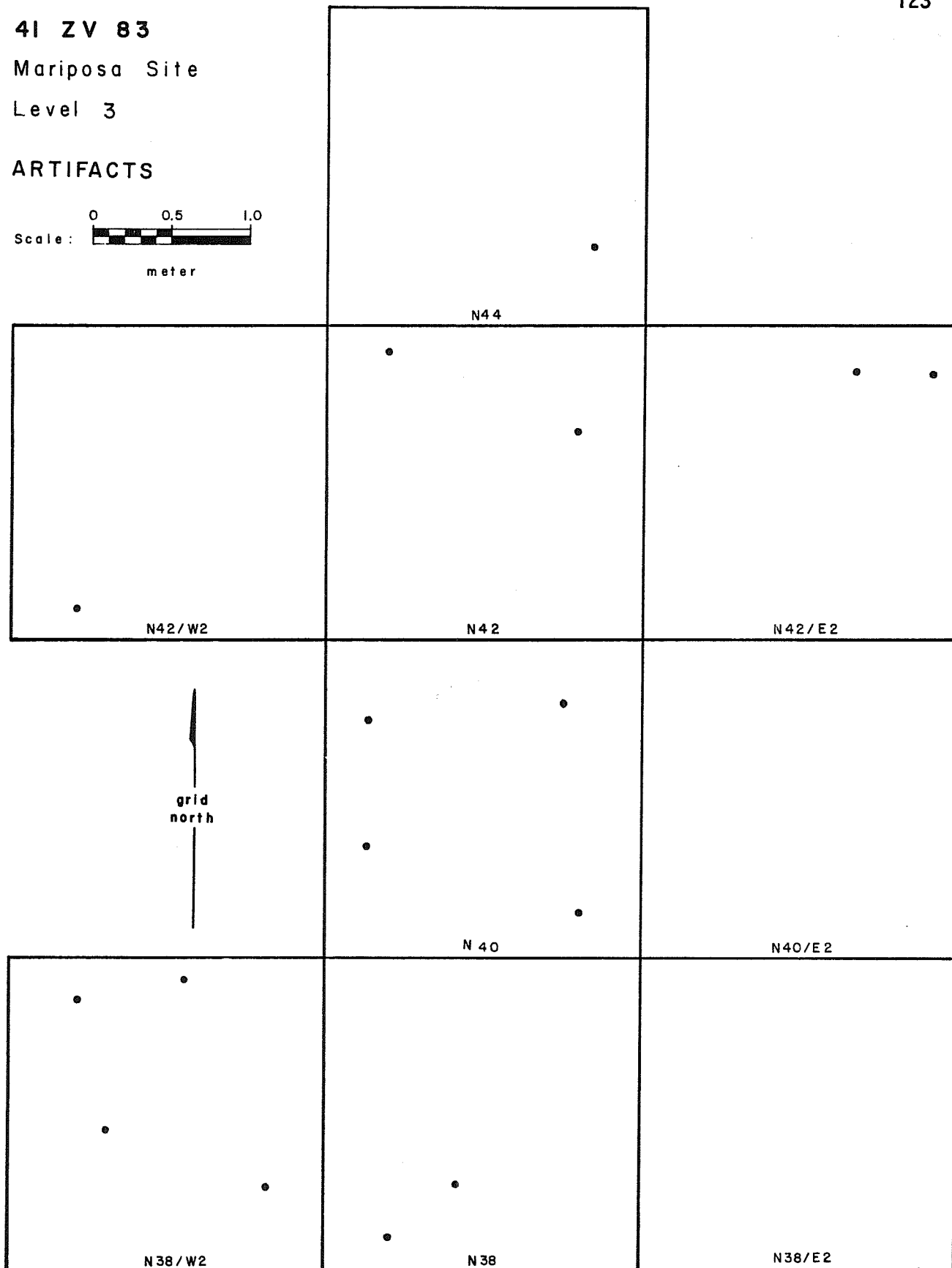
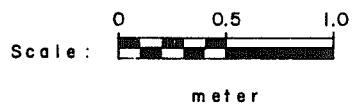
Two clusters of burned rock appear in the southern half of unit N42/E2. Possible clustering in N40/E2 and in N42/W2 is also observed. Charcoal was recovered

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Mariposa Site

Level 3

ARTIFACTS



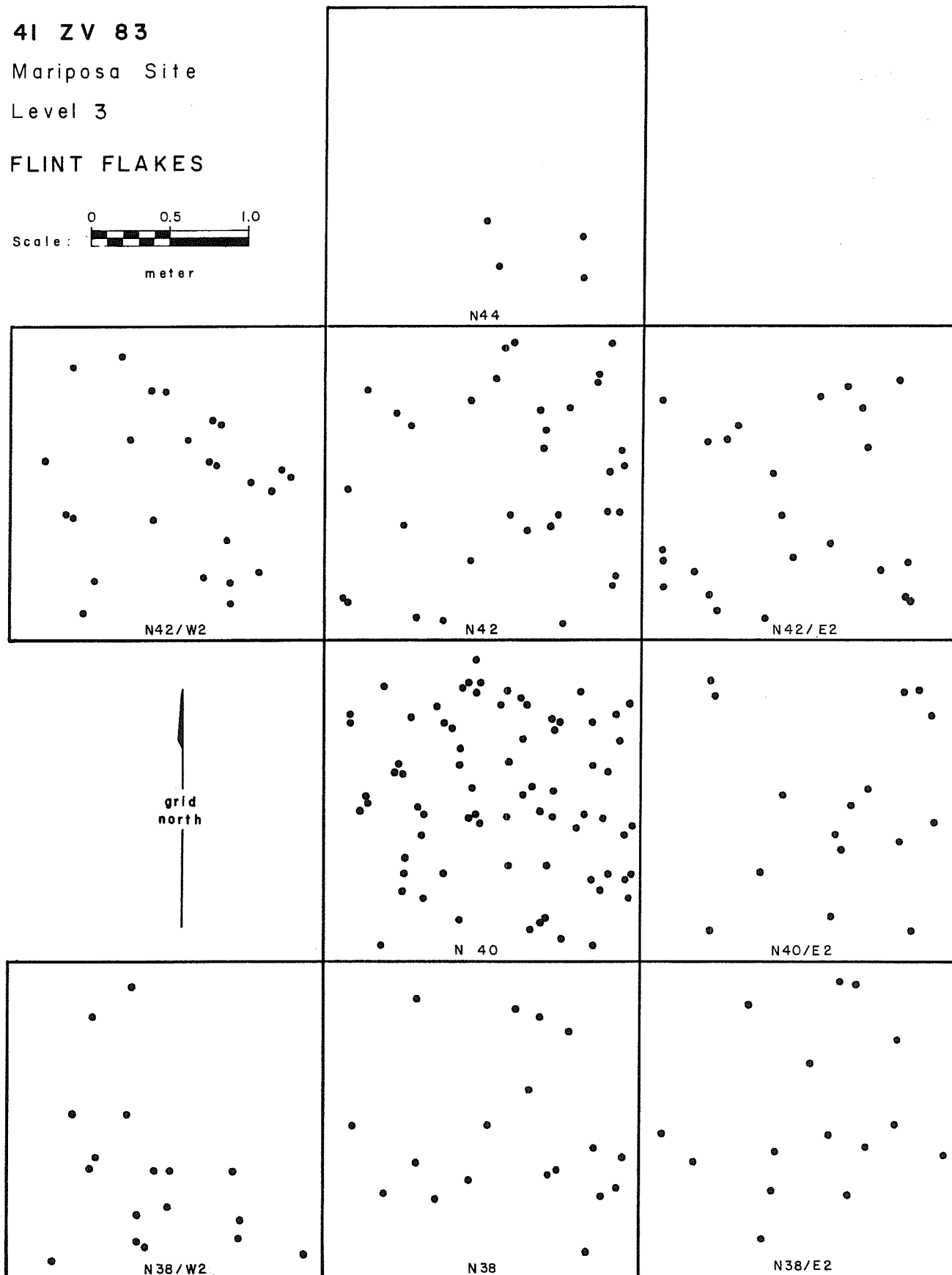
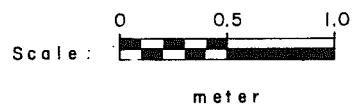
Map 13. Distribution Map of Artifacts, Level Three.

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Mariposa Site

Level 3

FLINT FLAKES



Map 14. Distribution Map of Flakes, Level Three.

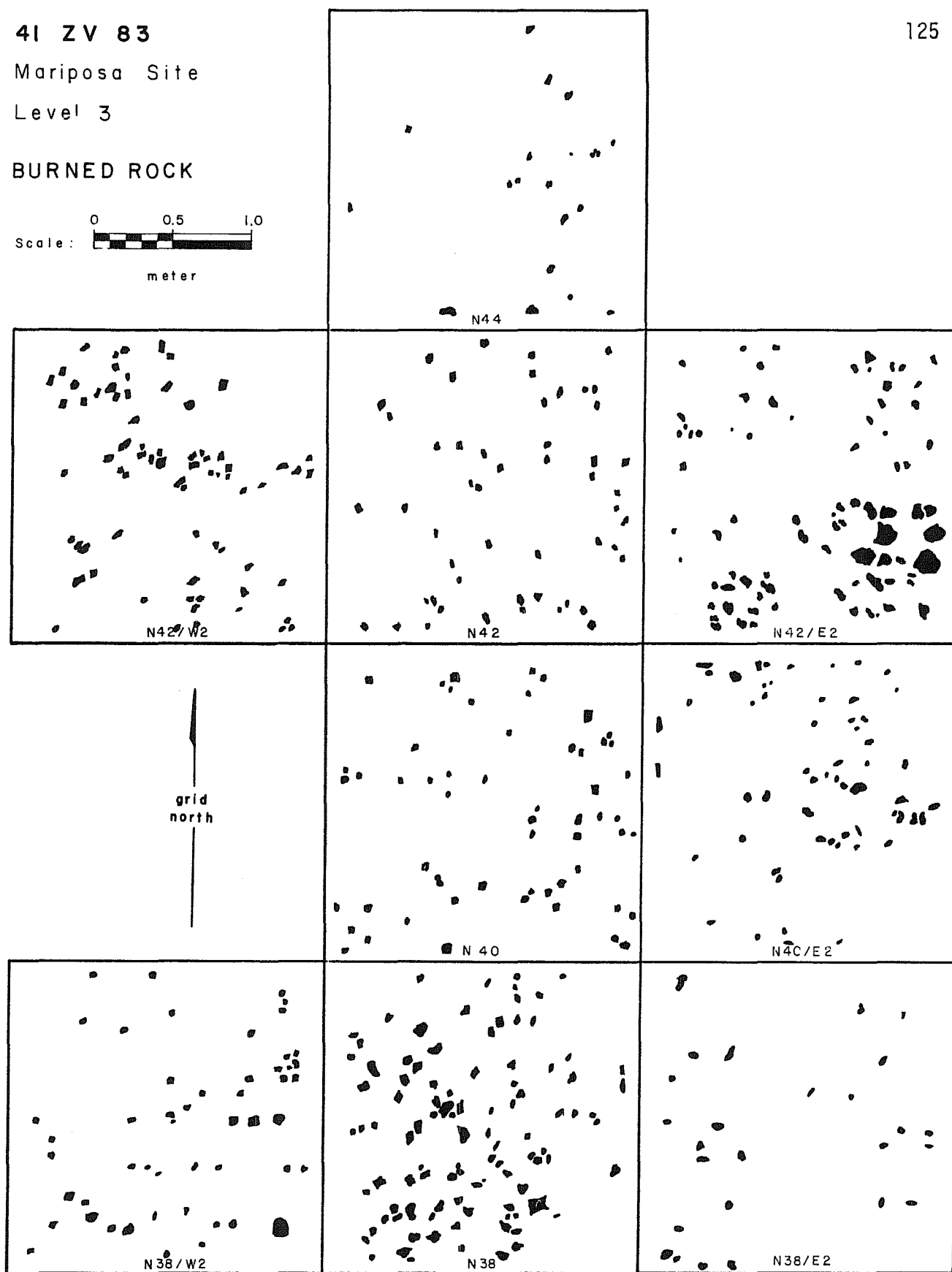
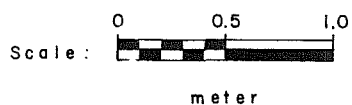
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Mariposa Site

Level 3

BURNED ROCK



Map 15. Distribution Map of Burned Rock, Level Three.

from the eastern half of N40/E2, in the western half of N38/E2, and in three areas within N38. Hearth activity is quite probable for the burned rock concentrations in N38, using charcoal as additional evidence, but the non-correlation of charcoal remains in N38/E2 and N40/E2 with burned rock concentrations hinders general conclusions.

Faunal Remains (Map 16)

Level three faunal remains were quite segregated. Snail clustering is observed in N44 and in N42/W2. Two discrete snail concentrations appear in N40, and several small snail concentrations occur in N38. The southeast quadrant of N38/E2 contains a snail concentration. Mussel shell is concentrated in the northern half of N40 and is associated with shell in the northeast quadrant of that unit. Two isolated mussel shell fragments, associated with no other faunal material, occur here. Mussel shells, bone and snail shells are clustered together in the northern half of excavation unit N42. In the southern half of unit N38, a concentration of bone material as well as two discrete snail clusters is apparent.

It seems that the eastern margin of the site was not intensively utilized as depositional areas for faunal remains.

Summary

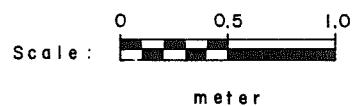
Except in excavation unit N38, all artifacts are outside and away from burned rock concentrations. The flake concentration in N40 is between the probable hearth areas. Burned rock concentrations and faunal remains co-occur in N38 but do not occur together to a significant degree in the remaining excavation units. Flake materials and faunal remains are associated in the northern half of N40, in N42, and in N44. Units N40/E2 and N42/E2 contain many flakes, randomly scattered, but very little faunal material. In terms of possible artifacts and faunal material correlations, N38 and the southern half of N42/W2 may be significant areas of such a relationship. Besides these two units, no relationship is apparent, however. Correlation of flake concentrations with artifact deposition is not readily apparent, except for some possible association in N38/W2, N38, and N44.

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Mariposa Site

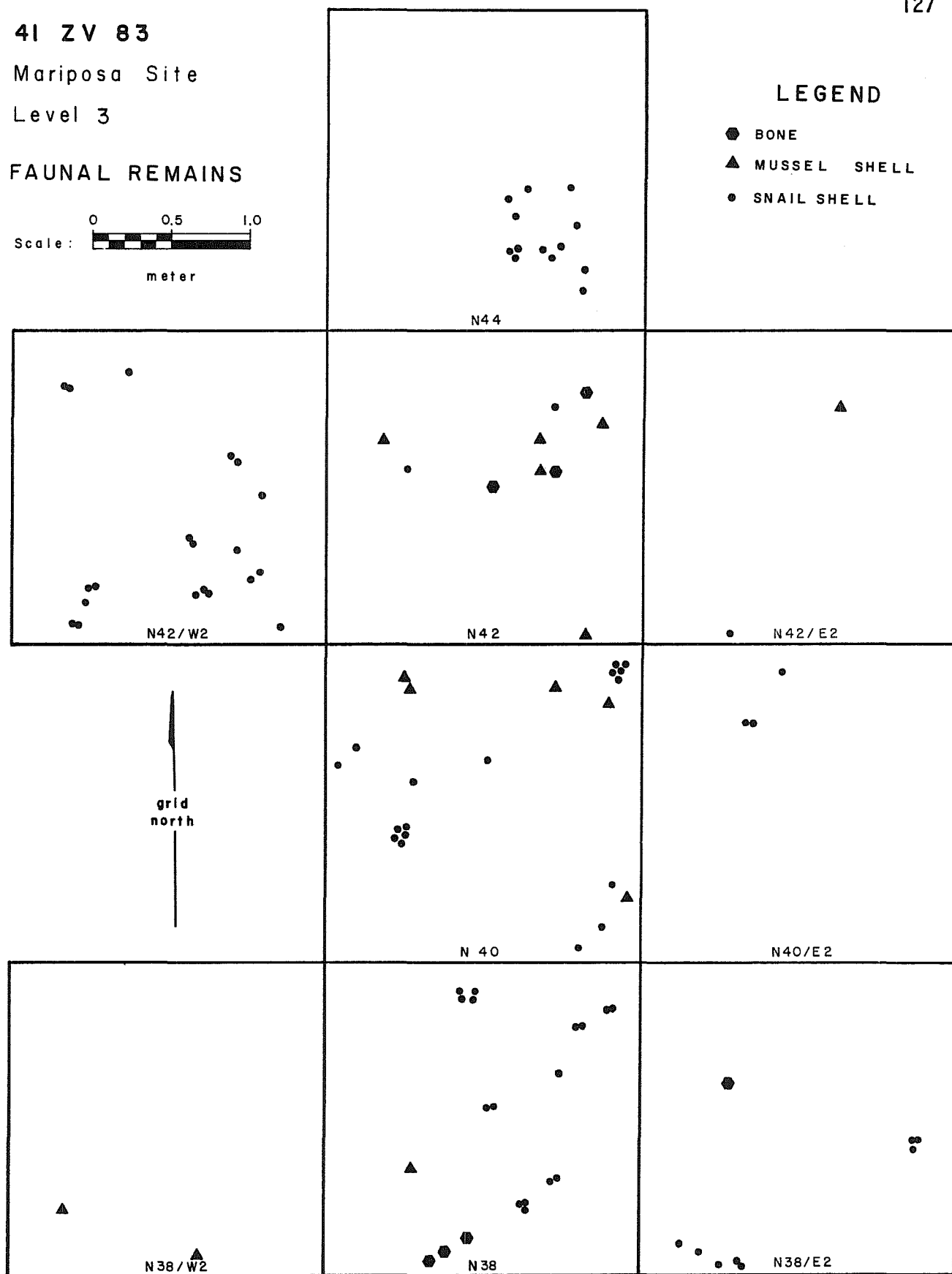
Level 3

FAUNAL REMAINS



LEGEND

- BONE
- ▲ MUSSEL SHELL
- SNAIL SHELL



Map 16. Distribution Map of Faunal Remains, Level Three.

VIII. LITHIC TECHNOLOGY

The accepted durability of lithic artifacts has generated a world-wide interest regarding the analysis of making prehistoric stone tools--lithic technology. In a general sense, the subject of lithic technology encompasses the methods and processes involved in producing stone tools. When the manufacture or function of an artifact is not known, experimental replication may be employed to elucidate these problems (cf. Ascher 1961; Coles 1968; Hester, Heizer and Graham 1975:228-232; Wilmsen 1970, 1974). Other avenues of investigation are possible: a spectrum of investigations, ranging from the physical processes within the lithic material (cf. Speth 1974) to the recognition of individual chipping styles (Gunn 1975). Swanson (1975) has compiled recent views concerning the relationships between lithic technology and taxonomy, experimental lithic analyses, and the use of lithic technology in archaeological situations.

A brief review of the extensive literature concerning the topic of lithic technology indicates another avenue of interest, the lithic manufacturing process. Introduction of a diachronic view can illustrate the changes in tool types and manufacture, as shown by Bordes (1968). Classification of the products and by-products introduced into the archaeological record by making lithic artifacts can be retraced as steps in the manufacturing process. This special area of investigation is, perhaps, the most directly useful for this thesis, since Hester (1975b) has already presented a testable model of lithic reduction for the study area.

Analysis of the stone tools and their manufacturing by-products is a way to infer cultural activities which produced them (Collins 1975). The manufacturing process has been described as an "etic" or generalized model composed of five steps:

- (1) acquisition of raw materials, (2) core preparation and initial reduction, (3) optional primary trimming, (4) optional secondary trimming and shaping, and (5) optional maintenance modification (Collins 1975:17).

Hester (1975b) has incorporated portions of this etic model for describing the activity processes ("fabrication phases") involved in producing chipped stone industries on the Rio Grande Plain of Texas. Archaeological contexts here indicate that three "phases" of Collins' etic model can be recognized (Hester 1975b:214). Phase I, defined as the "procurement of raw (lithic) materials," (Hester 1975b:214) is identical to Collins' Step 1 (above). Since suitable lithic resources for flintknapping are found only in terrace outcrops overlooking major stream channels of the Rio Grande Plain, terrace sites functioned as Phase I activity areas (Hester 1975b). These terrace sites are located away from the primary occupational sites of the area, which rest "on the floodplains, particularly on natural levees paralleling stream channels" (Hester 1975b:214). Terrace sites are uniquely situated with respect to chipped stone resources, so that only Phase I and the subsequent Phase II lithic activities occur here.

Phase II activities are concentrated to produce the "initial working and shaping of the raw material (using hammerstone percussion techniques)" (Hester 1975b: 214), or core preparation and initial reduction (Collins' Step 2, above). Two

distinct avenues of activity can be followed during this stage. Terrace cobbles could have been prepared (reduced) as cores for future flake removal. Flakes produced by this activity are thought to be "used as blanks for tool manufacture" (Hester 1975b:214). This flake-tool sequence is contrasted by a core-tool sequence in which cores are reduced into "preforms" (roughly-shaped bifaces) to be further reduced and made into tools (Hester 1975b:214). Analyses of materials encountered at the two types of sites (terrace workshop and floodplain occupation) have indicated that flakes removed by the flake-tool sequence were made at the terrace locations while core preforms produced by the core-tool sequence were carried to floodplain occupation sites for further modification. Several varieties of cores have been identified from archaeological sites on the Rio Grande Plain (cf. Hester 1975b and core model presented earlier), and these cores are considered to be an integral part of Phase II activities. While a core-blade industry has been postulated for this area and nearby regions of Texas (Hester 1975b:417-418; Hester and Shafer 1975), no evidence of this lithic industry was recovered from the Mariposa site.

Shaping, trimming and completion of lithic tools are considered to be Phase III activities (Hester 1975b:218). Phase III, as presented above, incorporated Collins' Steps 3, 4 and 5. These activities occur at floodplain occupation sites, "using flake blanks obtained from cores or preforms brought down from the terrace workshops" (Hester 1975b:218). Specific activities linked to this phase include bifacial thinning and final trimming (of both flake blanks and preforms) into completed tools (such as projectile points, knives, perforators, etc.). Flake blanks do not necessarily have to be bifacially thinned; unifacial chipping and trimming could produce scrapers, notches and gravers (Hester 1975b).

Lithic debris resulting from each phase is quite distinctive and reflects the different activities associated with Phases I, II and III. Hester (1975b:218) has commented on this fact:

The workshops (used in Phase I and II) are dominated by decortication flakes. Interior flakes, those removed from a shaped core, and thinning flakes are rare. At occupation sites (where Phase III took place), decortication flakes are almost entirely absent. Instead, there are much higher percentages of interior flakes, some of which are large and represent blanks for tool manufacture; others are quite small, probably representing core trimming activities. There are also numerous thinning flakes . . . Most are apparently the result of bifacial reduction.

Bifacial "overshot flakes" and unifacial retouch flakes also result from Phase III activities at occupation sites (Hester 1975b:218-219).

Analysis of lithic artifacts and debitage (cf. Chapter V) was oriented towards a technological description, allowing for a test of the Collins-Hester model. If the model as presented above is accurate, then the artifact assemblage at Mariposa should contain some distinctive items. Mariposa's physical location, on a floodplain and near a stream channel, indicates that it most likely functioned as an occupation site rather than a workshop site. This being so, according to the model, only Phase III activity by-products (and products) are

likely to be present (Hester 1975b:218). These should include biface thinning flakes, pressure flakes, finished and broken tools, and rejected preforms. Primary cortex flakes, large cores, and tested cores (with one or two flakes removed) should be absent. This distinction is made between occupation sites and workshop sites (on terraces), as these separate areas reflect "different kinds of flintworking" (Hester 1975b:218).

Compilation of the relative frequencies of the items mentioned above will constitute a brief test of the model. Similar data from the Holdsworth site (41 ZV 14), the Honeymoon site (41 ZV 34), and the Stewart site (41 ZV 121) will also be presented and evaluated in light of the Collins-Hester model. These sites were chosen because they are located in the general vicinity of Mariposa and because two of them (Holdsworth and Stewart) are believed to be occupation sites.

Examination of the flakes recovered from Mariposa should show a predominance of bifacial thinning flakes, pressure flakes, and interior flakes when compared to primary and secondary cortex flakes. Table 15, which lists the frequency of flake types recorded from Mariposa, indicates that this is a basically accurate assessment (after excluding flake fragments). Only 4.4% of the flakes are primary cortex flakes, while 27.6% are biface thinning flakes. No pressure flakes were recovered, probably since the 1/4-inch screen used at the site would allow these small specimens to escape detection. Frequencies recorded for both secondary cortex flakes and interior flakes (35.7% and 32.3% respectively) are greater than biface thinning flakes.

TABLE 15

FLAKE TYPES RECOVERED FROM MARIPOSA:
NUMBER AND RELATIVE PERCENTAGE

	Number	Relative Percentage
Primary Cortex Flakes	40	4.4
Secondary Cortex Flakes	321	35.7
Interior Flakes	291	32.3
Biface Thinning Flakes	<u>248</u>	<u>27.6</u>
TOTAL	900	100.0

Turning to three archaeological sites situated in similar environmental conditions (and in northwestern Zavala County), tabulated flake frequencies reveal further general support to the Hester-Collins model (see Table 16). Primary cortex flakes (not to be expected) contribute a meager 1.9% and 2.1% to the recovered flakes at the Holdsworth and Stewart sites respectively (Hester and

Hill 1972). At Holdsworth, biface thinning flakes account for 24.2% of the flake sample, and interior flakes dominate the sample with 45.7% of the flakes. Biface thinning flakes dominate the flake sample at the Stewart site (56.9%), followed by interior flakes, which contribute 25.3% of the sample.

Data from the Honeymoon site are somewhat different (Hill and Hester 1971). Here a recorded low percentage of biface thinning flakes (10.5%) is also associated with a relatively high percentage of primary cortex flakes (10.5%).

TABLE 16
FLAKE TYPE FREQUENCY (PERCENTAGE) RECORDED
FROM FOUR RIO GRANDE PLAIN (SOUTH TEXAS) SITES

	Mariposa	Honeymoon	Holdsworth	Stewart
Primary Cortex	4.4	10.5	1.9	2.1
Secondary Cortex	35.7	46.0	28.2	15.7
Interior	32.3	33.0	45.7	25.3
Biface Thinning	27.6	10.5	24.2	56.9

Mariposa Site, 41 ZV 83

Honeymoon Site, Area A, 41 ZV 34

Holdsworth Site, 41 ZV 14

Stewart Site, 41 ZV 121

This occurrence has been interpreted to be the result of the possible production of cores or usable flakes. Hill and Hester (1971:58) also feel that this site is not an occupation site. This would account for the distinctly different recovered flake type frequencies from this site.

Clearly, the prediction that primary cortex flakes will be scarce at floodplain occupation sites in this area is substantiated, since no occupation site listed contained more than 5% of these flakes within their respective flake samples. Bifacial thinning flake frequencies were, however, high at only one site (Stewart); these flakes constituted approximately one-fourth of the flake samples recorded for the other sites. Interior flakes, thought to be removed from core interiors (Hester and Hill 1972:46), were recorded in highest frequency at the Holdsworth site. These flakes generally accounted for at least one-quarter of the flake samples from the remaining sites considered here. Mariposa exhibited the highest frequency of secondary cortex flakes, followed by the Holdsworth

site. These flakes, which occur subsequent to the primary cortex flakes in a core reduction sequence (Hester and Hill 1972:46), represent a reduction activity from Phase II (Hester 1975b). The high (35.7%) frequency of this flake type at Mariposa does not easily correspond to the Collins-Hester model.

Finished and broken tools, as well as rejected preforms, are also Phase III activity by-products and should be represented at floodplain occupation sites such as Mariposa (and Holdsworth and Stewart). At the same time, large cores and "tested" cores should contribute only a small part, if any, to the tool assemblage. If one computes the ratio of finished tools, broken tools, and preforms recovered at a site (i.e., all tool categories except cores) to large cores and tested cores, one can predict a large value if the model is accurate. Conversely, small ratio values would tend to make the model incorrect or at least insufficient in this area.

According to the stated model, only preforms and flake blanks destined to become either finished tools or broken (during manufacture or use) tools should be present at occupation sites. It is assumed that very few, if any, cores should be present at these sites; cores should instead be located at terrace sites close to the lithic resources of the region. For the purposes of this limited study, cores are thought not to occur at occupation sites for two reasons: (1) Quantification of "large" cores is not readily apparent--when is a core small? (2) Other references used in this study do not distinguish between large and small cores, and therefore their results can be more easily compared to the results of this study. However, the author does wish to point out that core nuclei, or cores that are physically non-usable because all possible flakes from them have been removed, are likely to occur in limited numbers at occupation sites.

Table 17 summarizes the necessary information considered here. Data were drawn from the analysis of the lithic materials recovered at the Mariposa site, the Holdsworth and Stewart sites (Hester and Hill 1972), and the Oulline site (41 LS 3) (Hester, White and White 1969).

Two of the sites analyzed (Mariposa and Stewart) had relatively low ratio figures while the remaining two sites (Holdsworth and Oulline) had comparatively greater ratio values. This conflict casts some doubt on the validity of the Collins-Hester model. The fact that the ratio of tool frequency to core frequency is low at two sites indicates that core reduction activities (Phase II) are occurring at occupation sites. This is reinforced by the fact that secondary cortex flake frequency is also relatively high at Mariposa (see Table 15). Since three of the four sites examined here were either surface collected or tested (by test pits), the recovered data may be affected by sampling bias. It may well be that future excavation at these sites would record more cores and secondary cortex flakes in relation to the total lithic assemblage. In any case, it is clear that the excavated material from the Mariposa site indicates that Phase II activities can occur at occupation sites. Tested cores considered suitable for further reduction into tools or flakes may have been transported from terrace areas into the floodplain. At Mariposa Phase II by-products were recovered in sufficient quantity to suggest that this transportation of cores may have occurred.

TABLE 17
CORE FREQUENCY, OTHER TOOL FREQUENCY, AND
RATIO OF TOOLS/CORES FREQUENCY AT
FOUR RIO GRANDE PLAIN SITES

	Frequency of Cores	Frequency of Other Tools	Ratio of Core/Tool Frequencies
Mariposa Site	.164	.836	5:1
Holdsworth Site	.078	.922	11:8
Stewart Site	.316	.684	2:7
Oulline Site	.065	.935	14:4

Another aspect of the lithic technology expressed by the artifacts recovered from Mariposa is related to the general tool industry type. As stated earlier in this section, a core-tool industry and a flake-tool industry have been postulated as occurring in south Texas archaeological contexts. From Mariposa, flakes were prepared as tools in the following categories: utilized flakes, trimmed flakes, scrapers, 9 of 24 bifaces, and 6 of 42 projectile points. It must be emphasized that the only criteria used here to describe flake-tools is the presence of flake attributes (bulb of force, striking platform, rings of compression on the ventral surface of a flake). If these attributes could not be recognized, then no basis for distinguishing flake-tools from core-tools was considered conclusive. There were several bifaces which retained cortex on at least one of their faces, which may be evidence of the core-tool industry.

One last item should be addressed before closing this section. Flakes from Mariposa were examined for striking platform type. This was initiated to gain insight concerning the modes of core platform preparation practiced by the Late Prehistoric inhabitants of Mariposa. Referring back to the flake analysis undertaken in Chapter V, the following platform types and their respective frequencies were recognized:

Single Facet Platform	46.2%
Multi-Facet Platform	31.7%
Crushed or Shattered Platform	8.0%
Cortex Platform	11.1%
Convergent Platform	3.0%

As expressed by Hester and Hill (1972), several core preparation techniques are indicated. Cortex platforms indicate that cores were reduced with no formal

preparation. Cores undergoing preparation by removing one flake and using the new fracture surface for a striking platform produce flakes with single facet platforms. These flakes were the most frequently occurring type and may suggest a preferred core reduction procedure. More extensive faceting (flake removal) for preparing more core striking platforms will result in flakes with multi-faceted platforms. A unique platform type caused by striking flakes on previous flake scar ridges (convergent planes; cf. Hester 1971) are convergent flake platforms. This flake platform type occurred least frequently in the Mariposa sample. Finally, crushed or shattered platforms, where only platform remnants are evident, also were observed. Ultimately, these flake platform types will be integrated into the core reduction sequence previously presented (see Chapter V). Time did not allow for such a detailed study to be presented here.

IX. INTERSITE COMPARISONS

Once materials from archaeological sites have been analyzed and interpretations prepared, comparisons with (temporally and culturally) related regional sites can qualify (and perhaps quantify) apparent similarities and differences. Evaluation of such results will often lead to a crystallization of ideas concerning such topics as settlement patterns, subsistence techniques, lithic assemblages, specialized environmental adaptations and lithic resource utilization. Only initial steps can be pursued in this direction for Late Prehistoric sites near Mariposa. This situation arises since so little published results are available from this region, and the majority of these have appeared only in the last six years or so.

Tested sites to be considered here include the Holdsworth (41 ZV 14) and Stewart (41 ZV 121) sites (Hester and Hill 1972), 41 ZV 152 (Hester *et al.* 1975), Tortuga Flat (Hill and Hester 1973), the Ouline site, 41 LS 3 (Hester, White and White 1969), and some of the sites surveyed and described by Hester and Hill (1975b:3-6). The unpublished results of major excavations at 41 ZV 10 (also on the Chaparrosa Ranch) will soon provide comparative information. Upper levels of this site contained evidence of Late Prehistoric occupation (T. R. Hester, personal communication).

At least 16 "major" Late Prehistoric sites have been recorded from a limited study area of southern Texas (Hester and Hill 1975b:3-6). The Holdsworth, Tortuga Flat and Mariposa sites are included in this figure. Only the sites mentioned in the previous paragraph will be compared to Mariposa, since they contain the most detailed published information.

Some comparative statements concerning general site function and location have been already prepared. Hester and Hill (1975b:7) have ascertained that "all of the presently documented Late Prehistoric sites are occupation loci, generally with concentrated midden deposits 10 to 30 cm thick." These middens characteristically contain lithic debris, land gastropods (especially *Rabdotus* sp.), river mussel shells (*Unio* sp.), other faunal materials, scattered burned rock (sandstone and chert), baked clay and charcoal (Hester and Hill 1975b; Hester 1975c). It is most often the case that these sites are situated adjacent to creek banks in riparian microenvironments (Hester and Hill 1975b:7; Hester 1975c).

When compared to other Late Prehistoric sites of the region, Mariposa exhibits some unique characteristics. The extensive faunal remains from test pits and feature excavations at most tested Late Prehistoric sites, particularly the "Bone Pile" at Tortuga Flat (41 ZV 155; Hill and Hester 1973), the 11 faunal species recognized at 41 ZV 152 (Hester *et al.* 1975), and the recovered bone from Holdsworth (Hester and Hill 1972) are conspicuously lacking at Mariposa. It appears likely that, at least for the areas excavated, land snails played a more important role as a subsistence item at Mariposa. Utilization of fauna (bone, snail shells and mussel shells) was concentrated into distinct patterns or foci, where snail extraction may have been an important activity.

The recorded features at Mariposa are consistent with those from similar sites. Hearth areas, with associated charcoal, ash, clay lumps and some lithic debris

are found at Mariposa as well as most other regional Late Prehistoric sites (Hester and Hill 1975b). Specialized lithic activity areas, such as a bifacial reduction area at Tortuga Flat (Hester and Hill 1975b:7), are contained within Mariposa (i.e., a uniface retouch area in level 2 of 42). Surface clusters of ceramics, reported to occur at Tortuga Flat (Hill and Hester 1973), are non-existent at Mariposa. In fact, while many Late Prehistoric sites do contain some pottery, none was found at Mariposa. Flake and artifact distribution maps are presented from Mariposa, but there are none currently available from nearby sites. These maps also indicated preferred lithic activity areas. Diachronically, the distribution maps from Mariposa indicate that at Mariposa, as well as at many other Late Prehistoric sites, the occupation levels can best be recognized as zones "with numerous, often overlapping, discrete occupational episodes" (Hester and Hill 1975b:20).

Specialized (unique) cultural features have been reported from areal Late Prehistoric contexts. A buried (female) with associated burial goods *in situ* was recovered from 41 ZV 152 (Hester *et al.* 1975). Fifteen bone beads (tubular and barrel-shaped) were interred with the burial. A *Tortugas* dart point and a suite of faunal remains were also documented at this site (Hester *et al.* 1975). Another cultural feature recorded at Holdsworth may possibly represent a "partially-burned brush hut structure" (Hester and Hill 1975b:8).

Lithic assemblages characteristic of Late Prehistoric archaeological context are consistent for most sites, including Mariposa. Characteristic *Scallorn* and *Perdiz* projectile points, along with triangular varieties, compose the arrow point component. These have also been recovered from Tortuga Flat, Outline and the Holdsworth sites. *Zavala* points, which retain both arrow point and dart point attributes, were recovered from Mariposa in associated contexts with *Perdiz* and *Scallorn* points. *Zavala* points, though not associated with sites compared here, have been hypothesized to be "coeval with arrow point forms and were part of the late prehistoric cultural inventory" (Hester and Hill 1975b:8, see also Hill and Hester 1971). This has been substantiated by excavations at Mariposa, although it should be noted also that *Zavala* points are well represented (compared to *Perdiz* and *Scallorn* specimens) in the lower (earlier) contexts of the site.

Other bifacial tools occurring in Late Prehistoric sites include ovate and triangular forms, drills and perforators. Drills and perforators were not present at Mariposa. Unifacial tools such as end scrapers and side scrapers are well represented at Mariposa, as well as the other Late Prehistoric sites considered here. Hammerstones, considered to be common items in the Late Prehistoric material inventory (Hester and Hill 1975b:9), are sadly lacking at Mariposa. Manos and grinding slabs, seen to occur infrequently in most Late Prehistoric sites (Hester and Hill 1975b:9), are quite frequent at Mariposa. Scratched and grooved sandstone is another common artifact type at Mariposa. Lithic debitage analyses have been published from a few Late Prehistoric sites (Hill and Hester 1971; Hester and Hill 1972; Hester 1975b) and comparison of Mariposa's debitage analysis with these studies was done earlier. Results of this comparison will not be repeated in detail here; suffice it to say that the lithic debitage from Mariposa is quite distinct in some aspects from many sites and similar (in other aspects) to many sites. Causes for this situation must await a more thorough examination, but the limited study in Chapter VIII indicates that Phase II reduction sequences are occurring at the Mariposa site.

Integrating radiocarbon dates into the above framework should establish the temporal parameters we are dealing with. For the sites being compared, Mariposa, Holdsworth and Tortuga Flat have all produced radiocarbon dates. Occupations of Holdsworth and Tortuga Flat begin about A.D. 1440 and end close to A.D. 1760. Dates from the Mariposa site are listed in Table 1; the Late Prehistoric occupations here span a period of time from A.D. 1430 to A.D. 1650. All three sites were occupied into the early Historic period, yet none of them contain evidence for European contact. Returning to projectile points, it is apparent that for three Late Prehistoric sites on the Rio Grande Plain, *Scallorn* and *Perdiz* points were still being used into protohistoric times. This statement, initially forwarded by Hill and Hester (1973), is further reinforced by pertinent data from the Mariposa site (see also Hester 1975c).

X. SUMMARY AND CONCLUSIONS

The testing and excavation of the Mariposa site, 41 ZV 83 in Zavala County, Texas, has produced a significant amount of archaeological information concerning the Late Prehistoric period on the Rio Grande Plain. Examination of the present environment indicates that ample and varied flora and fauna are available to man within a very favorable climatic setting. This particular setting has not been constant through time, however, since grassland-savannas existing at the end of the Pleistocene have now been replaced by a thorny brush environment.

Earliest evidence for man in the region also occurs near the end of the Pleistocene. The archaeological record documents man's existence from this initial entry (ca. 11,000 years ago) until historic (European) contact. Unfortunately, the archaeological evidence is in many ways meager. Much more work is necessary before adequately detailed information can be synthesized into a realistic "processual" picture of the regional archaeology. Perhaps the best evidence has been produced for the Late Prehistoric period, since problems specifically concerned with technology, subsistence and settlement patterns, micro-environmental zone utilization, and site functionality have been addressed, at least in a preliminary fashion. The report produced here will contribute to and consequently expand on those ideas which have previously been put forth by Hester (1971, 1974b, 1974c, 1975a, 1975c) and Hester and Hill (1975b).

Extending approximately 6000 square meters horizontally, Mariposa contains abundant cultural debris from the surface to a depth of nearly 90 cm. Cultural material was concentrated in the uppermost 20 cm. Radiocarbon dates from this upper level of the site average around A.D. 1500, while a date of A.D. 620 exists for a deeper level. This lower level may be associated with probable occupation(s) of Mariposa during the Archaic period.

Material remains excavated from Mariposa yielded an assemblage generally resembling those from similar Late Prehistoric sites in the region. Faunal materials such as land gastropods (*Rabdotus* sp.), river mussels (*Unio* sp.), and mammal bone fragments were recovered in an area marked by scattered burned rock and hearth activity loci. Hearths were represented by the deposition of large specimens of burned rock, charcoal and infrequent pieces of baked clay. Lithic flakes and artifacts were encountered throughout the site. Primary cortex flakes, secondary cortex flakes, interior flakes and biface thinning flakes occurred in a ratio of 1:9:8:7. Artifacts recovered from Mariposa include several types of cores, various bifaces and unifaces such as end scrapers, side scrapers, and end and side scrapers. Flakes were utilized as tools directly after manufacture and without modification ("utilized flakes") and they were also "retouched" to function as tools. Distinctive projectile point "types" include the *Scallorn* and *Perdiz* varieties. These appear to be coeval throughout the Late Prehistoric occupation(s) at Mariposa. *Zavala* points appear in quantity in earlier (deeper) contexts and continue to be used along with the *Scallorn* and *Perdiz* points.

Within the site itself, horizontal patterning was manifested by the separation of specific cultural activities into discrete "activity areas." This is best illustrated by the patterning of faunal remains, where discrete snail shell loci were observed. Bone fragments, mussel shell remains and snail shells were often clustered together, indicating areas associated with subsistence activities.

Hearths, another area of distinct activity, were evidenced by the concentration or clustering of large specimens of burned rock, usually associated with charcoal. Many times hearths were also accompanied by clusters of artifacts, flakes, and faunal remains. It was often the case that lithic activity, as well as the deposition of faunal remains, was established away from (or between) hearth loci. Flake debris and artifacts were only rarely associated in the same areas; at the same time, clustered faunal remains were readily encountered with concentrations of flakes and/or artifacts.

Analysis of lithic materials occurring at Mariposa was oriented toward evaluating a preliminary model of the lithic industries observed from sites on the Rio Grande Plain. Detailed study of the lithic material from Mariposa indicated that tools were manufactured by either core-reduction or flake production and modification, since both processes can be shown to occur through examination of the cores recovered from the site. In light of the Collins-Hester model (Hester 1975b), it is apparent that Phase II activities can occur at occupation sites such as Mariposa, given the fact that relatively large amounts of cores and secondary cortex flakes occurred at Mariposa.

The majority of information recovered at the Mariposa site is quite comparable to other Late Prehistoric sites nearby. However, the high frequency of ground sandstone slabs at Mariposa may indicate an unusually intensive reliance upon processing vegetal materials. At the same time, the low frequency of hammerstones at Mariposa is unique among Late Prehistoric sites so far investigated. The variety of faunal remains, especially vertebrate, which is characteristic of most Late Prehistoric sites, was not encountered at the site. The differences, which are few in comparison to the many similarities, must be viewed with some caution. Mariposa, which was tested twice and excavated for one season, remains the only Late Prehistoric site extensively excavated. Comparative information from other Late Prehistoric contexts rests primarily on surface collections and/or test pits. It is quite apparent that this disparity of sampling could be responsible for the observed differences. It is also quite apparent that archaeological research in this region of Texas is far from complete and much work needs to be done.

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