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by

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PRINCIPAL INVESTIGATOR: Elton R. Prewitt

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FOREWORD

The following report prepared by Mr. Steven M. Kotter presents the results of archeological assessments conducted at site 41ZP73 in the Falcon Lake State Recreation Area, Zapata County, Texas. This work was sponsored by the Texas Parks and Wildlife Department as part of the preliminary studies leading to planned developments within the Recreation Area.

Site 41ZP73 was found to contain significant prehistoric archeological deposits which date to both the Late Archaic and the Late Prehistoric periods. The site represents an example of upland utilization of the area and is assessed to be of sufficient integrity to warrant detailed investigations. Alternatives to achieve compatability of the planned developments with the cultural resources are presented.

In addition to providing an analysis and discussion of the archeological materials recovered from 41ZP73, Mr. Kotter has prepared an analysis of artifacts collected from nearby sites by Mr. Clarence Shelton. These materials illustrate the range of artifacts associated with the prehistoric occupations in the Falcon Lake region and should prove to be useful to future research dealing with Southern Texas.

Elton R. Prewitt
Principal Investigator

ABSTRACT

Archeological investigations at site 41ZP73 located within Falcon State Recreation Area, Zapata County, Texas were conducted during May 1980 by Prewitt and Associates, Inc. The site is an open camp situated on an upland ridge above Medio Creek near the Rio Grande and was occupied from the Archaic Period through the Late Prehistoric Period. The proposed construction of boat launching facilities was found to be in conflict with significant cultural resources; alternatives are presented to eliminate, limit or mitigate any adverse effects which may be expected to result from the proposed construction activities.

ACKNOWLEDGMENTS

The cooperation and assistance of a number of people were necessary for the successful completion of this project. Mr. Ronald Ralph was field coordinator for the Texas Parks and Wildlife Department; Mr. Raul Guerra, Jr., the Falcon State Recreation Area superintendent, also provided assistance.

Mr. Van Landingham of the International Boundary and Water Commission gave permission for work below the 304-foot contour, as well as providing useful information on the area before lake inundation.

I would especially like to acknowledge the cooperation and assistance of Mr. Clarence Shelton, who lent his collection of artifacts from site 41ZP98 for analysis.

Ms. Linda Nance assisted in editing the report, typed the drafts and prepared the final copy for printing; Ms. Sandra Hannum drafted the maps and Ms. Linda Battles-Herron prepared the artifact illustrations. Mr. Elton R. Prewitt served as the Principal Investigator for the project; field assistants were Ms. Chris De Bremaecker and Mr. Lee Calaway. Mr. Steven M. Kotter was Project Archeologist and prepared the body of the report.

INTRODUCTION

Archeological testing of site 41ZP73 within Falcon State Recreation Area (Fig. 1) was conducted by personnel from Prewitt and Associates, Inc. between May 13 and May 17, 1980. The investigations were sponsored by the Texas Parks and Wildlife Department, Austin, Texas, and were coordinated by Mr. Ronald W. Ralph of the Master Planning Branch. The testing program conforms to the provisions of Service Agreement Contract 340-414 and State of Texas Antiquities Permit No. 241. The Principal Investigator was Elton R. Prewitt; field work was supervised by the Project Archeologist, Steven M. Kotter.

Site 41ZP73 is expected to be adversely affected by the proposed construction of a boat ramp, an associated parking area with access to the ramp, and a general access road. Investigations were designed to provide:

(1) an assessment of the significance of the site;

(2) an assessment of the impact of the proposed construction on any archeologically sensitive site areas; and

(3) recommendations toward compatability of any significant cultural resources and the expected impact.

Detailed descriptions and assessments of the results of this testing program are included in this report. Several alternatives are recommended to avoid, limit or mitigate potential adverse effects of the proposed construction on the recognized significant cultural resources at site 41ZP73.

TEST METHODS AND PROCEDURES

Prior to the initiation of the testing program, an on-site inspection of site 41ZP73 was conducted by field

personnel of Prewitt and Associates, Inc. The inspection included a general site orientation and examination of surficial indications of cultural material, a determination of specific areas to be affected by the proposed construction, and potential alternatives to lessen this impact if necessary.

An on-site review of the testing results by the Principal Investigator and by an archeologist from the Master Planning Branch of the Texas Parks and Wildlife Department was made before the completion of the site investigations. Additional testing was recommended and completed to define the boundaries of sensitive cultural resources and to assess potential alternatives.

Investigative methods employed at the site included both 1x1-meter test pits and 25x25-centimeter shovel probes. All test pits were staked at each corner and the units oriented to magentic north with the aid of a compass. The vertical increments used for excavation were 10-centimeter thick arbitrary levels which were measured from a level line set at the ground surface of the southeast stake. All fill was screened through ¼-inch mesh hardware cloth and controls were maintained by test pit and level. The fill from the shovel probes was screened as one level.

Matrix samples, representing natural soil zones and arbitrary 10-centimeter levels within natural zones thicker than 10 centimeters, were taken from a column in the southeast corner of Test Pit 2; the samples were taken to provide a fine-screened artifact sample.

Test pit and shovel probe locations were plotted on an aerial photograph/topographic map overlay with UTM

Figure 1

41 ZP 73

FALCON STATE RECREATION AREA

GENERAL LOCATION MAP

FIGURE REDACTED

coordinates based on these plottings provided by the Texas Parks and Wildlife Department. Detailed mapping was not attempted due to the dense brush covering the site and the subsequent impact of clearing necessary to facilitate such mapping. Locational data utilized in the Site Description and for test units is based upon the Texas Plane Coordinate System; this system is correlated with the Universal Transverse Mercator System as set forth below.

Universal Transverse Mercators	Texas Plane Coordinates	Unit

TEXT REDACTED

All notes, photographs, drawings and artifacts will be placed in the files of the Texas Archeological Research Laboratory at the Balcones Research Center, The University of Texas at Austin for permanent curation.

ENVIRONMENTAL SETTING

Site 41ZP73 is located within the boundaries of Falcon State Recreation Area in the southwest corner of Zapata County, Texas. The area is within the lower Rio Grande Valley geographic region.

The site is situated south of and overlooking Medio Creek, a left-bank lateral tributary of the Rio Grande. Medio Creek drains an area originating on an upland flat then extending southwest with a watershed five miles in length and four miles in maximum width. Loss in elevation is a little over 200 feet, half of which is under the normal pool elevation of Falcon Lake. The elevation of site 41ZP73 varies from 304 to 316 feet MSL; this is some 60 feet higher than and .35 mile distant from Medio Creek and is 100 feet higher than and 1.35 miles distant from the Rio Grande.

Surface Geology and Topography

In the Falcon Lake area the Rio Grande flows through a broad valley developed in marine sandstones and shales of Lower Tertiary age; these deposits are of alternating different hardnesses resulting in distinct benches and a gently undulating topography (Evans 1961). Site 41ZP73 is situated on an upland ridge formed by the dissection of the margin of an upland flat by lateral drainage into the Rio Grande. The ridge runs approximately north to

south with cultural materials concentrated on the western ridge slope and the ridge tip.

Glen Evans, in a study conducted before lake inundation, recognized four terraces of the Rio Grande below the exposed Tertiary bedrock. The highest terrace is the Reynosa Formation situated between 110 to 135 feet above the river; this extensive silt- and caliche-capped gravel terrace is thought to have been deposited during the middle Pleistocene. Within the study area, only isolated remnants on ridge and hill tops are left following extensive erosion. The Reynosa Formation is apparently the source of most of the silicious gravels found in the lower terraces as well as those found in the upland areas. Brown chert is the most common gravel component; agate, jasper and rhyolite are fairly common; quartz and quartzite are extremely rare (Evans 1961).

Site 41ZP73 is situated at an elevation which is within the range of the Reynosa Formation, but in an area where erosion has left no remnant gravels. The ridge crest and upper slope is covered by soil developed over Tertiary sandstone (Fig. 2*a*) which outcrops following the 302- to 304-foot contour around the ridge; all of the intact cultural material occurs above the sandstone outcrop. Stratigraphically beneath the sandstone is Tertiary shale which has been exposed primarily by lake wave erosion. Severely disturbed cultural materials were noted in one periodically inundated area along the shoreline on soil developed over this shale.

Below the Reynosa Formation are a series of low terraces, the highest of which is the Zapata Terrace of late Quaternary age. This terrace averages 65 feet

elevation above the Rio Grande and is well developed on both sides of the river. The flat surface consisting of silts occurs over sloping Tertiary bedrock with basal gravels composing the bulk of the terrace material; most of the archeological sites which are contained within terrace deposits in this area occur in the Zapata Terrace.

The next lower terrace, the Rosita Terrace, is very fragmentary within the Falcon Lake area. These deposits also contain buried archeological materials. Below this is the modern floodplain terrace where no archeological sites have been recorded (Evans, 1961).

Soils

The soils within the site area include Copita fine sandy loam, 0-3% slopes and Catarina clay, 1-5% slopes. As these soils are important to the site both archeologically and in relation to the proposed impact, they will be discussed in some detail.

The Copita soil is deep to moderately deep and calcareous with a light brownish-gray fine sandy loam surface layer. A friable light-colored sandy clay loam subsoil overlies a cemented sandstone substratum at depths of 25 to 48 inches. They are moderately permeable and well drained with slow runoff (U.S. Department of Agriculture 1972). A detailed description for the type location 5 miles north-northwest of Roma, Texas is given in Table 1.

Catarina soils are deep and calcareous with a surface layer of light brownish-gray clay. The subsoil is a firm light-colored clay with a high shrink-swell potential and overlies clays and clayey shale substratums at depths of 48 inches.

Figure 2. Site Photographs

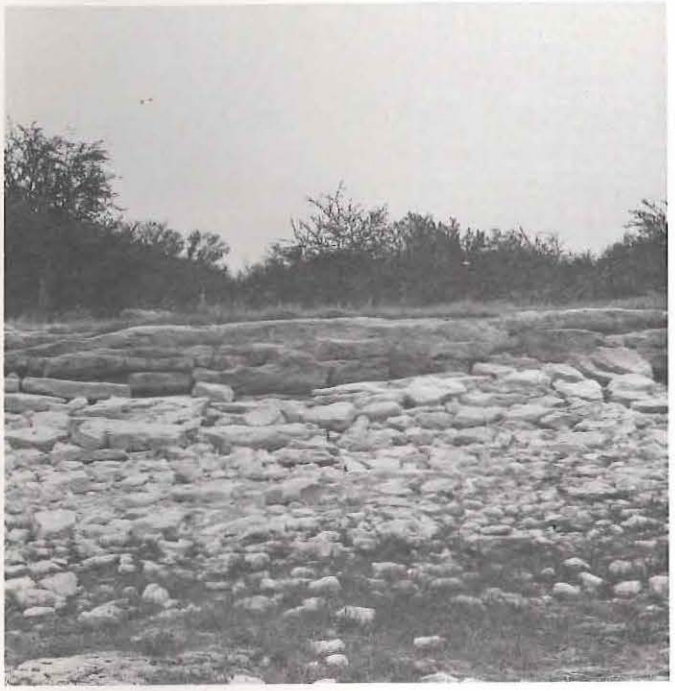
a. The sandstone outcrop forming the western site boundary. Shot is looking east in the general area of the proposed boat launching ramp. The sandstone was used as material for hearths and grinding stones.

b. General location of Shovel Probe 6 showing site vegetation dominated by shrub species.

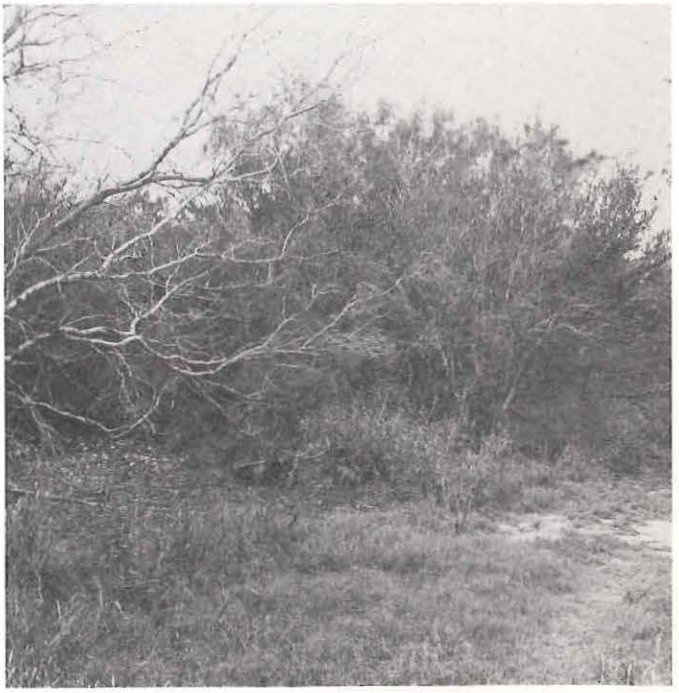
c. General shot of the southern site area and Shovel Probe 1 (location marked by figure in foreground) looking northeast. Tall trees in background mark eastern site boundary.

d. Feature 1 consisting of a ring of angular sandstone cobbles. Excavated area in center of the ring is not a part of the feature but represents the floor of Level 1.

Figure 2



a



b

c

d

TABLE 1

COPITA SERIES SOIL DESCRIPTION

A11 - 0-2" -- Light brownish gray (10YR 6/2) fine sandy loam, dark grayish brown (10YR 4/2) moist; weak fine subangular blocky structure; hard, friable; few snail shell fragments; calcareous; moderately alkaline; abrupt smooth boundary. (½ to 3 inches thick)

A12 - 2-11" -- Grayish brown (10YR 5/2) fine sandy loam, dark grayish brown (10YR 4/2) moist; compound, moderate coarse prismatic and weak subangular blocky structure when dry, structureless when moist; hard, friable; common roots; common fine pores; few snail shell fragments; few films and threads of $CaCo_3$; calcareous; moderately alkaline; clear wavy boundary. (5 to 13 inches thick)

B2ca- 11-26" - Pale brown (10YR 6/3) sandy clay loam, brown (10YR 5/3) moist; compound moderate coarse prismatic and weak subangular blocky structure when moist; hard, friable; common roots; common fine pores; few snail shell fragments; few films and threads of $CaCO_3$; calcareous; moderately alkaline; clear wavy boundary. (11 to 18 inches thick)

B3ca- 26-37" -- Light yellowish brown (10YR 6/4) sandy clay loam; yellowish brown (10YR 5/4) moist; weak medium subangular blocky structure; slightly hard, friable; few roots; common fine pores; few snail shell fragments; many films and threads of $CaCO_3$; calcareous; moderately alkaline; clear wavy boundary. (1 to 14 inches thick)

Cca - 37-49" -- Very pale brown (10YR 7/3) weakly cemented calcareous sandstone with thin strata and pockets of sandy loam; fractured; brittle; contains a few roots in the sandy loam in crevices; contains an estimated 5 percent by volume of $CaCO_3$ as coatings on upper boundary, and in fractures or partings; calcareous; moderately alkaline; gradual wavy boundary. (7 to 20 inches thick)

C - 59-54" -- Very pale brown (10YR 7/3) strongly cemented calcareous sandstone; contains a few fractures with $CaCO_3$ coatings.

Soil characteristics at the site were recorded in each of the shovel probes while measured profile sketches were made of the 1x1-meter units. All tests were confined within Copita fine sandy loam, but not all areas exhibited the developed type location profile (Table 1).

The northern site area at the tip of the ridge crest (as defined by Shovel Probes [SP] 4, 5, 7-12 and Test Pit [TP] 2) shows a complete profile development (Table 2) following in outline that of the type location. Differences between the two profiles, including an increase in snail shells, charcoal flecking and soil discoloration, are related to the prehistoric human occupation. These differences suggest a limited accumulation of midden-type deposits within both A horizons in portions of the northern site area.

TABLE 2

PROFILE DESCRIPTION TEST PIT 2

A11	0-5 cm light tan/gray fine sandy loam; hard, friable; snail shells numerous; abrupt smooth boundary
A12	5-37 cm grayish brown fine sandy loam; hard, friable; snail shells moderate; cultural flecking predominantly charcoal, some soil discoloration (reddish) from burning; clear wavy boundary
B2ca	37-60 cm light brown sandy clay loam; hard, friable; few snail shell fragments; clear wavy boundary
B3ca	60- light yellowish brown sandy clay loam; less hard, friable; few snail shells

Soils in the southern site area, including most of the ridge crest and both ridge slopes (SP1-3, SP13-15,

TP1 and TP3) are not well developed. Soil is a tan fine sandy loam with little or no horizon development. The depth of the loam varied from 15 cm (TP1) to 65 cm (SP15) and in some areas, if not all, is underlain by caliche gravels. A full soil profile to sandstone bedrock was not excavated.

Flora and Fauna

The Falcon Lake area is within the Tamaulipan biotic province as defined by Blair (1950); this large province includes most of Southern Texas and portions of northeastern Mexico. The climate is semiarid and megathermal with a water deficiency rated at -20 to -40. Thorny brush (Fig. 2*b*) is the predominant vegetation.

The Tamaulipan biotic province is not a homogeneous unit. The interior of Southern Texas and the Rio Grande Valley from Zapata County upstream is part of the Nuecian District characterized by thorny brush. The most important species include: mesquite (*Prosopis juliaflora*), various species of *Acacia* and *Mimosa*, granjeno (*Celtis pallida*), lignum vitae (*Porbera augustifolia*), cenizo (*Leucophyllum texanum*), white brush (*Aloycia texana*), prickly pear (*Opuntia lindheimeri*), tasajillo (*Opuntia leptocaulis*) and *Condalia* and *Castela*. The Rio Grande Valley from Starr County to the Gulf of Mexico is included in the subtropical Matamoran District with retama (*Parkinsonia aculeta*), Texas ebony (*Sideroxylon flexicaulis*), white olive (*Cordia boissieri*) and knackaway (*Ehretia elliptica*) in addition to many of the species listed above. Large elms (*Ulnus crassifolia*) and brush species alternately dominate the Rio Grande floodplain.

There is substantial evidence that the thorny brush now dominant in the Tamaulipan province is a recent development associated with European contact. Grasses were once more widespread with brush present in gravelly areas and along stream margins (Inglis 1964).

The vertebrate fauna of the province is a mixture of predominantly Neotropical and grassland species with some Austroriparian and Chihuahuan species. This includes 61 mammal, 36 snake, 19 lizard, 2 land turtle and 22 frog species and numerous bird species.

ARCHEOLOGICAL BACKGROUND

An in-depth archeological background of the Southern Texas region is beyond the scope of this report. A general background is provided for the region and is intended as an introductory statement for a portion of the Lower Rio Grande Plain; this includes investigations in Dimmit and Zavala, Zapata and Starr counties, as well as at site 41ZP73. Further limitations of the scope of this section include concentrations upon the Archaic and Late Prehistoric periods; these are the time periods recognized at site 41ZP73.

Southern Texas

The presently defined regional chronology of Southern Texas is general in nature and lacks firm dates even for major cultural transitions (Nunley and Hester 1975). There is reliable evidence of Paleo-Indian occupations between 9200 and 6000 B.C.; most of the recorded sites, however, are assignable to the Archaic period which lasted from the end of the Paleo-Indian period until approximately

A.D. 1200. At that time, arrow points, other new tool forms and, in some areas, ceramics appear which are characteristic of the Late Prehistoric period. The Late Prehistoric continued until contact with Europeans; this marks the beginning of the Historic period which in some places occurred as late as A.D. 1700.

At the time of historic contact, Southern Texas was inhabited by small hunting and gathering groups. The native groups, termed Coahuiltecan on the basis of a common language, were soon eliminated by a variety of causes and created a vacuum which was filled by a number of intrusive Plains Indian groups. During the eighteenth and early nineteenth centuries, first the Lipan Apache, followed by the Comanche and other displaced tribes, raided and occupied Southern Texas (Nunley and Hester 1975).

Two basic adaptations are recognized for the area -- a maritime or coastal adaptation and a savannah or interior adaptation (Hester 1975). Little is known of the coastal area until Late Prehistoric times when the Rockport Focus centered around Corpus Christi and the Brownsville Focus of the Rio Grande Delta dominated the southern Texas coast. Cultural materials from the Brownsville Focus include shell artifacts which were traded over a large area of southern and central Texas (Hester 1975) and along the northern Mexican coast and into the desert areas of northeastern Mexico. The Rockport Focus is characterized by occupation sites situated along coastal and bayshore margins, cemetery sites, stemmed arrow points, sandy-paste ceramics and a core-blade lithic industry.

The savannah or interior adaptation is best known

during the Archaic period when a very generalized subsistence strategy is recognized. The Late Prehistoric is less well understood except in specific areas; arrow points, including both stemmed and unstemmed varieties, and bone-tempered plain ceramics are associated with Late Prehistoric interior sites (Hester 1975). Portions of the savannah adaptation are discussed in detail later in this background.

Contact and interaction during the Late Prehistoric period between groups of the coastal and interior areas has been recognized. A widespread trade network involving a variety of materials apparently existed between Mexico, the coastal Brownsville Focus and the interior as far west as New Mexico (Hester 1975).

Dimmit and Zavala Counties

The Late Prehistoric period in Dimmit and Zavala counties, Texas, has been documented by Hester and Hill (1972) and summarized by Hester (1975). All of the sites recorded there are apparent occupation sites with high artifact densities which include lithics, land snails, mussel shells, scattered burned rocks, baked clay lumps, charcoal and bone contained within 10-30 centimeters of midden-type deposits. The sites are either oval or linear (following the bank of a stream) and average 3600 square meters in size. Intrasite patterning is poorly understood but excavated pits filled with bone, ash and baked clay, lithic processing areas, refuse clusters of snails and mussel shells, hearth clusters, isolated hearths and disposal areas have been recognized.

Chipped lithic materials include projectile points dominated by the *Perdiz* type with *Scallorn, Edwards, Fresno*

and a thick, stubby form similar to dart points also represented. At some sites the *Perdiz* type occurs alone, and at other sites it appears with the *Scallorn* and other types. Lithic tools include end and side scrapers, four-edge-beveled lozenge-shaped knives and bifacially-worked drills. Flakes are generally smaller than those of earlier industries and were used for tools. Both percussion and pressure flaking techniques and prepared core blade production were known. Grinding stones are not common. Some sites have bone-tempered ceramics with *Leon Plain* affinities (Hester 1975).

An analysis of the faunal remains demonstrated the use of forty-one species, indicating that few potential food sources were neglected. Although large mammals (bison, antelope and white tail deer) are represented, smaller mammals (jackrabbits, cottontail rabbits, packrats and cotton rats) were the major source of protein. Fish, birds and reptiles (especially turtle remains) are also prominent. Land snails and freshwater mussels were also used. As with most hunting and gathering groups, plant food is assumed to be the major food source.

The range of dates from radiocarbon samples for the sites in Dimmit and Zavala counties extends from A.D. 1440 to A.D. 1760.

Arroyo los Olmos

Several professional archeological investigations have been conducted in the Arroyo los Olmos drainage within Starr County, Texas. In 1956 Frank Weir made a brief reconnaissance survey of supposed Paleo-Indian sites near the town of El Sauz, including the La Perdida Site. Results were inconclusive (Weir 1956).

Milton Newton (1968) tested seven sites in the same area validating the Paleo-Indian occupation at the La Perdida Site. A local projectile point sequence was developed which suggested a general cultural continuity throughout the Archaic. His generalized chronology included a Lerma Phase followed by the Falcon Focus (*Abasolo, Tortugas, Pandora* and *Desmuke* types) and the Mier Focus (*Catan, Matamoras* and *Starr* types). Newton states that the prehistoric and early historic occupations were confined to a narrow band along streams with the Arroyo los Olmos as the main line of communication. Sites were distributed on terraces and small rises along both banks of the arroyo with concentrated debris nearest the stream and scattered remains on rises farther from the stream.

A more extensive survey was conducted in the area by Parker Nunley in 1975. These data (Nunley and Hester 1975) are used for the following summary. Within Starr County the vast majority of the recorded sites are concentrated along the Arroyo los Olmos; all apparently date to the Archaic period.

A total of fifty-two sites were recorded and these are found in two distinct topographic areas. Gallery sites, represented by twenty-seven sites, are situated on stream terraces or margins; bower sites, composed of twenty-three sites, are situated on hilly upland areas above the stream terraces. Two sites fit neither category.

The sites were given general functional classifications, either as temporary camps, multipurpose base camps or quarry/lithic workshop areas. The temporary occupations are the result of repeated short-term use probably on a seasonal basis or they represent single

episodes of use. Temporary and major occupation sites were evenly divided between gallery and bower areas; quarry sites were primarily within bower areas.

Investigations by Daniel Fox (1979) in the Arroyo los Olmos area were a continuation of Nunley's work outlined above. Intensive survey and limited testing of sixteen prehistoric sites yielded data showing a general lack of chronological data and intrasite artifact variability and a greater similarity between sites in the northern and southern portions of the arroyo than between the gallery and bower type sites. Specific site descriptions were mostly of surficial lithic scatters with only a small number of terrace sites which exhibit apparent subsurface cultural deposits.

The Falcon Lake Area

The first professional archeological investigation in the Falcon Lake area was by The University of Texas between 1950 and 1953. As part of the River Basin Surveys, sites were recorded by Cason (1952), Jelks (1952, 1953) and Krieger and Hughes (1950) on the United States side, and by Aveleyra (1951) on the Mexican side. Unfortunately, most of the data recovered were never published, and the few published reports are very general and inadequate.

A general synthesis of the area published in the *Introductory Handbook of Texas Archeology* (Suhm, Krieger and Jelks 1954) was based on these data and on artifacts in private collections. In addition to a division into Paleo-Indian, Archaic and Historic stages, two foci were defined. The Falcon Focus was characterized as a relatively long-term, stable complex based on nonspecialized

hunting and gathering; the Mier Focus as a poorly understood transition between the Archaic and Historic periods.

Several small-scale investigations have been conducted in the past few years. A survey below the Falcon Dam spillway recorded twenty-two prehistoric sites, twenty of which were categorized as occupation sites and two as quarry sites (O'Malley 1976). Most of the sites had not been intensively occupied; those that had been contained freshwater mussel shells. Other occupation sites are described as lithic scatters consisting of chipping debris and a few bifacially-worked tools. Quarry sites occurred in association with lithic source material.

Within Falcon State Recreation Area, site assessments for construction impact have been made by Paull and Zavaleta (1980) and by David Ing (1974). Two lithic scatters were recorded by Paull and Zavaleta along two dry washes draining a gentle upland rise. One possible hearth-sized burned rock feature was noted. Ing also recorded several upland lithic scatters, all apparently from the Archaic period, in an area around site 41ZP73.

Summary

Since the first professional investigation in 1950, archeological thought concerning Southern Texas and the Falcon Lake area has undergone a number of changes. As late as 1968 reports suggested a long-term cultural continuity with few material changes until the Historic period, and a regional uniformity of the archeological remains.

Beginning in 1970, emphasis has shifted away from a view of cultural homogeneity to one of cultural diversity between local drainage systems. Terms such as

Coahuiltecan, Falcon Focus and Mier Focus are thought to have little or no cultural meaning (Nunley and Hester 1975).

This intraregional diversity, however, is not yet defined; and as late as 1979 (Hester 1975; Fox 1979), no valid general statements could be made for the Arroyo los Olmos area, probably the best understood area in the region (Nunley and Hester 1975). Substantive data concerning prehistoric use of the Rio Grande Plain come from isolated areas. The Archaic in the Arroyo los Olmos area and the Late Prehistoric from Dimmit and Zavala counties are the best known; little is known of the entire prehistoric sequence from the Falcon Lake area.

The lack of data has also hampered interregional comparisons. Nunley and Hester (1975) noted a basic similarity of the remains from the Late Prehistoric of the Lower Pecos and Southeast Trans-Pecos area and Southern Texas. The relationship during that period with Central Texas and the coastal foci, however, is poorly understood.

SITE DESCRIPTION

Prehistoric site 41ZP73 (TEXT REDACTED

The site is crescent-shaped with cultural materials scattered over portions of the ridge crest and both eastern and western ridge slopes and is 375 meters in length and 40 meters in

Figure 3

FALCON STATE RECREATION AREA

41 ZP 73

TEST EXCAVATIONS

FIGURE REDACTED

maximum width. On the basis of surficial cultural materials and testing results, site 41ZP73 can be divided into northern and southern site areas.

TEXT REDACTED

This area is characterized by surficial cultural materials consisting of isolated hearth-sized burned rock features and scatters and an associated thin lithic scatter. The lithic scatter varies from 0 to 5 flakes per 1x1-meter square and includes both debitage and complete tools.

The ridge crest and particularly the ridge slopes have been affected by ongoing sheet erosion and limited rilling. The burned rock features noted were partially uncovered but were usually not displaced to a significant degree; however, the surficial artifacts have probably been subject to greater movement.

TEXT REDACTED

Cultural materials consist of a moderate to dense (10 to 40 flakes per 1x1-meter square) lithic scatter, as well as isolated and clustered hearth-sized burned rock features and scatters. Both debitage and tools are represented in the lithic tool inventories. Erosion in this site area does not appear to be a significant factor and the cultural remains appear to be relatively intact.

Also important to an understanding of the nature of site 41ZP73 are the materials noted and collected in

the deflated beach area below the ridge tip. The relationship between this area and the site as defined above is uncertain because of the surficial nature of the beach area and the limited sample available from testing.

IMPACT OF PROPOSED CONSTRUCTION

The purpose of the testing program was to assess the impact of the proposed construction as planned, and if these areas were found to contain sensitive cultural resources, to assess alternatives for construction placement.

TEXT REDACTED

Site 41ZP73 will be adversely affected by the construction

TEXT REDACTED

RESULTS OF TESTING

Fifteen shovel probes and three 1x1-meter test pits were excavated to test site 41ZP73 (Fig. 3). The

results and nature of each of these tests are summarized in Table 3.

TEXT REDACTED

The parking area, in the northern site area, was tested by Shovel Probes 4-12 and by Test Pit 2. The tests indicate that the artifact densities are highest and the depth of cultural deposits is greatest in an area around Test Pit 2 and Shovel Probe 7. The depth and density of materials decrease in all directions away from Test Pit 2 and Shovel Probe 7; however, the artifact density in the northern site area, even at its lowest frequency, is clearly greater than in the southern site area. Test Pit 2, the control unit for this area, contained 671 artifacts, including a number of tools, within 50 cm of deposition; the recovery frequency varied from nearly 300 in Level 1 to 25 in Level 5. A cluster of burned rocks which represents one of several possible living surfaces noted during excavation was recorded in Level 1.

No test pits or shovel probes were placed in the specific area of the proposed boat ramp because of a lack of surface indications of cultural material where wave action from the lake has deflated the deposits and sandstone and shale bedrock exposures are common.

A preliminary field assessment of these areas of proposed construction indicated that alternative

TABLE 3

TEST UNIT DESCRIPTIONS

Unit #	Texas Plane Coordinates	Surface Description	Depth of Unit	Soil Profile	Cultural Materials	Comments
TP1	TEXT REDACTED	Light lithic scatter	15 cm	tan fine sandy loam to 15 cm; caliche	5	Feature #1
TP2	TEXT REDACTED	Moderate to dense lithic scatter	70 cm	0-5 - A11 5-37 - A12 37-60 - B2ca 60- B3ca*	671	Rock cluster Level 1
TP3	TEXT REDACTED	Light lithic scatter	40 cm	tan fine sandy loam to 40 cm	45	
SP1	TEXT REDACTED	Very light lithic scatter	35 cm	tan fine sandy loam to 30 cm; caliche to 35 cm	no recovery	
SP2	TEXT REDACTED	No surficial cultural material	55 cm	tan fine sandy loam to 55 cm	4 subsurface	Near slope drainage
SP3	TEXT REDACTED	Light lithic scatter	58 cm	tan fine sandy loam to 58 cm	no recovery	Near TP1
SP4	TEXT REDACTED	Moderate to dense lithic scatter	40 cm	tan fine sandy loam to 40 cm	15 surface 19 subsurface	Burned rock noted at 15 cm

*See Soil Description in Environmental Setting section.

TABLE 3, Continued

Unit #	Texas Plane Coordinates	Surface Description	Depth of Unit	Soil Profile	Cultural Materials	Comments
SP5	TEXT REDACTED	Light lithic scatter	30 cm	tan/gray fine sandy loam to 30 cm	2 surface 14 subsurface	
SP6	TEXT REDACTED	Covered by lake high water debris	30 cm	lake debris to 10 cm; tan fine sandy loam to 30 cm; caliche	4 subsurface	
SP7	TEXT REDACTED	Moderate to dense lithic scatter	20 cm	Grayish-brown fine sandy loam to 20 cm	22 surface 50 subsurface	Mussel shell and charcoal noted
SP8	TEXT REDACTED	Light lithic scatter	70 cm	tan fine sandy loam to 70 cm; top 30 cm compacted	1 surface 3 subsurface	Charcoal noted at 30 cm
SP9	TEXT REDACTED	Light lithic scatter	50 cm	0-3 - A11 3-20 - A12 20-50 - B2ca*	1 surface 15 subsurface	
SP10	TEXT REDACTED	Very light lithic scatter	50 cm	0-8 - A11 8-25 - A12 25-50 - B2ca*	11 subsurface	

TABLE 3, Continued

Unit #	Texas Plane Coordinates	Surface Description	Depth of Unit	Soil Profile	Cultural Materials	Comments
SP11	TEXT REDACTED	No surficial cultural materials	45 cm	0-12 - A11 12-45 - A12*	1 surface 5 subsurface	
SP12	TEXT REDACTED	Very light lithic scatter	40 cm	0-5 - A11 5-40 - A12 40 - caliche*	1 surface 2 subsurface	
SP13	TEXT REDACTED	Very light lithic scatter	45 cm	tan fine sandy loam to 45 cm	no recovery	Burned rock noted
SP14	TEXT REDACTED	Very light lithic scatter	65 cm	tan fine sandy loam to 65 cm	7 surface and sub-surface	Burned rock at 8-10 cm
SP15	TEXT REDACTED	Very light lithic scatter	55 cm	tan fine sandy loam to 55 cm; caliche	6 surface and sub-surface	

placements might be desirable in order that culturally sensitive areas may be avoided. Shovel Probes 13-15 and Test Pit 3 were placed to test one such alternative in the southern site area along the eastern ridge slope (Fig. 3). The results of these tests were similar to those along the western ridge slope (Test Pit 1) but with slightly higher artifact densities and greater depth of cultural materials. In Test Pit 3 the highest density (30 artifacts) was in Level 1 although cultural materials were recovered from all four levels excavated; no burned rock clusters or features were noted.

SITE ASSESSMENT

The assessment of the significance of site 41ZP73 is based on its potential to provide information on archeological questions of both local and regional importance. This potential must include the ability to make definitive statements on the nature of the site based on the cultural materials present which can then be used in both intraregional and interregional comparisons with other site data.

The completed testing program, including an evaluation of the state of current cultural resource data for the Falcon Lake area and Southern Texas and the nature of the site's cultural materials, indicates that site 41ZP73 has a high information yield potential and represents a significant cultural resource.

Factors affecting the potential to yield significant information characterizing the prehistoric occupation of the site include:

(1) the presence of definable northern and southern

site areas with potential information on intrasite subsistence and social organization;

(2) the presence of identifiable features, including surficially-exposed features in both site areas and buried rock clusters in the northern site area which are sufficiently intact to develop a feature typology for the site;

(3) the distribution of these features as isolates within the southern site area and as isolates and clusters within the northern area with the potential to yield information on subsistence and social organization;

(4) the presence of possible living surfaces especially within the northern site area;

(5) the presence of a number of artifact categories, including both time- and functionally-diagnostic artifacts, occurring in high densities within the northern site area and to a lesser extent in the southern area; and

(6) the potential for the definition of activity areas associated with features and feature clusters and in areas where features were not noted.

This high information yield potential suggests that data from site 41ZP73 are suitable for the examination of questions which are of regional and interregional importance. The Falcon Lake area occupies a key geographic position in Southern Texas. Located along the Rio Grande between two major cultural complexes -- the coastal Brownsville Focus and the Chihuahuan Desert/ Trans-Pecos region -- the site may be important in understanding interaction between these areas. This applies equally well to the interior (monte) adaptations in Texas and Mexico.

Site 41ZP73 also has the potential to provide

data applicable to the development of a local and regional chronological framework. The transition from the Late Archaic to the Late Prehistoric in Southern Texas is poorly understood and the Late Prehistoric in the Falcon area not at all. Spanning both of these periods, the prehistoric occupation at the site represents an important resource; this is especially true when the loss of sites due to lake inundation is considered.

Two negative factors in the assessment of information yield potential at site 41ZP73 are the lack of preserved bone suitable for faunal analysis and sparse cultural fill within the observed features. Although both factors are important in an assessment, they do not detract significantly from the positive factors listed above.

RECOMMENDATIONS

The northern and southern site areas, although probably associated culturally, represent distinct resource units. The southern site area is typical of many of the upland sites in the Falcon Lake area in that it is a lithic scatter with isolated hearths. The cultural materials are surficial and subject to sheet washing and rilling and are therefore very fragile. Although the southern site area is a culturally-sensitive area, the information lost if the area were impacted would not be irreplaceable. In fact, considering the ongoing loss to natural processes, mitigation of any loss due to the proposed construction may be beneficial.

The northern site area, on the other hand, should be preserved as having a greater information yield potential than the other known sites above the pool elevation of Falcon Lake. The site area is relatively stable and represents a long-term resource if it is not subjected to additional impact.

A number of recommendations are presented which are directed toward achieving compatability of culturally-sensitive areas and the proposed construction. They are, in order of priority, from first to last:

Alternative 1: The site of the proposed construction should be moved from its present location to another as yet unspecified area. This alternative would not only eliminate any direct impacts to the significant cultural resources but would also eliminate the indirect impacts inherent in the other alternatives.

Alternative 2: The proposed construction should be limited to areas below the 304-foot contour line and built up above the normal pool elevation using borrowed fill and rip-rap construction techniques. The impact to culturally-sensitive areas would be indirect only (*e.g.*, increased pedestrian traffic on the site).

Alternative 3: The proposed construction design should be altered to lessen the direct impacts on the northern site area which will be incurred by parking area construction and to limit impacts on the southern site area. Two methods of lessening this impact are considered. The first is to relocate the proposed parking area to within the southern site area, where any loss of culturally-significant materials to both the access road and parking area would require mitigation efforts. The second method is to pad the northern site area prior

to the construction of the parking area and limiting other direct impacts to the proposed route of the access road. This alternative, however, is not desirable because of the anticipated destruction of the natural context of buried materials due to compaction and the need for compilation of a microtopographic site map essential to relocation of the ground surface after padding and construction.

Alternative 4: The site of the proposed construction should be as planned with subsequent loss of significant cultural resources. This alternative will require extensive excavations in both the northern and southern site areas to mitigate this loss. Alternative 4 is given a low priority of implementation because of the irreplaceable potential information contained within the site.

The recommended alternatives are general in nature and a detailed plan of recovery should be prepared for any construction alternative selected other than Alternative 1.

FEATURE DESCRIPTIONS

Several hearth-sized burned rock features were noted during a surface examination of the site. Within the southern area, isolated features occur in areas of thin lithic scatters while in the northern site area the features occur in both isolated instances and in clusters.

The observed features are circular to oval in outline, are constructed with tabular sandstone, and vary in diameter from 50 cm to 1 m with no recognizable

introduced feature fill (*e.g.*, charcoal wash). Sheet erosion and rilling, the major factors in exposing the features, has not been of sufficient magnitude to displace the burned rocks beyond a tightly-placed circle. The exact form, including surface preparation and rock placement, was not determined for most of these features; however, one feature was excavated which is typical of three noted in the southern site area.

Test Pit 1 was intentionally placed to bisect and expose a small circular ring of burned rocks surrounded by a thin lithic scatter. The feature outline was apparent before excavation in that the tops of the rocks were exposed 2-3 cm above ground surface; the bottom elevation of the burned rocks and the deepest recovered artifact were 5 cm below ground surface. A plan photograph of Feature 1 (Fig. 2*d*) shows a single circular ring constructed of sandstone rocks with a diameter of 60 cm. Except for the two rocks displaced toward the northeast, the areas inside and outside the ring are devoid of other burned rocks. The rocks were apparently placed on a flat ground surface with no surface preparation. The contents of the feature have been exposed to washing and leaching and no recognizable feature fill was noted. However, five artifacts were recovered from Level 1 of this test unit.

A small cluster of burned rocks which was not given a feature designation was uncovered during the excavation of Level 1 of Test Pit 2. The four fist-sized sandstone rocks occurred in an area 20x50 cm in diameter and in association with a triangular dart point. The bottom of the rocks and the projectile point were at the same level indicating that the cluster may be part of a

living surface. No feature outline or fill was noted; the cluster is probably a hearth remnant which has been washed and partially displaced by past sheet erosion. A total of 296 artifacts were collected from Level 1 of Test Pit 2.

ARTIFACT DESCRIPTIONS

Six artifact categories are represented by the cultural materials recovered during the testing program at site 41ZP73. Two other categories, grinding stones and ceramics, include a single mano fragment and one small sherd noted on the surface. The totals for five of the categories are given in Table 4 below; the remainder of the categories were not quantified.

TABLE 4
ARTIFACT CATEGORIES

Lithic tools	12
Lithic debitage	900
Grinding stones	1
Ceramics	1
Mussel shell	-
Snail shell	-
Hematite	1
Burned rocks	-

Lithic Tools

The lithic tool category from site 41ZP73 includes projectile points, retouched and utilized flakes, and one cobble tool.

Projectile Points

Six projectile points were collected, three from the surface and three during excavation. The projectile

points can be grouped into four forms summarized below.

Form 1, Triangular Dart Points

Specimen No. 1 (Fig. 4*a*) is a triangular blade 46 mm in length, 23 mm in maximum width and 6 mm in thickness, with no stem and slightly convex edges. No edge beveling was noted; the base is slightly concave and has been thinned by longitudinal flakes one-quarter to one-third as long as the length of the blade. Provenience is Test Pit 2, Level 1.

Specimen No. 2 (Fig. 4*b*) is a triangular blade 40 mm in length, 21 mm in maximum width and 7 mm in thickness, with no stem and slightly convex edges. The left lateral edge of each face is strongly beveled; the base has been thinned by longitudinal flakes one-third to one-half of the total blade length. The specimen was collected near Test Pit 1.

Specimen No. 3 is a basal fragment of a triangular blade with a maximum width of 23 mm and thickness of 7 mm with no stem and slightly convex edges. The left lateral edge of each face is slightly beveled and the base has been thinned by longitudinal flaking. The specimen was collected from the surface of the deflated beach area.

Form 2, Side-Notched Dart Point or Large Arrow Point (Fig. 4*c*)

This point is a triangular blade 52 mm in length, 17 mm in maximum width and 5 mm in maximum thickness. The edges are slightly convex with no beveling; the base is also slightly convex and has been thinned on one side by longitudinal flakes between one-quarter and one-third of the total blade length. The side notches have a haft length of 9 mm and a neck width of 10 mm. Provenience is Test Pit 2, Level 2.

Figure 4. Artifact Illustrations

a. *Tortugas* type dart point

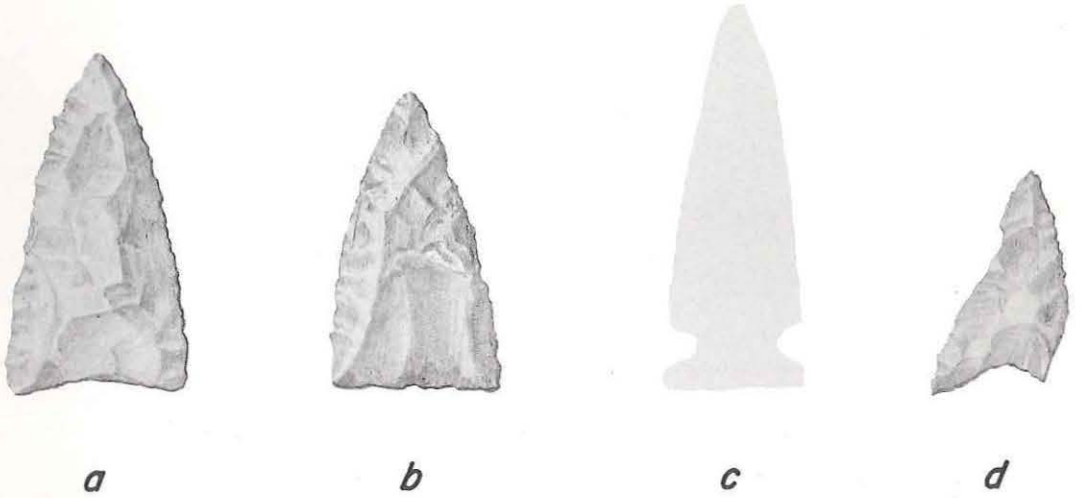
b. *Matamoras* type dart point

c. Side-notched dart point or large arrow point; similar to the *Scallorn* type arrow point but longer and thicker.

d. *Starr* type arrow point

e. Igneous porphyry cobble tool fragment

Figure 4



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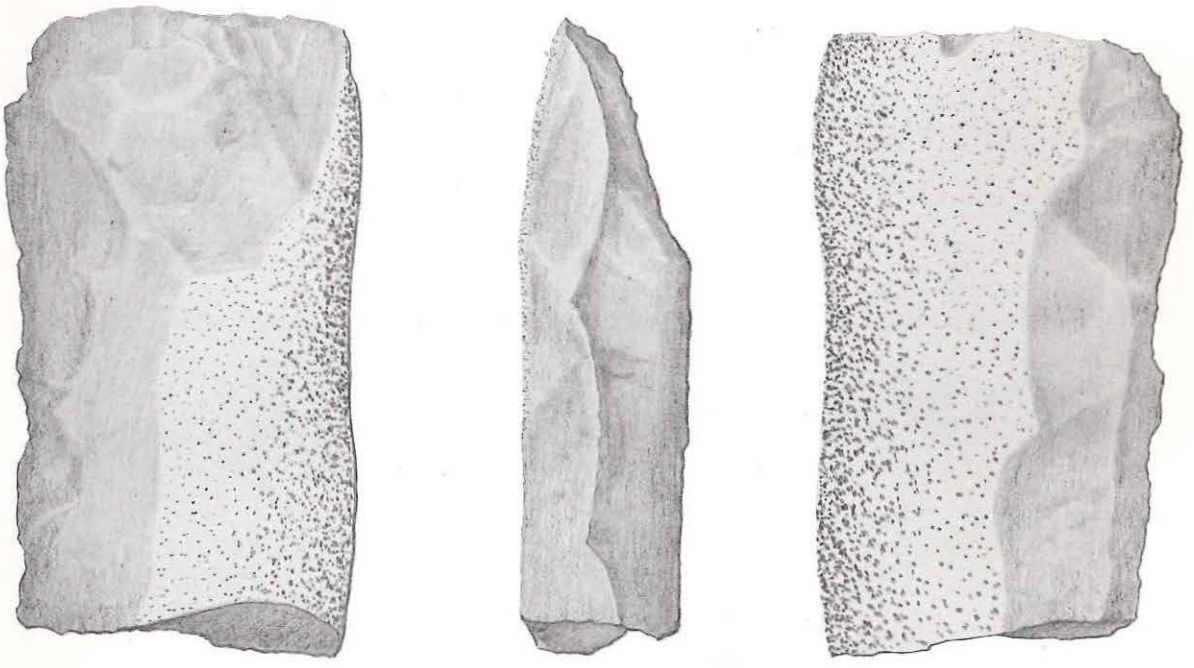

e

Form 3, Triangular Arrow Point (Fig. 4*d*)

This single specimen is a triangular point fragment made from a flake with one recurved edge and a strongly convex base. Total length is 31 mm with an approximate maximum width of 20 mm and a thickness of 3 mm. Provenience is Shovel Probe 10.

Form 4, Miscellaneous Stemmed Dart Points

This point is a fragment with both barbs and the tip broken off, leaving a rounded base and most of the blade. The original outline of the point could not be reconstructed.

Type designations for the projectile points collected are limited by the lack of specific data for the area. Form 1 Specimens 1 and 3 are probably *Tortugas* type, Specimen 2 is probably a *Matamoras* type. Form 2 generally falls within the description for the *Scallorn* type but is longer and thicker. Form 3 is a *Starr* type arrow point. Form 4 is untyped.

Retouched and Utilized Flakes

The retouched and utilized flakes represent only those recognized without the aid of a microscopic examination. Less intensively utilized or retouched pieces may be present in the artifact sample and are not included in the following tabulation. All of the artifacts included exhibit regular retouch along the working edge. The two complete tools and four tool fragments recovered are summarized in Table 5.

Cobble Tool (Fig. 4*e*)

An igneous porphyry cobble tool fragment was collected from the surface along the shore of Falcon Lake.

TABLE 5

RETOUCHED AND UTILIZED FLAKES

Flake Description	Flake Length	Flake Width	Flake Thickness	Working Surface	Length of Working Surface	Provenience
Complete interior flake	26 mm	18 mm	6 mm	Flake trimmed along convex edge to produce a straight working edge; retouching on dorsal surface	11 mm	Test Pit 2 Level 3
Complete interior flake	19	32	6	Retouch on dorsal surface along concave lateral edge	11	Shovel Probe 8
Primary platform end flake fragment	40	42+	14	Steep retouch along dorsal surface of slightly concave distal edge	28+	Test Pit 3 Level 1
Platform end secondary platform end flake fragment	25	25+	4	Retouch on ventral surface along slightly convex lateral edge and dorsal surface along a slightly concave distal edge	20 15+	Test Pit 2 Level 4
Interior chip	-	-	4	Retouch on ventral surface along one edge	12+	Test Pit 2 Level 4
Interior chip	-	-	4	Retouch on slightly concave edge	9+	Test Pit 2 Level 2

The tool is subrectangular with two working surfaces, a unifacially-worked gouge bit at the distal end and a bifacially-worked surface along one lateral edge. The remainder of the cobble is unmodified and the proximal end has been broken.

Lithic Debitage

Cores

A number of flake production cores were noted at the site, especially in the northern site area. One expended flake production core of purple chert containing clear crystalline inclusions was collected from near Test Pit 3. The core is roughly wedge-shaped with a flat surface, half of which is covered by cortex, opposite a pointed edge. Flakes have been removed from both the flat surfaces resulting in the production of unprepared platform secondary flakes, and bifacially from the pointed edge. Overall core dimensions are 41x26x26 mm.

Biface Fragments

Two biface fragments were collected which apparently represent biface production manufacturing failures. Both are from the site core area; one is a distal tip fragment that had been reduced to a thickness of 9 mm before a transverse fracture caused the tip to be discarded. The other biface fragment is a portion of a lateral edge that flaked off as a result of being struck too far from the edge. Overall dimensions are 45x20 mm and a maximum thickness of 13 mm. The point of impact which resulted in the failure is 13 mm from the edge of the biface.

Flake Debitage

Four basic flake debitage categories are recognized for this report:

(1) complete flakes with a complete striking platform and with the distal end and lateral edges intact enough to determine basic flake outline;

(2) platform end flake fragments with a complete striking platform but with breakage at either the distal end or lateral edges;

(3) chips including all thin flake debitage without a complete striking platform (primarily distal and lateral edge flake fragments); and

(4) angular chunks including miscellaneous blocky debitage with no recognizable flaking features.

Totals for these flake debitage categories by test unit and level are provided in Table 6 below. Except for Shovel Probes 4 and 7, the percentages for major units and levels are consistent. The higher percentage of platform end flake fragments and the correspondingly lower percentage of chips in Shovel Probe 4 may be significant.

All complete flakes, platform end flake fragments and chips were further divided into three decortication categories based on the percentage of cortex present on the dorsal surface. These categories are assumed to represent sequential stages in both biface and flake production core reduction.

Table 7 gives the totals and percentages of the decortication categories by test unit and level. There appears to be significant differences in the percentages of secondary and interior flakes between Level 1 from Test Pits 2 and 3 and Levels 2 and 3 from Test Pit 2.

TABLE 6

FLAKE DEBITAGE

Provenience	Complete Flakes #	%	Platform End Flake Fragments #	%	Chips #	%	Angular Chunks #	%	Totals
TP1, L1	1		1		3		-		5
TP2, L1	81	27.5	57	19.3	145	49.15	12	4.1	295
L2	39	26.5	29	19.7	77	52.4	2	1.36	147
L3	40	31.25	23	18.0	62	48.4	3	2.3	128
L4	20	26.3	15	19.7	40	52.6	1	1.3	76
L5	9		4		10		2		25
TP3, L1	9	29.0	6	19.35	15	48.4	1	3.2	31
L2	3		4		3		-		10
L3	2		-		-		1		3
L4	-		1		-		-		1
SP2	-		-		4		-		4
SP4	8	24.2	12	36.4	13	39.4	-		33
SP5	2		5		8		-		15
SP6	1		1		2		-		4
SP7	13	18.05	22	30.55	34	47.2	3	4.17	72
SP8	2		-		1		-		3
SP9	4		5		6		1		16
SP10	3		-		7		1		10
SP11	2		-		4		-		6
SP12	1		-		2		-		3
SP14	1		1		5		-		7
SP15	3		-		3		-		6
TOTALS	244	27.4	186	20.9	434	48.76	26	2.9	900

TABLE 7

FLAKE AND CHIP DECORTICATION CATEGORIES

Provenience	Totals	Primary		Secondary		Interior	
		#	%	#	%	#	%
TP1, L1	5	0		2		3	
TP2, L1	286	9	3.15	47	16.43	230	80.42
L2	145	7	4.83	38	26.21	100	68.96
L3	125	4	3.2	29	23.2	92	73.6
L4	75	6	8.0	8	10.66	61	81.33
L5	23	3	13.04	4	17.39	16	69.56
TP3, L1	30	1	3.33	5	16.66	24	80.0
L2	10	0		2		8	
L3	2	0		0		2	
L4	1	0		0		1	
SP2	4	1		0		3	
SP4	33	3	9.1	7	21.2	23	69.7
SP5	15	0		5		10	
SP6	4	0		1		3	
SP7	69	1	1.45	13	18.8	55	79.7
SP8	3	0		0		3	
SP9	15	2		3		10	
SP10	10	0		3		7	
SP11	6	1		1		4	
SP12	3	1		0		2	
SP14	7	0		2		5	
SP15	6	1		0		5	
TOTALS	857	40	4.67	160	18.67	657	76.66

This difference may indicate an affiliation of the surficial materials over the entire site and the presence of an earlier occupation represented by Levels 2 and 3 of Test Pit 2.

Secondary Flakes

Secondary flakes were subjected to further analysis using divisions into three categories based on the location of the cortex on the dorsal surface:

(1) cortex at the platform only or at the platform and part of the proximal end;

(2) cortex along one lateral edge; and

(3) cortex at the distal end.

These divisions for the 82 secondary flakes recovered from the entire site are summarized in Table 8. Comparisons of data are possible only for Test Pit 2, Levels 1, 2 and 3 due to the small sample recovered from other units and levels.

A comparison shows that Levels 2 and 3 are basically similar and that they are different from Level 1. The presence of secondary flakes with cortex along the lateral edge in Level 1 probably represent a difference in biface reduction strategy. The data on secondary flakes again points to a cultural distinction between the surficial material and that recovered in Test Pit 2, Levels 2 and 3.

Grinding Stone

The grinding stone category is comprised of one fist-sized mano fragment noted on the surface near Test Pit 1. The mano is made of local sandstone and is oval in outline; it was used on the flat surfaces of both faces.

TABLE 8

SECONDARY FLAKES

Provenience	Cortex at Proximal End #	%	Cortex at Distal End #	%	Cortex along Lateral Edge #	%
TP1, L1	-		-		-	
TP2, L1	16	66.6	-		8	33.3
L2	15	75.0	2	10.0	3	15.0
L3	11	73.3	2	13.3	2	13.3
L4	5		-		1	
L5	3		-		-	
TP3, L1	1		-		2	
L2	1		-		-	
L3	-		-		-	
L4	-		-		-	
SP2	-		-		-	
SP4	2		-		-	
SP5	1		-		-	
SP6	-		-		-	
SP7	3		-		1	
SP8	-		-		-	
SP9	-		-		-	
SP10	1		-		1	
SP11	-		-		-	
SP12	-		-		-	
SP14	1		-		-	
SP15	-		-		-	
TOTALS	60	73.17	4	4.88	18	21.95

Ceramics

One ceramic sherd of unknown type or affinity was noted on the surface of the northern site area during a review after the testing was completed. The sherd is thin with a reddish exterior and clay body (Herrington 1980), similar in color to 2.5 5/8 or 2.5 4/8 (Munsell 1973). The clay is fine-textured with white inclusions of an unknown material which probably was added as a tempering agent. The exterior was highly polished and the interior well smoothed. The sherd was not collected.

Mussel Shells

All of the mussel shells collected are too fragmentary for generic identification. They are badly weathered and only one specimen retains an intact umbo. All of the mussel shells collected or noted were from within the northern site area; the frequency of recovery was sparse but consistent.

Snail Shells

Snail shells are included with the discussion of artifacts based on the suggested possibility of the use of snails as a food source (*e.g.*, Hester 1975). The dominant species evident at 41ZP73 was *Rabdotus alternatus* although other species are represented in very small quantities. Snail shell densities generally covary with the other artifact densities; that is, the densities are highest in levels where other artifact densities were highest. No snail shell features or concentrations were recognized.

Hematite

A single specimen of soft, bright orange hematite was recovered from Level 5 of Test Pit 2. Its cultural significance is uncertain; however, hematite was not noted as occurring naturally within the site's soil profile.

Burned Rocks

Scattered rocks and rock fragments that had apparently been thermally altered through use as hearthstones were noted in several test units. Most are local sandstone, although one quartzite cobble is included. One small cluster of burned rocks was recorded during excavation and numerous hearth-sized features were noted on the surface; these are discussed under Feature Descriptions.

An inventory of all the artifacts collected from site 41ZP73 is provided in Table 9.

ARCHEOLOGICAL SUMMARY

Site 41ZP73 is an upland site situated on a sandstone and shale ridge crest above a minor side drainage near the Rio Grande. Three aspects of the site are discussed in the following archeological summary - intrasite variability and organization, site temporal affiliation and chronology, and site activity.

Intrasite Variability

Surface indications of occupation and the results of the testing program can be used to define northern and southern site areas. In the northern site area, which is confined to the top of the ridge crest, high artifact densities occur within 20-50 cm of well developed soil

TABLE 9

EXCAVATED ARTIFACT AND DEBRIS INVENTORY

Category	TP1,L1	TP2,L1	TP2,L2	TP2,L3	TP2,L4	TP2,L5	TP3,L1	TP3,L2	TP3,L3	TP3,L4
Dart points	-	1	-	-	-	-	-	-	-	-
Arrow points	-	-	1	-	-	-	-	-	-	-
Biface fragments	-	-	1	-	-	-	-	-	-	-
Retouched flakes	-	-	1	1	2	-	1	-	-	-
Complete flakes	1	81	39	40	20	9	9	3	2	-
Primary	-	3	2	1	3	-	-	-	-	-
Secondary	-	24	20	15	6	3	3	1	-	-
Interior	1	54	17	24	11	6	6	2	2	-
Platform end flake fragments	1	57	29	23	15	4	6	4	-	1
Primary	-	-	3	-	2	1	-	-	-	-
Secondary	1	10	7	4	1	-	1	-	-	-
Interior	-	47	19	19	12	3	5	4	-	1
Chips	3	145	77	62	40	10	15	3	-	-
Primary	-	6	2	3	1	2	1	-	-	-
Secondary	1	13	11	10	1	1	1	1	-	-
Interior	2	126	64	49	38	7	13	2	-	-
Angular chunks	-	12	2	3	1	2	1	-	1	-
Mussel shells	-	+	+	+	-	+	-	-	-	-
Hematite	-	-	-	-	1	-	-	-	-	-
TOTALS	5	296	150	129	79	25	32	10	3	1

TABLE 9, Continued

Category	SP2	SP4	SP5	SP6	SP7	SP8	SP9	SP10	SP11	SP12	SP14	SP15	Totals
Dart points	-	-	-	-	-	-	-	-	-	-	-	-	1
Arrow points	-	-	-	-	-	-	-	1	-	-	-	-	2
Biface fragments	-	1	-	-	-	-	-	-	-	-	-	-	2
Retouched flakes	-	-	1	-	-	1	-	-	-	-	-	-	7
Complete flakes	-	8	2	1	13	2	4	3	2	1	1	3	244
Primary	-	-	-	-	-	-	1	-	-	-	-	-	10
Secondary	-	2	1	-	4	-	-	2	-	-	1	-	82
Interior	-	6	1	1	9	2	3	1	2	1	-	3	152
Platform end flake fragments	-	12	5	1	22	-	5	-	-	-	1	-	186
Primary	-	3	-	-	-	-	-	-	-	-	-	-	9
Secondary	-	3	1	1	5	-	1	-	-	-	-	-	35
Interior	-	6	4	-	17	-	4	-	-	-	1	-	142
Chips	4	13	8	2	34	1	6	7	4	2	5	3	444
Primary	1	-	-	-	1	-	1	-	1	1	-	1	21
Secondary	-	2	3	-	4	-	2	1	1	-	1	-	53
Interior	3	11	5	2	29	1	3	6	2	1	4	2	370
Angular chunks	-	-	-	-	3	-	1	-	-	-	-	-	26
Mussel shells	-	-	-	-	-	-	-	-	-	-	-	-	
Hematite	-	-	-	-	-	-	-	-	-	-	-	-	1
TOTALS	4	34	16	4	72	4	16	11	6	3	7	6	913

which includes some cultural deposition; burned rock features also occur in clusters and in isolated instances. In the southern site area low densities of surficial to shallowly buried material and isolated burned rock features occur over a large area of the ridge crest and slopes.

If both site areas are at least partially contemporaneous (see below) then these differences can be used to partially define core and peripheral activity areas within the site boundaries. Differences in both area activity and intensity of use are necessary for a meaningful definition of core and peripheral areas; these were partially demonstrated for site 41ZP73. The division, then, must be considered as an hypothesis which should be tested during any further excavations which may be conducted at the site.

Site Temporal Affiliation and Chronology

Stratigraphic and artifactual evidence suggests at least two and possibly three prehistoric occupations of site 41ZP73.

Excavation in the northern site area recorded stratigraphic evidence of at least two prehistoric occupations. The burned rock cluster noted is part of an upper living surface with associated artifactual materials which extends from the ground surface to approximately 10 cm below ground surface. The materials below this surface represent one or more earlier occupations, although no stratigraphically separable evidence of a third occupation was recognized.

Evidence of a third occupation comes from a limited analysis of the flake debitage. There is an

apparent division, based on percentages of decortication categories and types of secondary flake cortex placement, between Level 1, Levels 2 and 3 and Levels 4 and 5. Unfortunately, none of these divisions can be associated with any degree of certainty to a particular time-diagnostic artifact type.

In the southern site area most of the cultural materials are restricted to one surface with no recognized vertical separation. The surface may represent a single occupational episode or a relatively stable natural surface used during a number of occupations. Conclusive statements are limited by the available sample size, but at least part of the material appears contemporaneous with the upper surface recognized in the northern site area (based on similarities in flake debitage between Level 1 of both Test Pit 2 and Test Pit 3 and projectile point distributions).

The time-diagnostic artifacts recovered from the site do not provide a clearcut cultural sequence that can be associated with particular horizontal or vertical units. Two projectile points were recovered in the controlled excavations of Test Pit 2: a *Tortugas* type from Level 1 and an untyped corner notch projectile point from Level 2. This appears to be a possible temporal inversion which may have been caused by the activities of burrowing animals; the *Tortugas* type projectile point appeared to be in primary context.

The time-diagnostic artifacts (projectile points) from 41ZP73 are summarized in Table 10. Three of the artifacts, the *Matamoras* and *Starr* types and the corner notched point, are characteristic of the Terminal Archaic and Late Prehistoric periods. The *Tortugas* type,

although more indicative of the Archaic period, has an apparently long temporal distribution and its occurrence within the upper occupation is not surprising. The stemmed dart point is not particularly diagnostic although it certainly falls within the Archaic.

TABLE 10

TEMPORALLY-DIAGNOSTIC ARTIFACTS

Form	Type Description	Established Time Limits
1 (Specimen 1)	*Tortugas*	4000 B.C. - A.D. 1000 (Suhm and Jelks 1962)
1 (Specimen 2)	*Matamoras*	A.D. 500 - A.D. 1700 (Suhm and Jelks 1962)
2	Untyped	Terminal Archaic - Early Late Prehistoric
3	*Starr*	A.D. 900- A.D. 1800 in Mexico (Suhm and Jelks 1962)
4	Untyped	Undifferentiated Archaic

Site Activity

The artifact and feature categories recognized at site 41ZP73 can be associated with general activity types based on accumulated archeological data from other sites. The following discussion of site activities includes all materials noted and collected for both site areas and all levels, and characterizes a particular situation and setting -- an upland ridge top above a major side drainage near the Rio Grande. Possible differences in activity type between site areas and occupations are then discussed within this framework.

The presence of hearth-sized burned rock features, the accumulation of hearth and other cultural debris, and the remains of subsistence activities indicate that site 41ZP73 was used as a camp. A camp is defined as an area used for an extended length of time for group food preparation and sleep. A wide range of activities are usually represented within the site area including use as a base for more limited activity outside the site area. Another site activity, for example lithic processing, may be the primary reason for the site's presence, in which case the camp activity is necessary for the intensive but limited activity.

The subsistence base at the site as represented by the material remains included hunting (projectile points), gathering (grinding stones and possibly land snail shells), and fishing (mussel shells). It is difficult to be more specific given the sample of excavated materials and the lack of recovered faunal remains. Projectile points are well represented at the site suggesting that hunting was of some importance, whereas the one grinding stone fragment noted may indicate that at least hard seed gathering was of lesser importance. Gathering, however, except in special instances, is assumed to be the most important contribution to the subsistence base in extractive-type exploitation systems (Nunley 1972). The mussel shells noted were undoubtedly collected from the Rio Grande; this not only indicates the use of freshwater mussels, but suggests the possible use of other resources from within the riverine environment.

In summary, the subsistence base recognized at site 41ZP73 is diverse and includes the use of a number of microenvironmental units (upland and riverine) and food sources (hunting, gathering and fishing).

The activity most heavily represented by the artifacts recovered (unmodified debitage flakes, cores and biface fragments) is lithic processing. This is especially true in the northern site area where the high density of interior flakes indicate that final stage lithic processing was an important activity. Both flake production and biface reduction strategies are represented with biface reduction predominating.

The number of artifacts not related to either subsistence activities or to lithic processing at site 41ZP73 are few and are limited to a small number of modified flakes, a cobble tool and a ceramic sherd. Except for the cobble tool, a combination gouge bit and bifacial edge (Shelton Collection, see Appendix) indicative of specialized push plane or scraping activity, the artifacts fall within activities characteristic of camp sites.

The recorded feature, representative of a number of similar features noted, is an unspecialized surface hearth with no preparation to increase heat retention. Possible activities associated with this type of feature would include simple open-fire food preparation and use as a source of warmth. The hearth features noted at the site are the most important evidence of camping activities.

No features were excavated within the northern site area; other feature types, indicative of more specialized food preparation, may be present there and elsewhere in the site, but if so, they remain buried.

The primary demonstrable variations between the activities represented by the northern and southern site areas is one of intensity of use. Possible indications

of different activities include certain artifact categories -- that is, ceramics and mussel shells found in the northern site area and grinding stones in the southern site area -- and feature clusters found only in the northern site area. These and other differences, notably the accumulation of culturally-related deposition, appear to indicate the use of the northern site area for most camp related activity. The southern site area shares other activities, specifically lithic processing and flake tool use, with the northern area but not the camp activities.

Differences in the activities represented by the occupations at site 41ZP73 can be demonstrated by the unmodified lithic debitage. These are apparently related to variations in lithic processing strategy and reduction stage rather than in activity.

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APPENDIX: THE SHELTON COLLECTION, 41ZP98

Steven M. Kotter

INTRODUCTION

During a period of low pool elevation shortly before Hurricane Beulah struck Southern Texas in September of 1967, Mr. Clarence Shelton collected surface artifacts and debris from a number of localities in the Falcon Lake area. Most of the material is from one locality which has been designated as site 41ZP98 by the Texas Archeological Research Laboratory. Artifacts from other localities were not kept separate and constitute a small portion of the cultural material contained in the collection which is described below.

Site 41ZP98 was originally recorded as 41ZP73; however, it was misplotted on Texas Archeological Research Laboratory maps. The erroneous site plotting coincided with the location of another site which was subsequently tested and is described in the main body of this report. As the error was not discovered until testing and report preparation were completed, the number of the site based on the Shelton Collection was changed rather than that of the tested site. The following description of the location and cultural material noted at site 41ZP98 is based on the recollections of Mr. Shelton (1980).

The site is located on a flat high terrace (or bench) 0.5 to 1.0 mile east of the confluence of Medio Creek and the Rio Grande. Cultural materials were exposed on sandy soils below a rock ledge. An attempt was made by Mr. Shelton to collect debitage as well as artifacts and several debitage categories are well represented by his collection. Small flake debitage, numerous enough to form a mounded debris line created by wave action, was noted but not collected. The presence or absence of other cultural materials such as mussel shells and burned rocks was not recalled.

Although from several localities, the Shelton Collection is felt to be of sufficient integrity to be used to describe and characterize a specific locality, site 41ZP98.

SITE AGE AND CULTURAL AFFILIATION

Artifact assemblages representing the range of archeological sites within Southern Texas are only recently emerging in reports of controlled excavations. Although widely scattered evidence from this region suggests considerable cultural diversity, certain artifact categories and specific forms are apparently regional in their distributions. Despite a paucity of published data, trends in formal artifact attributes may be used in a general sense to separate some of the artifact groups on the basis of their primary geographical or temporal distribution.

Several artifact categories within the Shelton Collection are either temporally or culturally diagnostic; these include projectile points, various other tools and ceramics. The recognized lithic technologies may also reflect temporal or cultural variations. The artifacts and technologies represented in the collections from site 41ZP98 are used as a basis to discuss regional and interregional cultural affiliations and chronology.

Falcon Lake is situated in a strategic area of Southern Texas. The Rio Grande was probably a major factor in limiting or directing the diffusion of cultural traits from adjacent regions. Elements commonly associated with cultural developments in these areas

may potentially occur in Southern Texas and may reflect periodic vagaries in the translocations of ideas and/or people. Influences derived from Central Texas, the Lower Pecos, the Rio Grande Delta, the Texas Coastal Bend and the provinces of Tamaulipas and Nuevo Leon in Mexico may be especially important in Southern Texas. However, any tendencies defining the cultural dynamics represented by archeological materials in the Falcon Lake area must be viewed against a background of area-specific cultural history and adaptation.

It is suggested here that the cultural materials from site 41ZP98 include artifacts that can be considered characteristic of several regional cultural traditions. Perhaps the most important of these traditions covers a large area of eastern Mexico and extends as far south as the central highlands.

Mexico

Although the English language data available from Mexico is sparse, several published reports are pertinent to an understanding of the Falcon Lake area. Two of these reports (MacNeish 1958; Epstein n.d.) provide the comparative data discussed below; other reports, not used directly but which are generally useful, are Taylor (1966) and MacNeish *et al* (1967).

Primary stratigraphic evidence comes from a series of rockshelter sites in Tamaulipas which were excavated by MacNeish (1958) and most particularly from Diablo Cave. The one complex and four phases identified at Diablo Cave include three nonceramic and two ceramic occupations. Although this cultural sequence was refined by excavation at other sites, it provides a sufficient basis from which

to discuss a nonstratified surface artifact collection. Certain artifact categories and a few specific artifact forms described by MacNeish and used by him to characterize these occupations are contained in the Shelton Collection. The artifacts shared by the two areas and indications of the intensity of the occupation at site 41ZP98 during each temporal division are discussed below.

Diablo Complex: No evidence of the occupation of site 41ZP98 by peoples represented by the Diablo Complex was noted in the Shelton Collection. The only shared artifact category, choppers made from chert cores, is also included in the artifact inventories of the four later phases.

Lerma Phase: This phase is characterized by *Lerma Double Pointed* projectile points, none of which were identified with any certainty within the collection. Other artifact categories, however, including snub-nosed end scrapers, square-based blades, flake side scrapers, ovoid bifaces and choppers, were identified. Gravers, also characteristic of the Lerma Phase in Tamaulipas, are not represented in the materials from the Falcon Lake area.

Nogales Phase: Although the use of site 41ZP98 possibly began as early as the Lerma Phase, the first major occupation represented by the cultural materials within the Shelton Collection includes artifacts characteristic of the Nogales Phase. Projectile point types typical of this phase include *Abasolo Round-Based*, *Nogales Triangular* and *Tortugas Triangular*. *Clear Fork* gouges and several artifact categories also occurring in the Lerma Phase are shared between the two areas. Disc scrapers and small chipped discs recovered from

Diablo Cave are not included in the Shelton Collection.

Eslabones Phase: The artifact inventory recovered from the Eslabones Phase is similar to that of the Nogales Phase but with the addition of Pueblito ware ceramics, prismatic blades and *Palmillas*, *Ensor* and *Morhiss* projectile points. None of these artifacts characteristic of the Eslabones Phase were collected from site 41ZP98.

Los Angeles Phase: In addition to a number of artifacts included in earlier phases, the cultural materials from the Los Angeles Phase occupation are characterized by Los Angeles ware ceramics, flake end scrapers, thin well-made ovoid and triangular knives, prismatic blades and *Starr*, *Fresno*, *Matamoros* and *Catan* projectile points. Except for the ceramics, flake end scrapers and prismatic blades, these artifacts were also recovered from site 41ZP98 and appear to represent a significant occupation. There is, however, no evidence to indicate that agriculture, which constitutes a major subsistence strategy identified at Diablo Cave, was practiced at the Falcon Lake area site.

The San Isidro Site, a nonstratified camp located in Nuevo Leon, was excavated by Epstein (n.d.). The data from this site are presented in an easily used format and include a summary which incorporates investigations by MacNeish (1958) and Aveleyra (1951) in Mexico and by others in Texas.

Artifacts recovered from both the San Isidro Site and from site 41ZP98 include large square-based bifacials, *Clear Fork* and other gouges, pebble choppers, split pebbles, a number of unifacial tools and certain projectile point types.

In his summary, Epstein (n.d.) states that the data from Tamaulipas collected by Aveleyra (1951) are very similar to those from the San Isidro Site. This is also generally true of the Falcon Lake area based on Suhm, Krieger and Jelks (1954) and of the sites excavated by MacNeish (1958).

Specific tendencies in lithic artifacts noted by Epstein during his investigations in Mexico include:

(1) the use of prepared platform flakes for the manufacture of unifacial tools (in contrast to the use of unprepared platform flakes in the Trans-Pecos area);

(2) the prevalence of heavy core tools and unifaces in the early phases (Diablo, Lerma); and

(3) the use (specific to the San Isidro Site) of small flint artifacts during the Archaic and Late Prehistoric and of large bifaces and pebble tools of limestone by early man.

Texas

The primary geographic distribution of other artifact categories and specific forms represented in the Shelton Collection centers within three regions of Texas. Projectile points include types which are characteristic of the Southern, Trans-Pecos and Central Texas regions; some of the arrow points are geographically widespread types common to several regions. The data summarized in Table 11 include phase and period names for specific areas; these are not meant as chronological identifiers applicable to 41ZP98.

As stated earlier, the published data from the Southern Texas region are from widely scattered areas and are as yet poorly understood. Projectile points

TABLE 11
GEOGRAPHIC AND TEMPORAL DISTRIBUTION
OF STEMMED PROJECTILE POINTS

Trans-Pecos Texas	Central Texas	Widespread
		Alba-like, *Perdiz*, *Scallorn* (Late Prehistoric)
Shumla, *Shumla*-like (Middle Archaic)		
Langtry	*Pedernales* (Round Rock Phase)	
Pandale/Buda (Early Archaic)	*Nolan* (Clear Fork Phase)	
Gower (Early Archaic)	*Gower* (San Geronimo Phase)	

considered characteristic of this region include a number of stemless, triangular to leaf-shaped and lanceolate forms such as *Tortugas*, *Matamoros*, *Abasolo*, *Catan*, *Refugio*, *Desmuke*, *Kinney* and *Starr*. All of these point types, however, except *Desmuke* and *Refugio* are also characteristic of recognized phases in Tamaulipas, Mexico (MacNeish 1958; Epstein n.d.).

More surely indicative of the Southern Texas region is the significant use of a number of gouge forms. These tools include the *Clear Fork* variety, which has a very widespread distribution, and a number of small bifacially worked forms which are apparently indigenous to the region. The class of artifacts described by Shafer and Hester (1971) as *Olmos* bifaces is not significantly represented in the cultural materials from site 41ZP98. A general similarity in both tool forms and manufacturing techniques has been noted between the Falcon Lake material and that from Choke Canyon (Mallouf 1980). The report, however,

is unavailable at this time.

Unfortunately, none of the artifacts characteristic of Southern Texas can be considered to be temporally diagnostic. Other than certain general statements (such as a separation between *Tortugas* and *Abasolo* types and *Matamoros* and *Catan* types), no consistent stratigraphic separation has been reported.

Summary

The cultural processes and history resulting in the distribution of the diagnostic artifacts discussed above are unknown. Clearly, additional work will be necessary to obtain even a general cultural framework for the Falcon Lake area and site 41ZP98. Certain general statements, however, can be made.

The projectile point types have known geographic distributions which include other areas of Texas and Mexico in addition to the Falcon Lake area. The stemmed forms, which are a minority in the Shelton Collection, have primary geographic distributions in Central Texas and the Trans-Pecos region. Triangular, leaf-shaped and lanceolate forms occur in both Northeastern Mexico and Southern Texas.

In general the major artifact categories of tools other than projectiles and thinned blades show affinities with those from Tamaulipas and Nuevo Leon. Specific tool forms, however, are distinct and are probably related to local traditions and adaptations as well as to possible influence from other regions in Texas. One aspect of the possible association of cultural materials between the Falcon Lake area and Northeastern Mexico which remains unexplained is the

importance of agriculture and ceramics. Both are a significant part of the subsistence base and artifact inventories in some of the sites excavated by MacNeish (1958) but not, as far as we now know, in Southern Texas. The two ceramic sherds from the Shelton Collection could not be typed or assigned a cultural affinity.

Indications of relationships between the Falcon Lake area and the Southern Texas region include a number of small bifacially worked gouge forms and the *Refugio* and *Desmuke* projectile point types. The unpublished data from Choke Canyon should be useful in defining the relationship more clearly and hopefully give some indication of similarities between Southern Texas and Northeastern Mexico.

A portion of the specific artifact forms identified at site 41ZP98 appears to be local or at least of limited distribution. On the whole, the differences are minor and cannot be used to define distinct tool types, at least on the limited data available. One group of artifacts, those reduced by unifacial cobble reduction (discussed in the following section) appears to represent a distinctive trait which occurs only at a few sites in Starr and Zapata counties, Texas.

LITHIC TECHNOLOGY

Reduction Strategies

The lithic material available in the Falcon Lake area is in cobble and gravel form only. All lithic processing, therefore, involves cobble reduction. Five cobble reduction strategies were recognized within the Shelton Collection; these include:

(1) core flake production;

(2) edge reduction;

(3) complete bifacial reduction;

(4) complete unifacial reduction; and

(5) large flake on split cobble production.

Core flake production is represented by one single platform core on a rounded agate nodule. The artifact probably resulted from an attempt to flake a unique material and is aberrant from the lithic technology usually employed at site 41ZP98.

The edge reduction strategy includes all cobble tools where most of the cobble is left unmodified and flake removal is limited to tool edge preparation. Artifacts resulting from this strategy include flake debitage and several tool categories which are summarized below.

Tool Category	# of Specimens
Unifacial concave scraper Form 1	1
Unifacial hand-held chopper tools	1
Certain bifacial hand-held chopper tools	2
Miscellaneous bifacial tools Form 1	1
TOTAL	5

Complete bifacial reduction is represented in the Shelton Collection by a large number of artifact categories and specimens. Cobbles are reduced by flaking both surfaces where the edges of the cobble are used as a striking platform and the flakes are removed medially. The initial stages of bifacial reduction (represented by the bifacially worked cobble debitage category) could include both flake production and initial bifacial tool reduction. The evidence for flake production is discussed later; the evidence for bifacial tool reduction is summarized below.

Debitage Category	# of Specimens
Bifacially worked cobbles	100
Thinned biface manufacturing failures	76
Certain thinned blade base and distal tip fragments	121
TOTAL	297

Tool Category	# of Specimens
Certain bifacially worked gouges	26
Certain ovate bifaces	8
Guadalupe tools	4
Bifacial hafted drill	1
Certain miscellaneous bifacial tools	1
Certain projectile points and thinned blades	169
TOTAL	209

The complete unifacial reduction flaking strategy is similar to that for bifacial reduction except the flakes are removed from one surface only. Again, as with bifacial reduction, reduction could include both flake and unifacial tool production. This strategy does not appear to have been addressed by previous investigators in the region. The primary evidence of unifacial reduction includes flaked cobble debitage and gouge tool forms as summarized below.

Debitage	# of Specimens
Unifacially worked cobbles	45

Tools	# of Specimens
Unifacial gouges	22
Unifacial gouge combination tools	9
TOTAL	31

A cursory examination of the artifacts recovered during salvage work in the Falcon Reservoir area and which are housed at the Texas Archeological Research Laboratory, The University of Texas at Austin, revealed

a number of unifacially worked cobble gouges and cobbles. The sites listed and the total for each artifact category in Table 12 should be considered as partial since an exhaustive study was not attempted.

TABLE 12

PROVENIENCE OF UNIFACIALLY WORKED ARTIFACTS

Site	Unifacially Worked Cobbles	Triangular Gouge Forms	Subrectangular Gouge Forms	Gouge Fragments
41SR40	2	-	-	-
41SR42	-	5	2	-
41SR48	-	1	2	-
41ZP4	1	-	-	-
41ZP7	2	1	-	-
41ZP8	1	2	-	1
41ZP9	1	-	1	-
41ZP12	1	-	-	-
41ZP13	-	1	-	-
41ZP15	-	-	-	1
41ZP19	-	-	-	1
41ZP25	1	1	-	-
41ZP26	2	2	-	-
41ZP27	1	1	-	-
41ZP28	-	1	-	-
41ZP30	-	1	-	-
41ZP43	1	-	-	-
41ZP50	2	7	-	-
41ZP55	1	2	-	-
41ZP56	-	1	-	-
41ZP66	-	2	1	-

Another reduction strategy is suggested by the presence of very large flakes and/or split cobbles which are beyond the size range of the strategies defined above. Although this strategy is not clearly

defined by the artifacts in the Shelton Collection, the technique may be similar to that for producing split cobbles as reported by MacNeish (1958) and from Choke Canyon (Mallouf 1980). Artifacts suggesting this reduction strategy include:

Debitage	# of Specimens
Certain unmodified flake debitage Biface manufacture failures on flakes	44

Tools	# of Specimens
Unifacial side scrapers	9
Unifacial chopper tools	1
TOTAL	10

Totals for each of the reduction strategies recognized for site 41ZP98 are given in Table 13. Although the predominant strategy utilizes bifacial reduction, the totals below indicate significant use of both unifacial and large flake production strategies.

TABLE 13

SUMMARY OF REDUCTION STRATEGIES AT 41ZP98

Reduction Strategy	Debitage #	Debitage %	Tools #	Tools %	Total #	Total %
Core flake production	1	0.3	-	-	1	0.15
Edge reduction	-	-	5	1.96	5	0.8
Bifacial reduction	297	76.7	209	81.9	506	78.8
Unifacial reduction	45	11.6	31	12.2	76	11.8
Large flake production	44	11.4	10	3.9	54	8.4
TOTALS	387		255		642	

Flake and Cobble Tools

The completed tools within the Shelton Collection include both those made on flakes and those made by the removal of flakes from cobbles. Two aspects of these tool types are discussed: (1) the relative contribution of each to the lithic technology at site 41ZP98, and (2) their importance to certain specific tool forms.

Table 14 provides a complete listing by artifact category and form which shows the use of flake, reduced cobble and edge-reduced cobble artifacts. The totals for each are summarized in Table 15.

These data show that reduced cobbles were most frequently used but that there was significant use of flakes (and/or split cobbles) and minimal use of edge-reduced cobbles. The flake category, however, is probably under-represented due to the difficulty of recognizing flakes which have been completely bifacially worked. Only those specimens where remnants of the ventral flake surface can be identified are included in the flake category.

A number of differences in the use of flakes and reduced cobbles for specific tool categories and forms can be identified. The differences are especially evident for unifacially worked tools where all of the gouge forms are reduced cobbles and most other tools are flakes. Other artifact categories include forms with a distinct preference for either flakes or reduced cobbles, but the correlation is not consistent. A statement that larger artifacts were generally made from reduced cores and smaller artifacts from flakes,

TABLE 14

ARTIFACT CATEGORIES SHOWING USE OF FLAKES, REDUCED COBBLES AND EDGE-REDUCED COBBLES AT 41ZP98

Debitage Category	Flakes	Reduced Cobbles	Edge-Reduced Cobbles	Totals
Tested cobbles	-	-	11	11
Flake production cores	+	-	-	-
Bifacially worked cobbles	-	100	-	100
Unifacially worked cobbles	-	45	-	45
Thinned biface manufacturing failures	44	77	-	121
Thinned blade base and tip fragments	19	121	-	140
TOTALS	63 15.1%	343 82.25%	11 2.6%	417

Tool Category	Flakes	Reduced Cobbles	Edge-Reduced Cobbles	Totals
Bifacial gouges	4	26	-	30
Form 1	-	3	-	3
Form 2	-	2	-	2
Form 3	2	-	-	2
Form 4	1	1	-	2
Form 5	-	2	-	2
Form 6	-	5	-	5
Form 7	-	3	-	3
Form 8	-	7	-	7
Form 9	1	3	-	4
Ovate bifaces	1	8	-	9
Form 1	1	5	-	6
Form 2	-	3	-	3
Bifacial chopper tools	2	-	2	4
Guadalupe tools	-	4	-	4
Bifacial hafted drill	-	1	-	1
Miscellaneous bifacial tools	1	1	1	3
Form 1	-	-	1	1
Form 2	1	-	-	1
Form 3	-	1	-	1
TOTALS	8 15.7%	40 78.4%	3 5.9%	51

TABLE 14, Continued.

Tool Category	Flakes	Reduced Cobbles	Edge-Reduced Cobbles	Totals
Unifacial gouges	-	22	-	22
Form 1	-	14	-	14
Form 2	-	1	-	1
Form 3	-	7	-	7
Gouge combination tools	-	9	-	9
Form 1	-	6	-	6
Form 2	-	2	-	2
Form 3	-	1	-	1
Unifacial side scrapers	9	-	-	9
Form 1	2	-	-	2
Form 2	7	-	-	7
Unifacial snub-nose end and side scrapers	1	-	-	1
Unifacial concave scrapers	1	-	1	2
Form 1	-	-	1	1
Form 2	1	-	-	1
Unifacial chopper tools	-	-	1	1
Miscellaneous unifacial tools	1	-	-	1
TOTALS	12 26.7%	31 68.9%	2 4.4%	45

Tool Category	Form	Flake	Other	Totals
Subtriangular to lanceolate	17 forms	14 24.6%	43 75.4%	57
	1	1	1	2
	2	3	3	6
	3	1	6	7
	4	3	3	6
	5	-	2	2
	6	-	3	3
	7	1	1	2
	8	-	2	2
	9	2	6	8
	10	1	2	3
	11	-	2	2
	12	-	4	4
	13	1	1	2
	14	-	2	2
	15	1	1	2
	16	-	3	3
	17	-	1	1

TABLE 14, Continued.

Tool Category	Form	Flake	Other	Totals
Triangular	23 forms	15 13.4%	97 86.7%	112
	1	1	2	3
	2	-	1	1
	3	-	2	2
	4	-	5	5
	5	-	8	8
	6	2	2	4
	7	-	1	1
	8	3	19	22
	9	4	4	8
	10	-	7	7
	11	-	2	2
	12	-	2	2
	13	-	5	5
	14	3	5	8
	15	-	6	6
	16	-	9	9
	17	-	4	4
	18	2	1	3
	19	-	1	1
	20	-	4	4
	21	-	1	1
	22	-	1	1
	23	-	5	5
Stemmed	17 forms	6 17.1%	29 82.9%	35
	1	3	-	3
	2	-	1	1
	3	-	2	2
	4	-	1	1
	5	-	4	4
	6	-	2	2
	7	-	2	2
	8	2	-	2
	9	-	2	2
	10	-	1	1
	11	-	5	5
	12	1	1	2
	13	-	1	1
	14	-	1	1
	15	-	1	1
	16	-	3	3
	17	-	2	2

TABLE 14, Continued

Tool Category	Form	Flake	Other	Totals
Marginally bifacial and unifacial	2 forms	4 100.0%	-	4
	1	3	-	3
	2	1	-	1
TOTAL		39 18.75%	169 81.25%	208
TOTAL ALL ARTIFACTS		122 17.3%	583 82.7%	705

TABLE 15

SUMMARY OF FLAKE, REDUCED COBBLE AND EDGE-REDUCED COBBLE USE AT 41ZP98

	No.	Percent
Flakes and/or split cobbles	122	16.9
Reduced cobbles	583	80.9
Edge-reduced cobbles	16	2.2
TOTAL	721	100.0

although true in some instances would be an oversimplification. This is especially true when the number of large flake biface manufacturing failures and flake tools is considered.

Bifacial and Unifacial Flaking

The number of bifacially and unifacially worked tools given below shows a distinct preference for bifacial flaking techniques. If only tools other than projectile points and thinned blades are considered, however, the totals for bifacial and unifacial flaking are approximately equal.

Bifacial tools	269	85.7%
Projectile points and thinned blades	208	
Other tools	51	
Unifacial tools	45	14.3%
	314	100.0%

Figure 5 is a schematic flow chart for the four major cobble reduction strategies; included are both flake and core tools and unifacial and bifacial flaking.

SOURCE MATERIAL

Natural Cobbles (22 specimens)

A number of natural cobbles are included in the collection of artifacts from site 41ZP98; this suggests that either the site is located on or near a cobble source or that cobbles were brought to the site before any modification. The two cobble sources within the Falcon Lake area are the Reynosa Formation which occurs as erosional remnants on upland ridges, and cobbles originally from the Reynosa Formation which have been redeposited in gravel

bars along major streams. Given the quantity of material represented in the collection and the site's topographic location, the most logical sources for cobbles are the lowland gravel bars associated with the Rio Grande.

The shape and dimension of the natural cobbles representative of the range included in the collection are provided below.

Shape	Length	Width	Thickness*
Elongate oval cross section	3.40	0.85	0.60
	1.80	0.45	0.40
	1.00	0.25	0.25
	0.90	0.35	0.20
	0.60	0.20	0.15
Subrectangular lenticular cross section	1.25	0.60	0.25
	1.20	0.50	0.20
	0.90	0.50	0.20
	0.80	0.30	0.15
	0.70	0.25	0.10
Rounded	0.95	0.95	0.60
	0.95	0.80	0.50
Circular lenticular cross section	0.55	0.50	0.15

Lithic Material

A wide variety of parent materials are represented in the Shelton Collection; all of them are apparently within the range of variation of the naturally occurring gravels and cobbles. The materials include various grades of chert, agate, poor grade jasper, chalcedony and a number of igneous rocks (primarily rhyolitic and other porphories). Grain size and fracture properties vary greatly within and among the types of cobbles.

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*All measurements throughout this report are in centimeters.

SCHEMATIC FLOW CHART OF ARTIFACT PRODUCTION AT 41ZP98

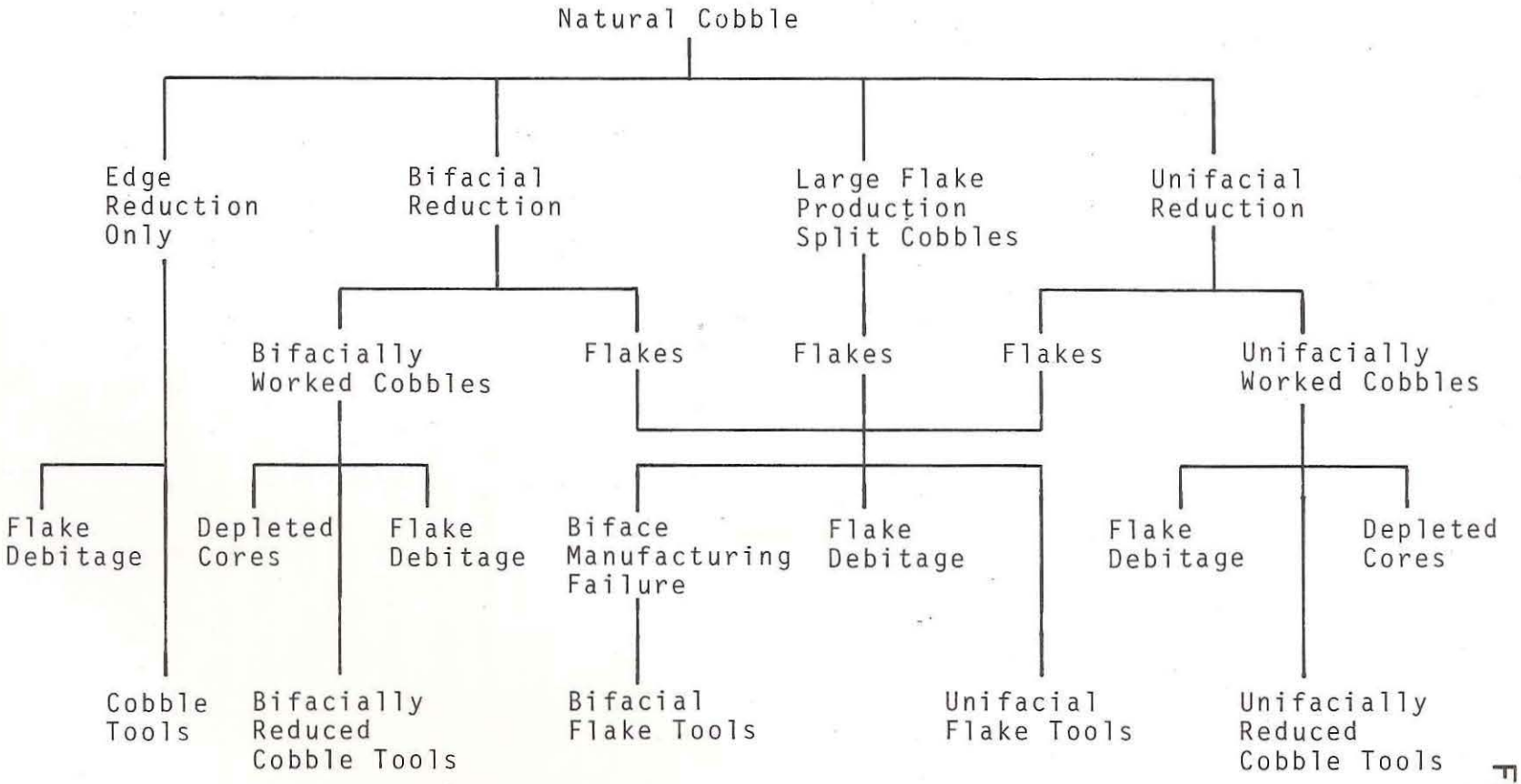


Figure 5

COBBLE REDUCTION DEBITAGE, EXCEPT FLAKES

Tested Cobbles (11 specimens)

The tested cobble artifact category includes cobbles which have been subjected to limited and generally unpatterned flake removal. Three of the specimens have only one flake removed; the remainder have from two to six flakes removed and could be described as chopper-type or single platform cores.

Three are unifacially worked and five are bifacially worked. These tested cobbles range from 3 to 16 cm in length, 3.5 to 12 cm in width, and 2.5 to 5 cm in thickness.

Flake Production Core (1 specimen)

Only one specimen within the collection can be included solely within the flake production core artifact category. Two other artifact categories, bifacially worked cobbles and unifacially worked cobbles, could be either flake production cores or tool reduction stages.

The single flake production core is a small agate nodule which measures 4.5 x 4.3 x 3.4 cm. Flakes have been removed around the entire circumference of the nodule; a natural flat facet was used as a striking platform. Cortex remains on the surface opposite the striking platform. Although this artifact shares some characteristics of blade production cores, it probably represents an attempt to flake a material and cobble shape which is outside the normal lithic processing technology.

Bifacially Worked Cobbles (100 specimens)

This artifact category includes thick, roughly flaked, bifacially worked cobbles from which flakes have been removed from the edges medially and where there have been negligible attempts at thinning or shaping the resulting artifact.

Bifacially worked cobbles could result from two distinct processes:

(1) Flake production cobble reduction; or

(2) Initial thinned bifacial tool cobble reduction.

That is, the artifacts could be either partially or totally depleted flake cores or initial-stage biface manufacturing failures and rejects. Both possibilities are most likely represented in the specimens included in this artifact category. These bifacially worked cobbles range from 7 to 13 cm in length, 4 to 8 cm in width and 3 to 4 cm in thickness.

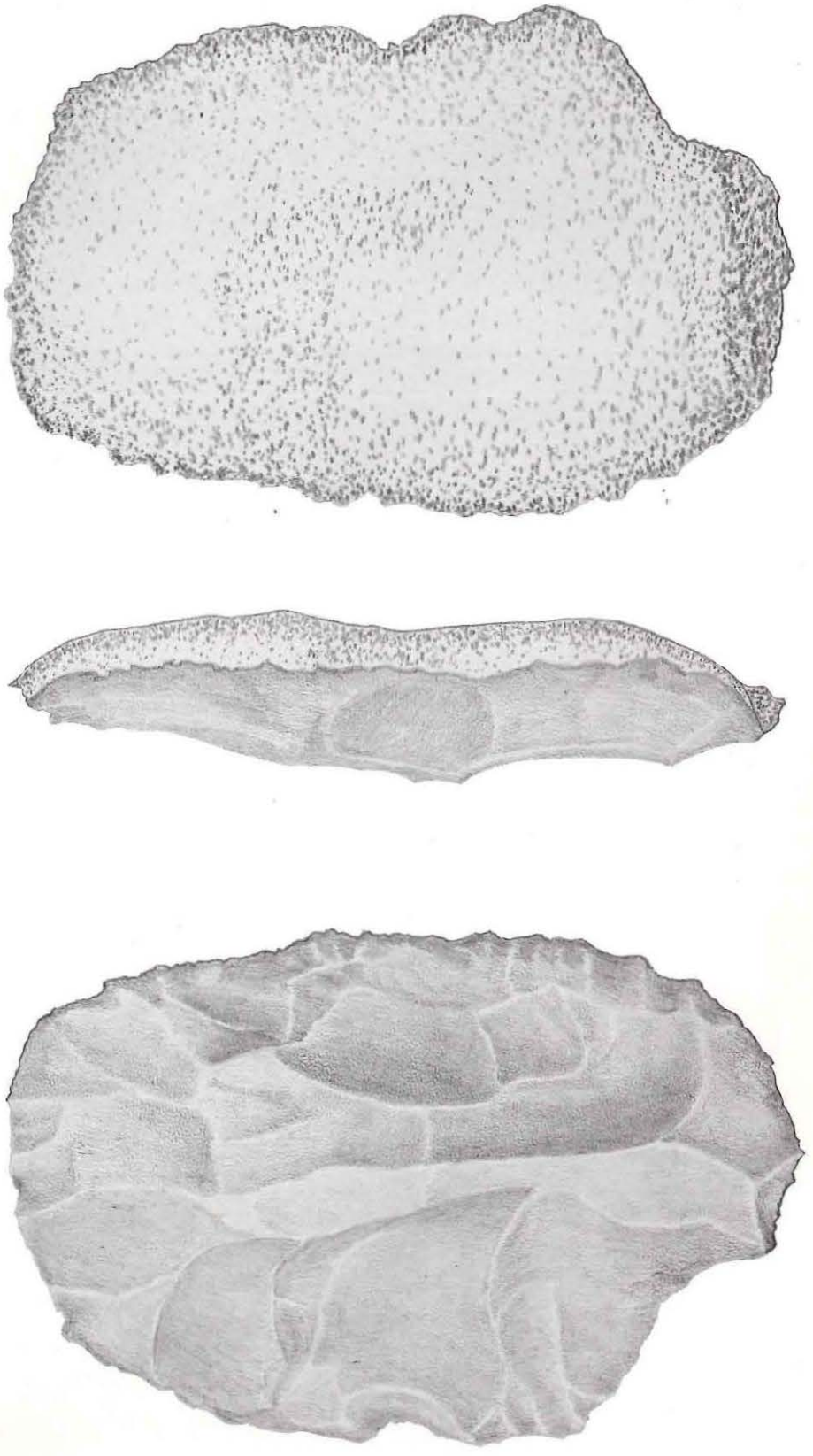
Unifacially Worked Cobbles (45 specimens; Fig. 6)

A number of unifacially worked cobbles which are included within the collection were produced by removing flakes from the edges medially using one cortex surface as the striking platform. The artifacts show little evidence of intentional shaping and vary greatly in the number of flakes removed and subsequently in thickness and regularity of the medial cross section. On several specimens the cortex was not completely removed from the flaked surface; seven specimens show limited (1-3 flakes) bifacial flaking.

Unifacially worked cobbles probably represent either (1) partially or totally depleted flake production cores, or (2) unifacially worked cobble tool

Figure 6. Unifacially Worked Cobble

Figure 6



"preforms" and manufacturing failures and rejects. Although only their use for tools can be positively documented (see Unifacial Gouges below), the artifacts are probably evidence of both processes. A number of split cobbles that were subsequently unifacially worked may also be included in this artifact category. These unifacially worked cobbles range from 6.5 to 12 cm in length, 4 to 9.5 cm in width, and 2 to 3.5 cm in thickness.

Thinned Biface Manufacturing Failures (7 specimens)

This large category of artifacts includes non-flake debitage which resulted from the production of thin, bifacially worked tools. The artifacts were apparently rejected in the secondary stage of reduction, during artifact thinning and shaping, because of irregularities in material or because of human error. This artifact category grades into both the initial reduction stage, characterized by bifacially worked cobbles as discussed above, and completed tools, but represents a distinct morphological and reduction class.

Thinned biface manufacturing failures include (1) fragments resulting from transverse breakage during attempted flake removal, (2) whole specimens with material irregularities, (3) whole specimens rejected due to problems in thinning, and (4) whole specimens rejected for unknown reasons.

The artifacts within this category are bifacially worked cobbles which have been flaked either primarily or totally by percussion. They range from 4 to 10 cm in length, 3 to 7 cm in width, and 1 to 3 cm in thickness.

Thinned Biface Base and Distal Tip Fragments (121 specimens)

This artifact category includes fragments of thinned bifaces, thinned blades and projectile points; both manufacturing failures and any specimens broken during use are included. The artifacts grade into thinned biface manufacturing failures, but generally they are thinner and more lenticular in cross section and the bases are shaped to apparent final form outlines. The thinned biface manufacturing failures were probably rejected primarily because of human error.

FLAKE REDUCTION DEBITAGE, EXCEPT FLAKES

Thinned Biface Manufacturing Failures (4 specimens; Fig. 7*a*)

These are similar to thinned biface manufacturing failures on cobbles except that they are on flakes. These specimens range from 4 to 9 cm in length, 3 to 7 cm in width, and 1 to 3 cm in thickness.

Unprepared platform primary	2
Unprepared platform cortex	4
Prepared platform cortex	5
Miscellaneous cortex	13
Interior	20
	44

Thinned Biface Base and Distal Tip Fragments (19 specimens)

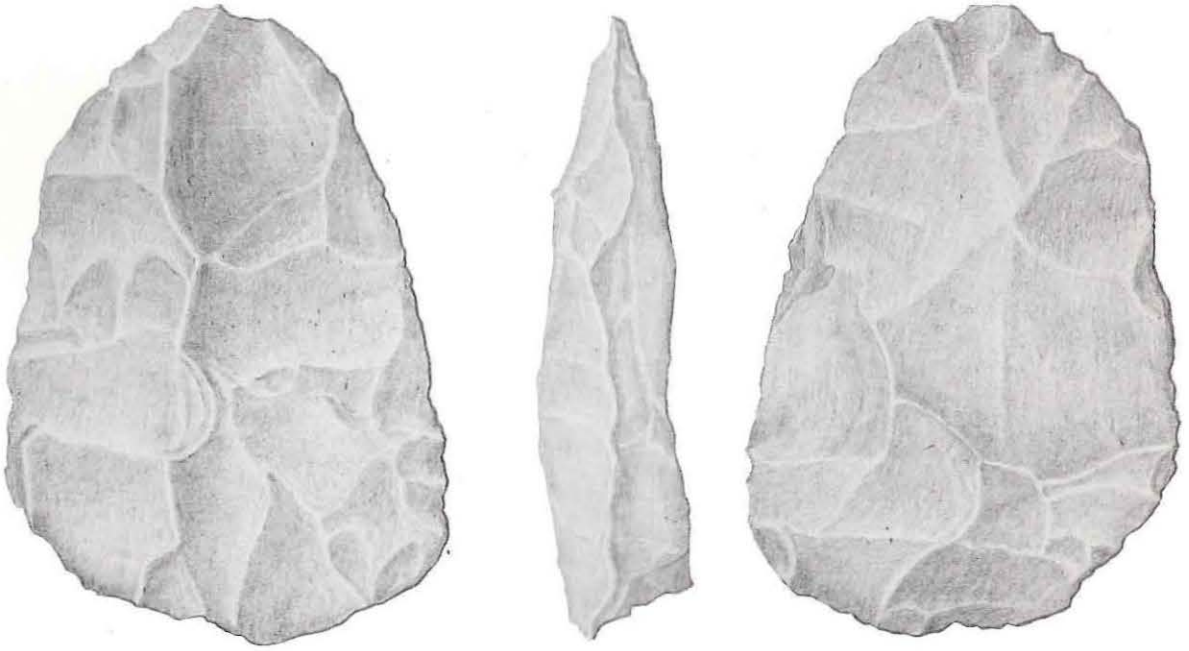
This group of specimens is similar to the thinned blade fragments on cobbles except that these are on flakes. Most of them have no cortex remaining.

Figure 7. Artifact Drawings

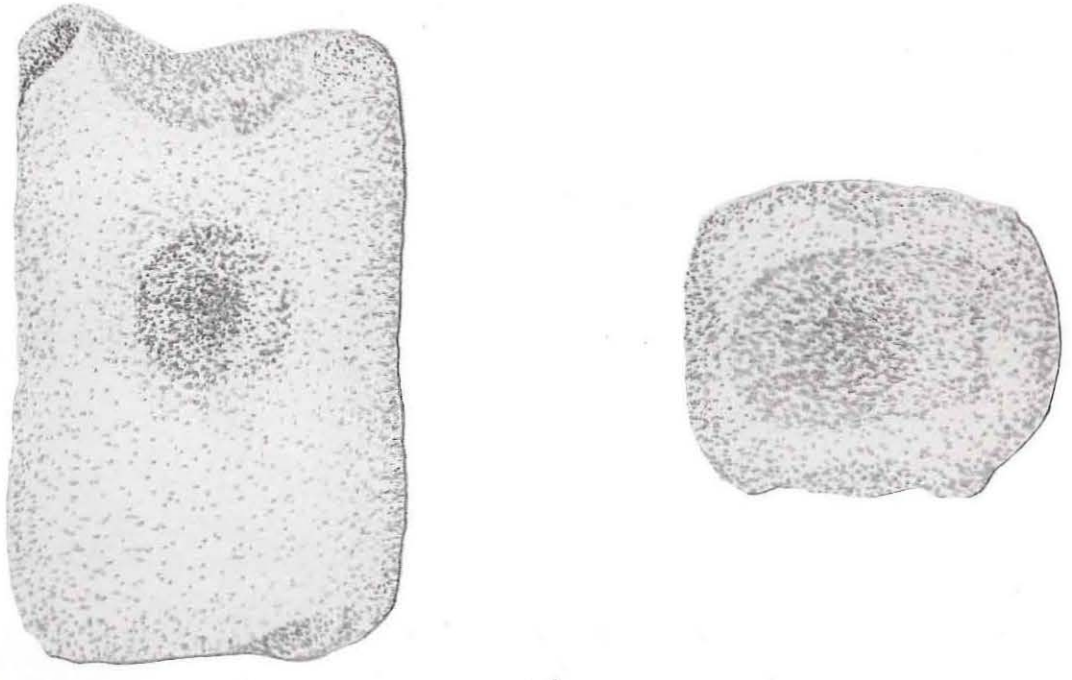
a. Thinned biface manufacturing failure on flake

b. Pitted stone

Figure 7



a



b

FLAKE DEBITAGE

Unmodified flake debitage is divided into categories based upon the amount of cortex which remains on the dorsal surface, the striking platform type and whether the debitage is complete or fragmentary. Three decortication categories are recognized: (1) primary, 80-100% cortex; (2) secondary, any to 80% cortex; and (3) interior, no cortex. Striking platforms are either: (1) unprepared; (2) prepared, single facet; or (3) prepared, multifacet (biface thinning flakes). Flake debitage is also divided into categories based on whether the specimen is a (1) complete flake, (2) platform end flake fragment, or (3) chip.

In addition, secondary flake debitage was differentiated by the location of the cortex on the dorsal surface; these categories include: (1) cortex at platform (proximal) end, (2) cortex along one lateral edge, (3) cortex along one lateral edge and distal end, and (4) cortex at the distal end. One special flake category is included within the secondary debitage; this consists of a single sequence flake which has cortex around the entire flake circumference.

The flake debitage categories and the number of specimens of each within the Shelton Collection are given in Table 16.

DISCUSSION

Despite the attempt by Mr. Shelton to collect a complete sample of artifacts at site 41ZP98, the sample of flake debitage should not be considered as

TABLE 16

FLAKE DEBITAGE

Decortication Category	Platform Type	Flake Category	# of Specimens
Primary	Unprepared	Complete	15
	Unprepared	Platform end flake fragments	3
	Prepared single facet	Complete	4
	Prepared single facet	Platform end flake fragments	3
		Chips	2
		Unclassified	1
Secondary (platform end)	Unprepared	Complete	17
	Unprepared	Platform end flake fragment	1
Secondary (platform and distal ends) (sequence)	Unprepared	Complete	1
Secondary (lateral edge)	Unprepared	Complete	2
	Prepared single facet	Complete	5
Secondary (lateral edge and distal end)	Prepared single facet	Complete	1
Secondary (distal end)	Prepared single facet	Complete	3
	Prepared biface thinning	Complete	1
		Unclassified	2
Interior	Prepared single facet	Complete	4
	Prepared biface thinning	Complete	3
		Chips	7
		Unclassified	1
			77

fully representative. Other debitage categories within the collection provide evidence that a large number of interior flakes which resulted from tool manufacture should be present at the site.

The flake debitage within the collection, including 28 primary, 34 secondary and 15 interior flakes, is heavily represented by cortex flakes. A high number of cortex flakes is expected based on the flakes which would be removed from both bifacially and unifacially worked cobbles discussed above. However, a large number of interior flakes should also be present.

Frequencies for the type of striking platform represented by unmodified flakes reflects that which is expected given the lithic technology expressed by bifacially and unifacially worked cobbles. Again, though, interior multifacet (biface thinning) platform flakes are under-represented.

	P	S	I	T*
Unprepared	18	21	0	39
Prepared, single facet	7	9	4	20
Prepared, multifacet	0	1	3	4
	25	31	7	63

The division of flakes by completeness shows a high percentage of complete flakes; perhaps this is indicative of a significant bias in the collecting procedure.

	P	S	I	T
Complete	19	30	7	56
Platform end flake fragments	6	1	0	7
Chips	2	2	7	11
Unclassified	1	1	1	3
	28	34	15	77

*P = primary; S = secondary; I = interior; T = total.

TOOLS OTHER THAN PROJECTILE POINTS AND THINNED BLADES

This broad tool category is divided into bifacially and unifacially worked specimens and then is divided further into tool types within these major divisions. Most of the terms used are self-explanatory; however, the term gouge needs explanation. The gouge category includes all tools with a specialized push-plane scraping bit used primarily for woodworking activities (Hester, Gilbow and Albee 1973; Howard 1973). Since no wear analysis of these specimens was made, the term as used here is generic with function implied by other studies.

Bifacial Gouges

Form 1 (3 specimens; Fig. 8*a*)

Lithic Technology: Bifacially shaped by percussion; percussion and pressure retouch along both surfaces of bit.

Description: Subrectangular thinned bifaces with transverse beveled bits. Working edge of bits are convex with an indistinct angle slightly to the right of medial which appears to be the main area of use. Tool edges are slightly convex, proximal ends are slightly convex to slightly concave and thinned. The smallest specimen exhibits extensive use-wear (smoothing) primarily on the unbeveled surface. Medial and longitudinal cross sections are lenticular.

Length	Width	Thickness	Bit Angle
6.3	3.4	0.9	60°
4.0	2.9	0.8	60°
2.9	2.8	0.9	75°

Figure 8. Bifacial Gouges

a. Form 1

b. Form 2

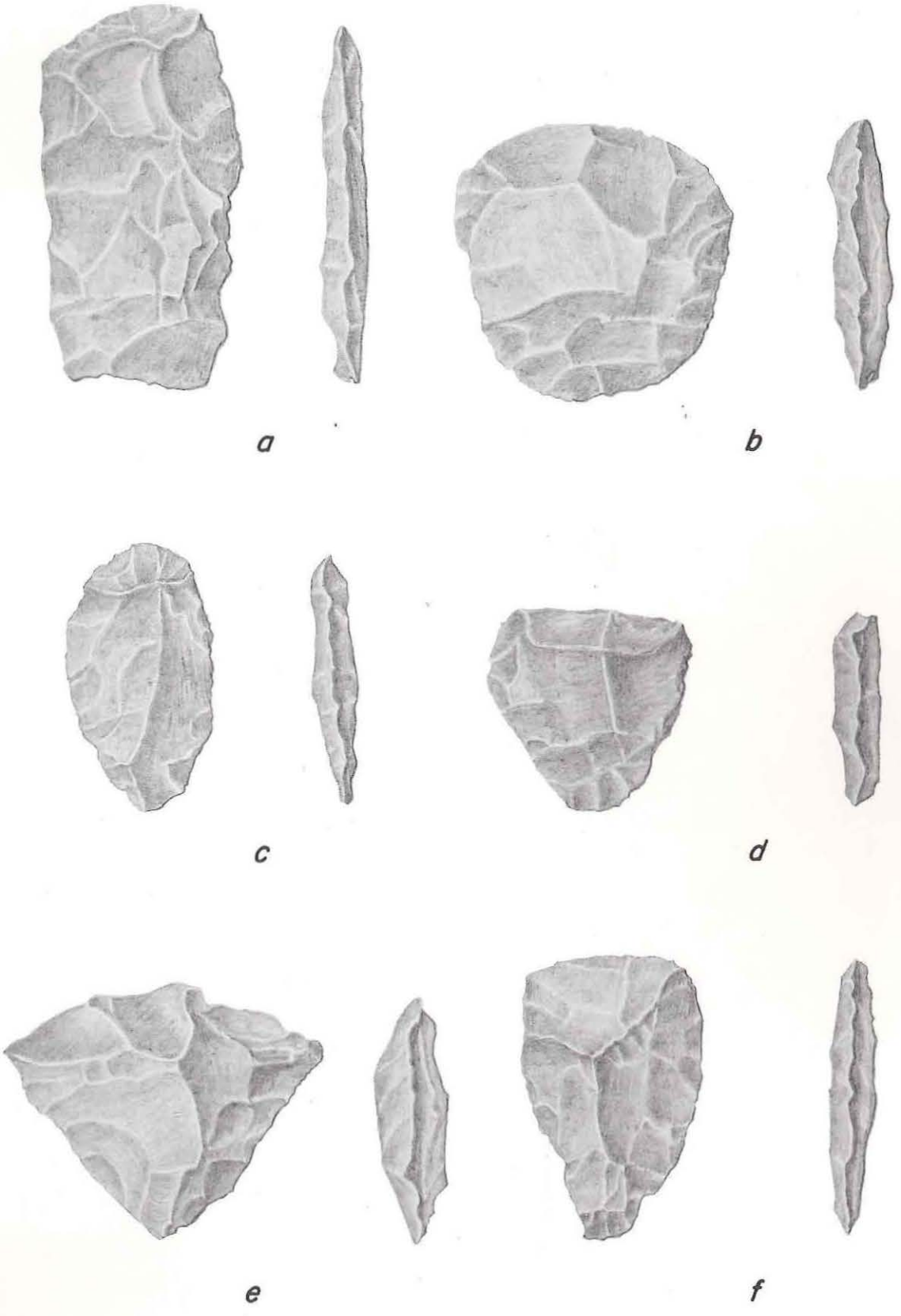
c. Form 3

d. Form 4

e. Form 5

f. Form 6

Figure 8



Form 2 (2 specimens; Fig. 8*b*)

Lithic Technology: Bifacially worked by percussion; retouch generally is limited to bit only.

Description: Ovate thinned bifaces with convex, beveled bits. Tool edges are straight to slightly convex, bases are rounded and thinned. Bits form a continuous curve and have been thinned by longitudinal flaking of both surfaces. Longitudinal cross sections are lenticular to planoconvex medial cross sections are planoconvex.

Length	Width	Thickness	Bit Angle
4.7	4.7	1.0	65°
-	3.8	0.9	65°

Form 3 (2 specimens; Fig. 8*c*)

Lithic Technology: Bifacially chipped by percussion; both specimens are on flakes; one is possibly on a manufacturing failure. Retouch generally is limited to bits only.

Description: Small, leaf-shaped to subrectangular bifaces with strongly convex, beveled bits with a distinct angle approximately in the center of the bit. Tool outline varies considerably and is not a formal attribute. Longitudinal and medial cross sections are lenticular to planoconvex.

Length	Width	Thickness	Bit Angle
4.6	3.0	0.9	65°
4.4	2.5	0.8	58°

Form 4 (2 specimens; Fig. 8*d*)

Lithic Technology: Bifacially chipped by percussion; one specimen is on a flake. Retouch generally is along both edges and bits.

Description: Small, triangular bifaces with straight beveled bits. Tool edges are slightly convex; bases are pointed to rounded. Bits have been thinned by longitudinal flaking of both surfaces on one specimen. Longitudinal cross sections are planoconvex and are thickest just proximal of the bevel; medial cross sections are planoconvex. These are similar in form and size to *Olmos* bifaces (Shafer and Hester 1971).

Length	Width	Thickness	Bit Angle
3.3	3.3	0.9	64°
3.5	2.8	1.0	45°

Form 5 (2 specimens; Fig. 8*e*)

Lithic Technology: Bifacially worked by percussion; retouch along bits only.

Description: Triangular bifaces with straight, slightly beveled bits. Both specimens have one edge at right angles to the bit while the other edge is convex. One specimen is made on a biface manufacturing failure. Longitudinal and medial cross sections are generally lenticular.

Length	Width	Thickness	Bit Angle
4.1	4.3	1.3	57°
4.7	2.7	1.0	56°

Form 6 (5 specimens; Fig. 8*f*)

Lithic Technology: Bifacially worked by percussion; generally retouched along edges and bits.

Description: Subtriangular thinned bifaces with straight to slightly convex unbeveled bits. Edges are slightly convex; polls are rounded points. Both surfaces of bits have been thinned by longitudinal flaking. One specimen appears to be a preform or manufacturing

failure and is not included in the metric tabulation. Medial and longitudinal cross sections are lenticular.

Length	Width	Thickness	Bit Angle
4.8	3.0	0.8	41°
4.6	2.6	0.7	31°
-	3.2	0.8	55°
-	3.3	0.7	25°

Form 7 (3 specimens; Fig. 9*a*)

Lithic Technology: Bifacially flaked by percussion; retouched only along bits.

Description: Triangular thinned bifaces with straight unbeveled bits. Edges are slightly convex and proximal ends are pointed to rounded. Bits are thinned by longitudinal flaking. Medial and longitudinal cross sections are lenticular.

Length	Width	Thickness	Bit Angle
10.6	5.0	2.0	51°
9.5	4.7	1.3	70°
6.8	3.6	0.9	45°

Form 8 (7 specimens; Fig. 9*b*)

Lithic Technology: Bifacially worked by percussion; retouched along edges and beveled surface of bits.

Description: Large triangular bifaces with straight to slightly concave beveled bits. Edges are slightly convex; polls are rounded points. The ventral surfaces are slightly rounded and even; the dorsal surfaces generally have three distinct ridges: one medial and two from either corner of the bit which intersect the medial ridge in the center of the bit just above the bevel. Longitudinal cross sections are

thickest at the ridge intersection and are thinnest at the polls; medial cross sections are generally plano-convex.

Length	Width	Thickness	Bit Angle	
9.1	4.7	2.4	65°	
8.3	4.7	2.3	70°	
6.9	4.5	1.6	69°	
5.6	5.2	1.3	61°	
6.8	3.8	1.5	83°	58° bevel
-	3.8	1.2	58°	
-	4.8	1.5	70°	

Form 9 (4 specimens; Fig. 9*c*)

Lithic Technology: Bifacially worked by percussion; retouch along edges and bevel surface of bits.

Description: Large subrectangular bifaces with straight to convex beveled bits. Edges are slightly convex; polls are straight to rounded. Two specimens show some tendency toward the dorsal surface ridges described for bifacial gouge Form 8. Medial cross sections are generally planoconvex, although one specimen is convex-convex; longitudinal cross sections are thickest at midpoint with bits and bases thinned by longitudinal flaking.

Length	Width	Thickness	Bit Angle	
8.4	3.9	2.2	63°	
7.5	4.6	2.1	68°	
7.8	4.5	2.1	60°	
8.0	5.1	2.5	63°	78° bevel

Ovate Bifaces

Form 1 (6 specimens; Fig. 10*a*)

Lithic Technology: Bifacially chipped by percussion;

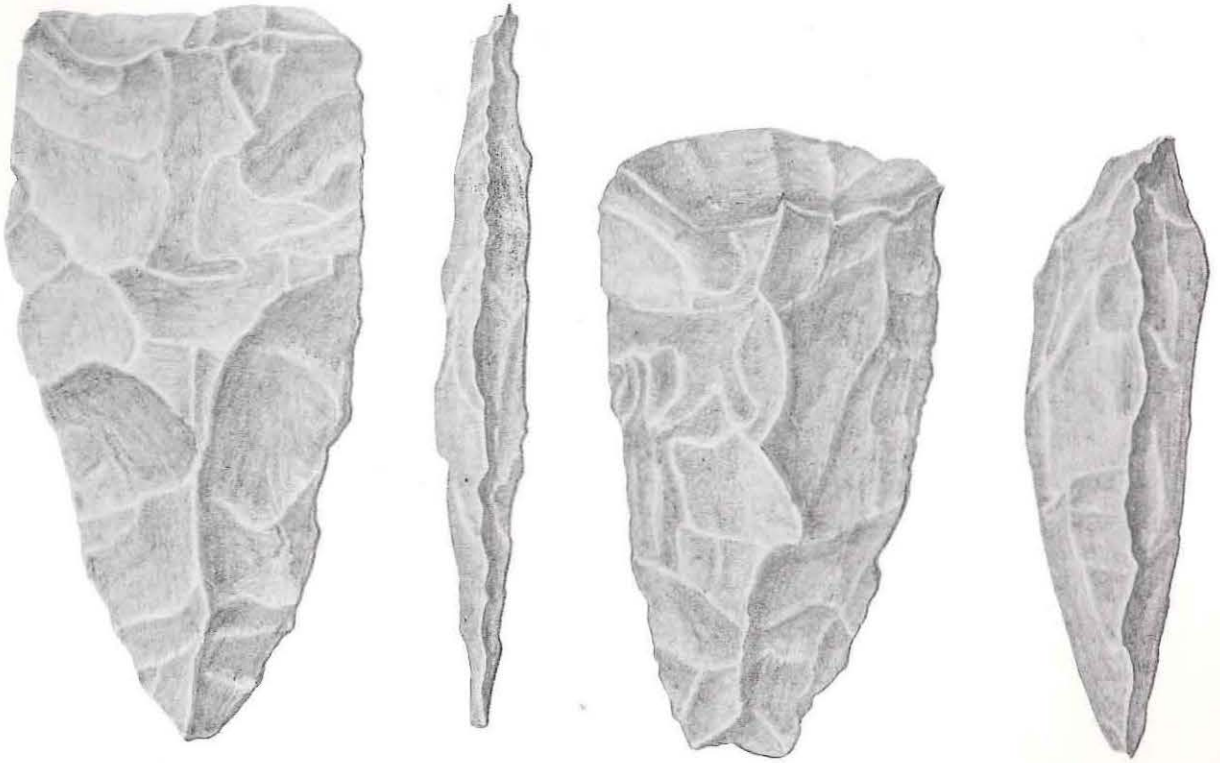
Figure 9. Bifacial Gouges

a. Form 7

b. Form 8

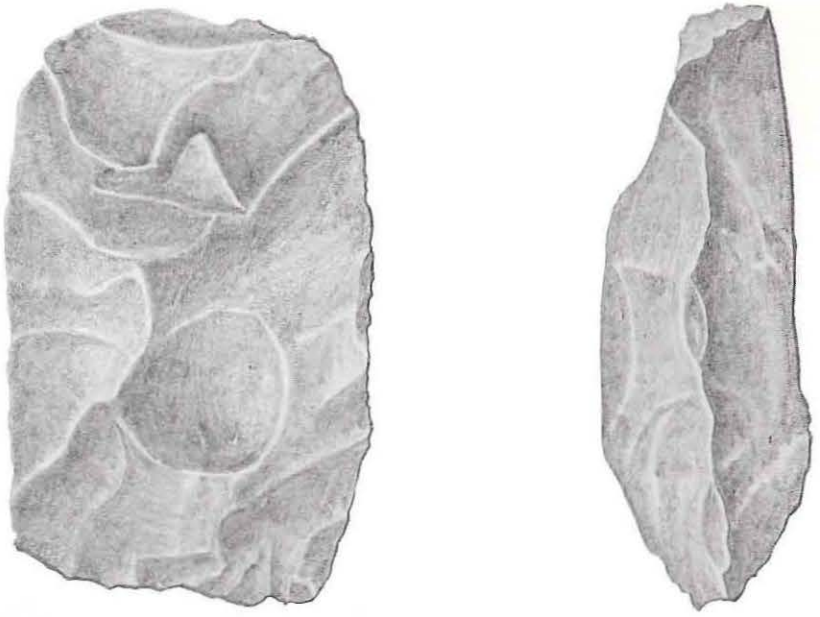
c. Form 9

Figure 9



a

b

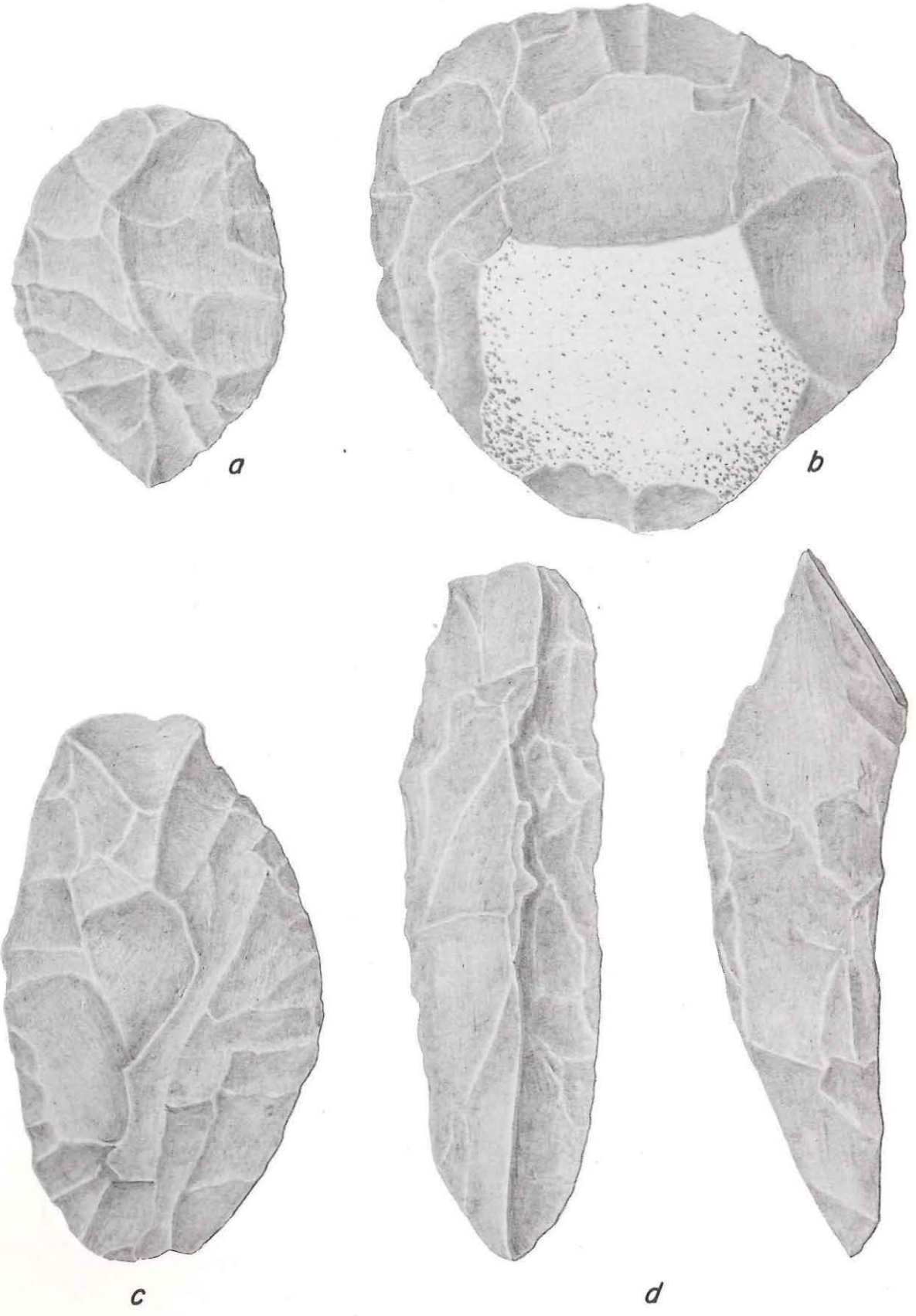


c

Figure 10. Bifacial Tools Other than Projectile Points and Thinned Blades

a. Ovate biface, Form 1
b. Bifacial hand-held chopper tool
c. Ovate biface, Form 2
d. *Guadalupe* tool

Figure 10



one specimen is on a flake; percussion retouch along edges and bases.

Description: Oval to subtriangular thick bifaces.

Length	Width	Thickness
6.8	5.3	1.6
6.5	4.8	1.5
6.1	5.1	2.0
5.8	3.9	1.5
5.6	4.1	1.4
-	4.1	1.1

Form 2 (3 specimens; Fig. 10*c*)

Lithic Technology: Bifacially worked by percussion; fine retouch along one edge each only.

Description: Similar to Form 1 except for finer edge preparation along one edge of each specimen.

Length	Width	Thickness
9.6	5.7	3.0
8.5	6.8	2.4
8.3	5.3	1.8

Bifacial Hand-Held Chopper Tools (4 specimens; Fig. 10*b*)

Lithic Technology: Bifacially worked by percussion; two specimens are on flakes. Limited retouch on both surfaces of edges.

Description: Large roughly flaked tools with a bifacial edge opposite a rounded butt or poll.

Length	Width	Thickness
6.3-9.2	7.5-9.5	2.4-3.6

Guadalupe Tools (4 specimens; Fig. 10*d*)

Lithic Technology: Bifacially flaked by percussion.

Description: Long thick bifaces which are pointed at one end and rounded to squared at the other end. Cross sections are planoconvex with a distinct angle to the plane surface opposite the pointed end.

Length	Width	Thickness
12.0	3.3	3.3
11.5	3.4	3.3
10.9	3.0	3.7
10.1	3.5	2.9

Bifacial Hafted Drill (1 specimen; Fig. 11*a*)

Lithic Technology: Bifacially worked by percussion; pressure retouch along edges and base.

Description: A thin, well-made, bifacially worked, hafted drill. The haft is twice the width of the bit; thinned and subrectangular in outline; bit edges are straight. Longitudinal and medial cross sections are lenticular.

BB	BS	S	T	ML	MBW	BW	HL	NW	BD*
*	*	*	0.6	7.4	1.2	1.9	2.6	1.2	-0.7

Miscellaneous Bifacial Tools

Form 1 (1 specimen; Fig. 11*b*)

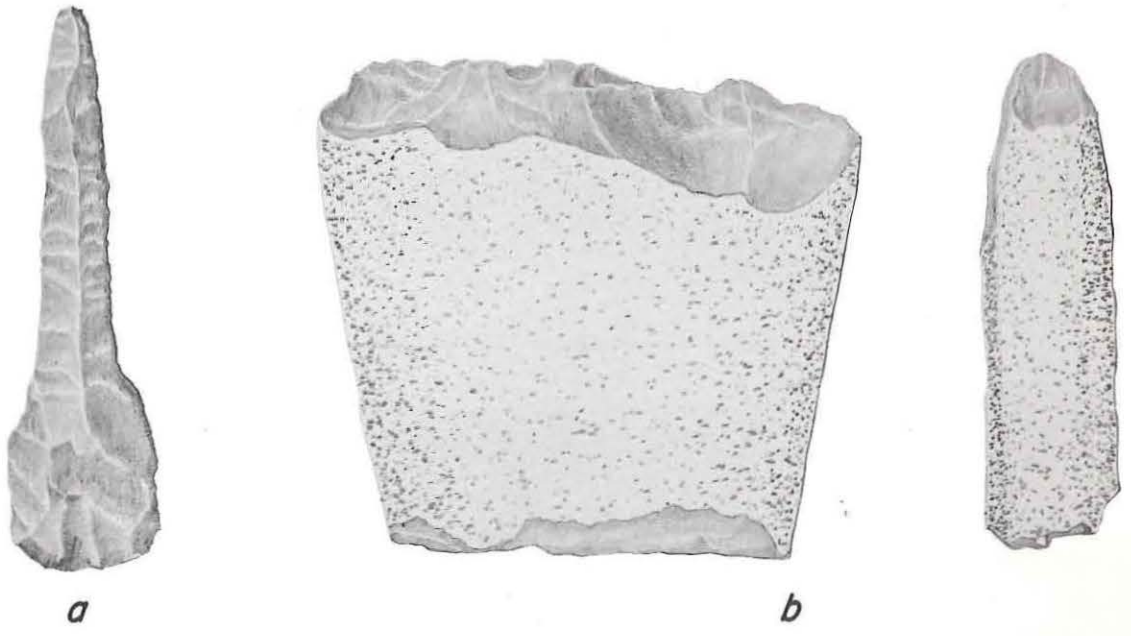
Lithic Technology: Bifacially worked by percussion on cobble.

BB = beveled blade, BS = beveled stem, S = serration (= absence; ** = presence); T = maximum thickness; ML = maximum length; MBW = maximum blade width; BW = base width (at proximal end of stem); HL = haft length; NW = neck width (stem width just below shoulders); BD = base depth (+ = concave; - = convex; 0 = straight), nd = no data (i.e., partial specimen).

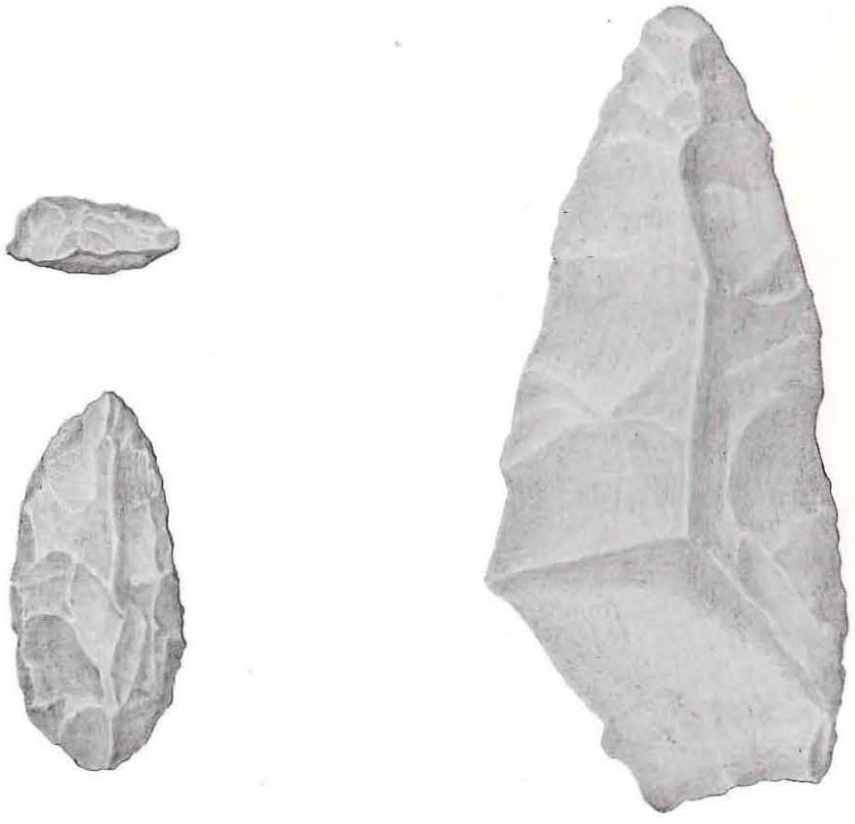
Figure 11. Bifacial Tools Other than Projectile Points and Thinned Blades

a. Bifacial hafted drill
b. Miscellaneous bifacial tool, Form 1
c. Miscellaneous bifacial tool, Form 2
d. Miscellaneous bifacial tool, Form 3

Figure 11



a b



c d

Description: A subtriangular cobble with one edge bifacially worked; proximal end is broken.

Length	Width	Thickness
6.5+	7.2	1.9

Form 2 (1 specimen; Fig. 11*c*)

Lithic Technology: Bifacially flaked by percussion on a flake.

Description: Small leaf-shaped biface probably too thick and crudely worked to be a projectile point.

Length	Width	Thickness	
5.0	2.3	1.1	both lateral edges

Form 3 (1 specimen; Fig. 11*d*)

Lithic Technology: Bifacially worked by percussion; no retouch.

Description: This specimen is the distal tip fragment of a bifacially worked pointed tool. Edges are slightly convex; proximal end is lacking. One surface shows extensive smoothing which probably resulted from stream tumbling. Longitudinal and medial cross sections are planoconvex.

Length	Width	Thickness
10.5+	4.9	1.2

Unifacial Gouges

Form 1 (14 specimens; Fig. 12*a*)

Lithic Technology: Unifacially worked by percussion; retouch generally along edges and bases.

Description: Similar to bifacial gouge Form 8 but these specimens are unifacial and are generally less regular.

Length	Width	Thickness	Bit Angle
10.5	5.8	2.7	83°
9.3	4.4	2.1	58°
9.1	4.3	1.9	62°
8.3	3.9	1.8	70°
7.3	4.4	1.9	77°
7.3	4.5	1.7	74°
7.7	5.8	2.0	63°
7.1	5.6	2.1	72°
6.6	4.0	1.4	70°
6.5	5.1	1.6	66°
6.5	4.2	1.6	65°
5.5	4.0	1.5	71°
5.3	5.2	1.7	68°
4.6	4.3	1.2	65°

Form 2 (1 specimen; Fig. 12*b*)

Lithic Technology: Unifacially worked by percussion; retouch generally at bit end only.

Description: Similar to unifacial gouge Form 1 except with strongly convex bits.

Length	Width	Thickness	Bit Angle
8.9	4.6	1.4	45°

Form 3 (7 specimens; Fig. 12*c*)

Lithic Technology: Unifacially thinned by percussion; retouch along edges and beveled surface of bits.

Description: Similar to bifacial gouge Form 9 but these are unifacially worked. One specimen is double bitted.

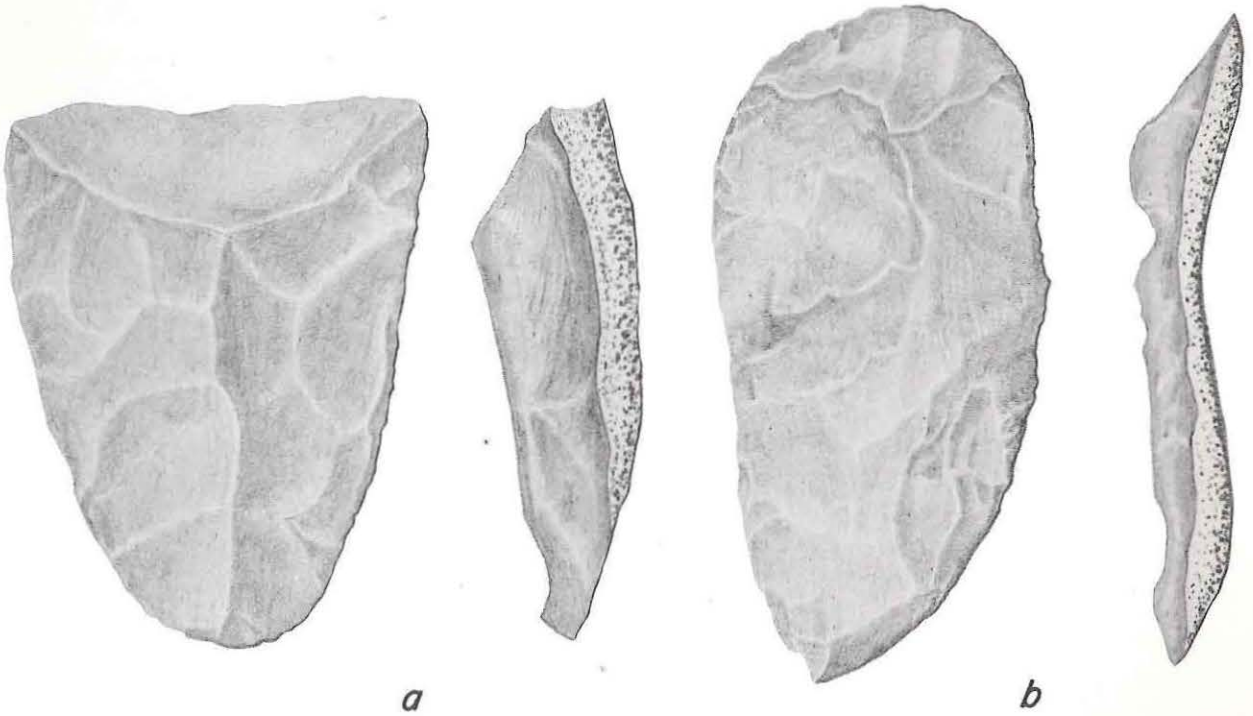
Figure 12. Unifacial Gouges

a. Form 1

b. Form 2

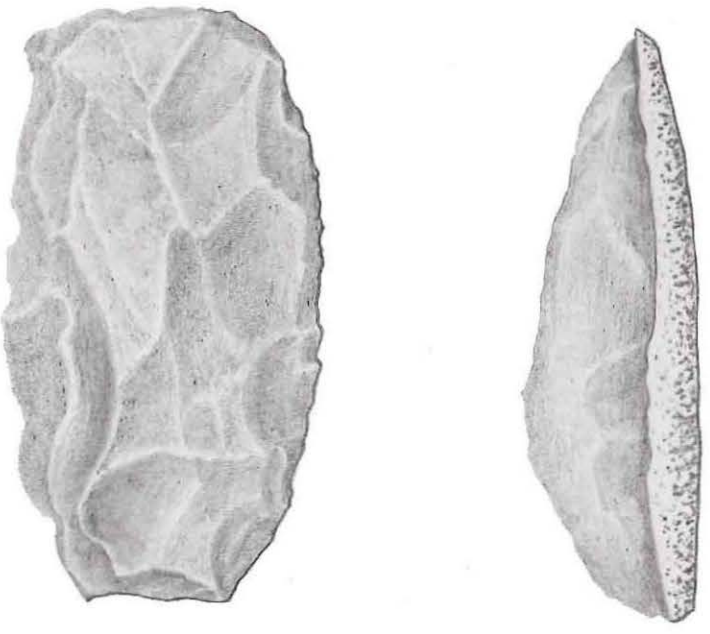
c. Form 3

Figure 12



a

b



c

Length	Width	Thickness	Bit Angle	
8.5	5.8	2.3	60°	
7.8	4.1	2.2	51°	
7.6	4.6	1.7	54°	
6.9	4.9	1.9	62°	
6.6	4.4	2.4	61°	
5.9	5.2	1.7	55°	53°
-	4.7	1.4	54°	

Gouge Combination Tools

Form 1 (6 specimens; Fig. 13*a*)

Lithic Technology: Bifacially worked by percussion; retouch along edges and beveled surface of bits.

Description: Similar to unifacial gouge Form 1 but with one lateral edge bifacially worked (both lateral edges are worked on one specimen).

Length	Width	Thickness	Bit Angle
8.5	4.4	2.1	74°
7.8	4.5	2.3	75°
7.3	5.0	2.2	67°
7.4	4.2	1.7	65°
6.8	4.4	1.6	75°
5.8	4.1	1.6	65°

Form 2 (2 specimens; Fig. 13*b*)

Lithic Technology: Bifacially worked by percussion; retouch along edges and dorsal surface of bits.

Description: Similar to unifacial gouge Form 3 but with one lateral edge bifacially worked. One specimen is beveled; the other is not.

Length	Width	Thickness	Bit Angle
6.6	5.2	1.3	74°
-	5.1	2.0	61°

Form 3 (1 specimen; Fig. 13*c*)

Lithic Technology: Unifacially worked by percussion; retouch along one lateral edge and dorsal surface of bit.

Description: Similar to unifacial gouge Form 3 but with one lateral edge worked into a unifacial edge.

Length	Width	Thickness	Bit Angle
7.4	5.4	2.3	57°

Unifacial Side Scrapers

Form 1 (2 specimens; Fig. 14*a*)

Lithic Technology: Unifacially worked by percussion. Both specimens are on flakes; one specimen has percussion retouching along both edges and one on both edges and distal end.

Description: Shaped subtriangular side scrapers with straight bases, convex edges and rounded distal ends. The base of one specimen is an unprepared platform. The proximal flake end of the other specimen has been trimmed by steep flaking and is also thinned from the base. Cross sections are planoconvex.

Length	Width	Thickness	
7.2	5.6	1.6	both lateral edges
6.6	4.5	1.8	both lateral edges and end opposite bulb

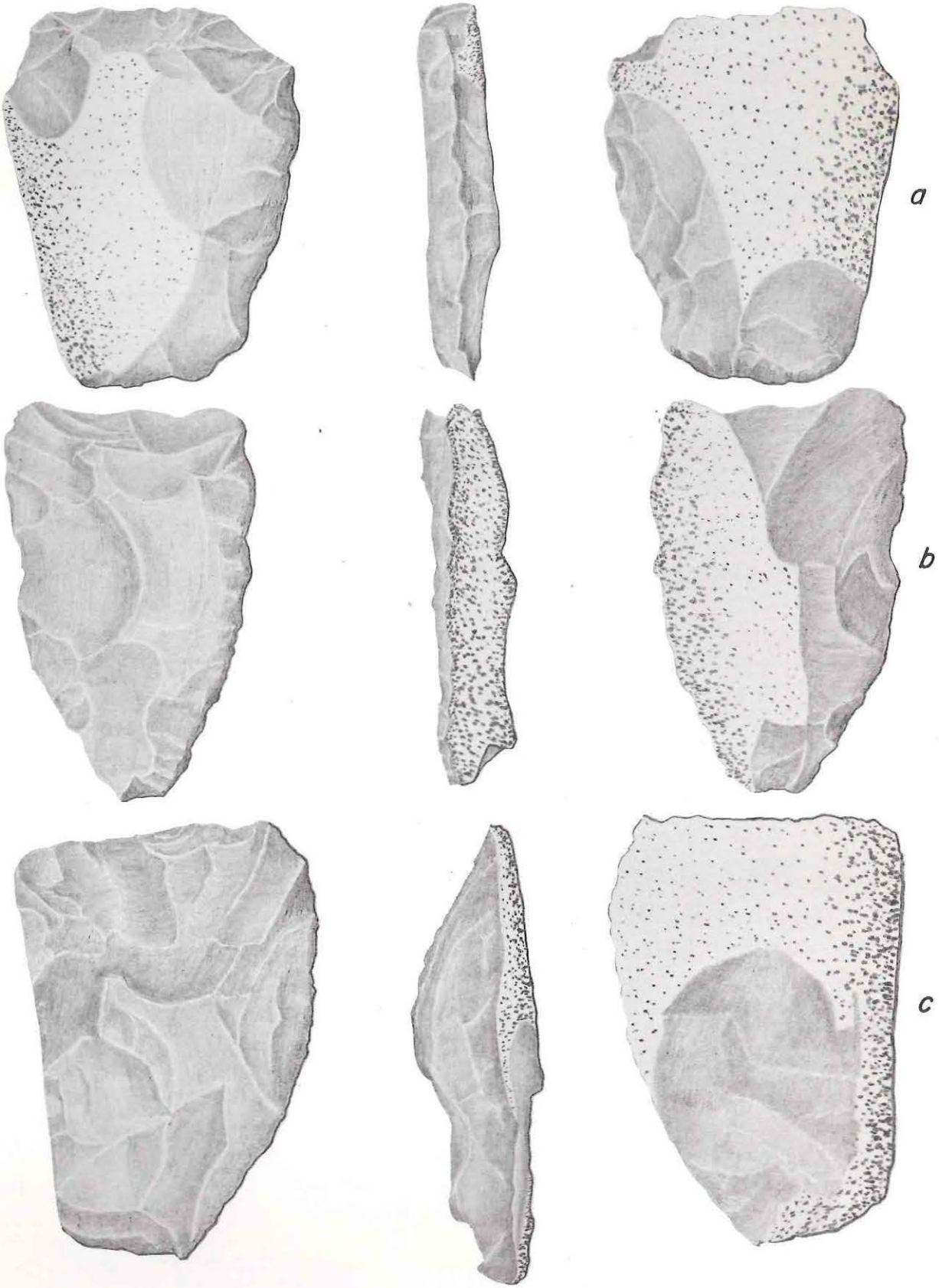
Figure 13. Gouge Combination Tools

a. Form 1

b. Form 2

c. Form 3

Figure 13



Form 2 (7 specimens; Fig. 14*b*)

Lithic Technology: Unifacial percussion and possibly pressure retouch along one edge; these specimens are on biface manufacturing failures, all of which are flakes.

Description: Variously shaped biface manufacturing failures each with a single retouched convex edge.

Length	Width	Thickness	
7.5	3.2	1.1	edge opposite bulb
7.2	4.8	0.9	edge opposite bulb
6.8	5.9	2.2	edge opposite bulb
6.7	4.6	1.2	lateral edge
7.0	4.1	1.4	lateral edge
6.1	5.0	2.0	lateral edge
5.2	2.8	0.7	lateral edge

Unifacial Snub-Nose End and Side Scraper (1 specimen; Fig. 14*c*)

Lithic Technology: Unifacially worked by percussion on an unprepared platform secondary flake; retouch along distal end and one lateral edge.

Description: Trimmed subrectangular end and side scraper.

Length	Width	Thickness	
4.2	3.7	1.2	end opposite bulb and one lateral edge

TOOLS OTHER THAN PROJECTILE POINTS AND THINNED BLADES

Unifacial Concave Scraper

Form 1 (1 specimen; Fig. 14*d*)

Lithic Technology: Unifacially worked by percussion on cobble; percussion retouch along working surface.

Description: A concave scraper on an oval lenticular core.

Length	Width	Thickness
5.5	5.3	1.9

Form 2 (1 specimen; Fig. 14*e*)

Lithic Technology: Unretouched secondary flake.

Description: Concave scraper on one edge of a triangular flake.

Length	Width	Thickness	
4.0	3.8	1.0	edge opposite bulb

Unifacial Hand-Held Chopper Tool (1 specimen)

Lithic Technology: Unifacially worked by percussion on cobble.

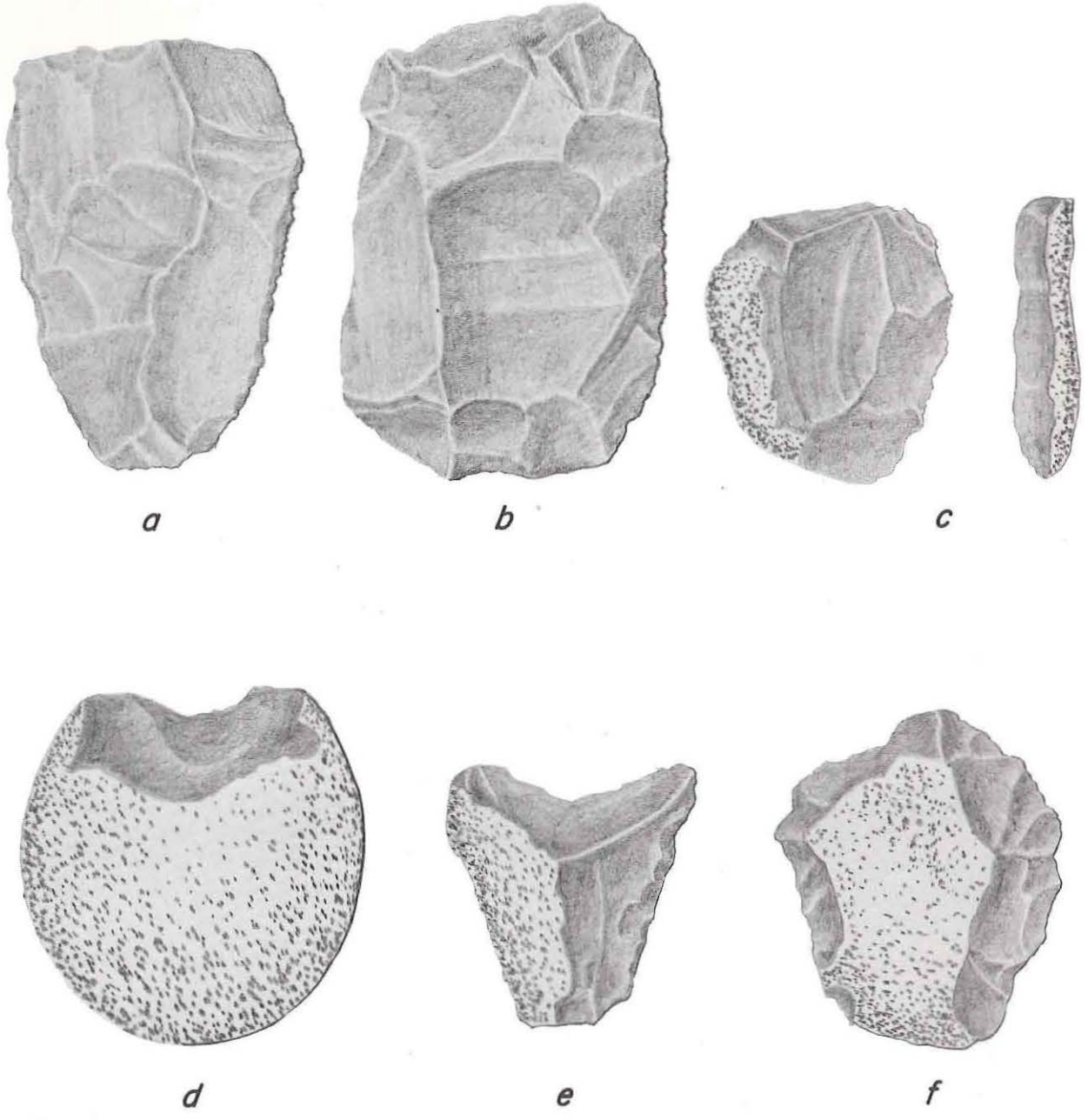
Description: Cobble tool with a roughly flaked edge opposite a rounded proximal end.

Length	Width	Thickness
9.9	8.2	4.1

Figure 14. Unifacial Tools

a. Side scraper, Form 1
b. Side scraper, Form 2
c. Snub-nose end and side scraper
d. Concave scraper, Form 1
e. Concave scraper, Form 2
f. Miscellaneous unifacial tool

Figure 14



Miscellaneous Unifacial Tool (1 specimen; Fig. 14*f*)

Lithic Technology: Unifacially worked by percussion on an unprepared platform primary flake.

Description: An oval flake with rough retouch along both edges and distal end.

Length	Width	Thickness	
5.2	4.5	1.4	both lateral edges and end opposite bulb

PROJECTILE POINTS AND THINNED BLADES

This category includes all projectile points, whether stemmed or unstemmed, and thinned blades which are defined here as any tool with two generalized bifacially chipped edges and no other distinct working surfaces. Thinned blades are assumed to represent knives and other cutting tools.

A number of the stemmed forms are similar to specimens reported from Northern Mexico by MacNeish (1958) and by Taylor (1966). Specific references from the United States are provided for many of the stemmed forms.

Subtriangular to Lanceolate Projectile Points and Thinned Blades (17 forms)

Form 1 (2 specimens; Fig. 15*a*)

Type Designation: *Catan*

Lithic Technology: Bifacially worked by percussion; one specimen is on a flake; pressure retouch along edges only.

Description: Small leaf-shaped dart points with tips heavily worked and pointed.

Base: Semicircular; no distinction from edges; thinned.

Edges: Slightly to strongly convex; recurved near tips.

Beveling: None

Serration: None

Length to Width Ratio: 1.5 to 1

Width to Thickness Ratio: 3 to 1

Longitudinal Cross Section: Thickest near tip

Medial Cross Section: Lenticular

BB	BS	S	T	ML	MBW	BW	HL	NW	BD
*	*	*	0.6	2.9	1.8	1.8	*	*	-0.5
*	*	*	0.7	3.5	2.3	2.3	*	*	-0.6

Form 2 (6 specimens; Fig. 15*b*)

Type Designation: *Catan*

Lithic Technology: Bifacially worked by percussion; three specimens are on flakes; pressure retouch on one surface along edges.

Description: Subtriangular to leaf-shaped dart points.

Base: Slightly to strongly convex

Edges: Slightly convex

Beveling: Three with true beveling; two with differential edge-beveling; one is unbeveled.

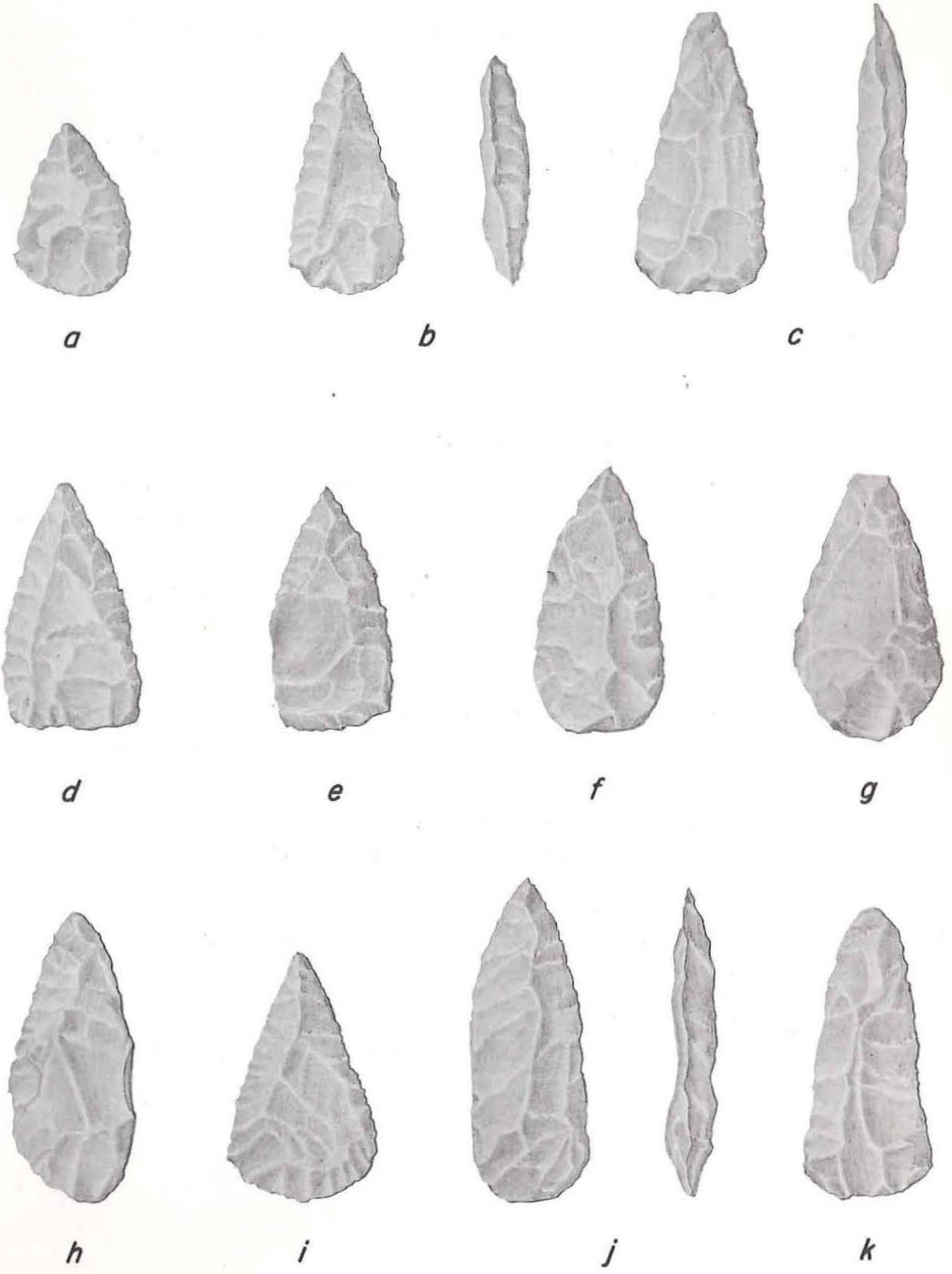
Serration: Four specimens

Length to Width Ratio: 1.6-2 to 1

Figure 15. Subtriangular to Lanceolate Projectile Points and Thinned Blades

a. Form 1, *Catan*
b. Form 2, *Catan*
c. Form 3, Untyped
d. Form 4, Untyped
e. Form 5, Untyped
f. Form 6, Untyped
g. Form 7, *Desmuke*
h. Form 8, *Desmuke*
i. Form 9, *Abasolo*
j. Form 10, *Abasolo*
k. Form 11, possible *Abasolo*

Figure 15



Width to Thickness Ratio: 2.5-3 to 1

Longitudinal Cross Section: Generally thickest at midblade to tip.

Medial Cross Section: Beveled

BB	BS	S	T	ML	MBW	BW	HL	NW	BD
**	*	**	0.7	4.2	2.0	2.0	*	*	-0.6
**	*	**	0.7	4.2	2.2	2.2	*	*	-0.2
**	*	**	0.7	4.0	2.1	2.1	*	*	-0.7
**	*	*	0.7	3.9	1.8	1.8	*	*	-0.6
*	*	**	0.7	3.6	2.0	2.0	*	*	-0.7
**	*	*	0.6	3.1	1.9	1.9	*	*	-0.3

Form 3 (7 specimens; Fig. 15*e*)

Type Designation: Untyped

Lithic Technology: Bifacially-worked by percussion; one specimen is on a flake; pressure retouch along edges only.

Description: Subtriangular to leaf-shaped dart points.

Base: Slightly to strongly convex

Edges: Straight to slightly convex

Beveling: Four specimens show slight differential edge-beveling.

Serration: Two specimens

Length to Width Ratio: 2-2.5 to 1

Width to Thickness Ratio: 2.6-3.5 to 1

Longitudinal Cross Section: Thickest midblade to tip (4); lenticular (3).

Medial Cross Section: Lenticular

Comments: Similar to Form 4 but narrow relative to length.

BB	BS	S	T	ML	MBW	BW	HL	NW	BD
**	*	*	0.8	5.1	2.1	2.1	*	*	-0.6
**	*	**	0.6	4.7	1.9	1.9	*	*	-0.8
*	*	**	0.7	4.4	2.1	2.1	*	*	-0.8
*	*	*	0.6	4.3	2.1	2.1	*	*	-0.7
**	**	*	0.6	4.1	1.7	1.7	*	*	-0.6
**	*	*	0.7	4.0	1.9	1.9	*	*	-0.4
*	*	*	0.6	4.0	2.0	2.0	*	*	-0.6

Form 4 (6 specimens; Fig. 15*d*)

Type Designation: Untyped

Lithic Technology: Bifacially worked by percussion; 3 specimens are on flakes; pressure retouch along edges and to a lesser extent along bases.

Description: Triangular to subtriangular dart points.

Base: Weakly to strongly convex

Edges: Slightly convex

Beveling: Slight differential edge-beveling on 3 specimens.

Serration: 3 specimens

Length to Width Ratio: 1.5-2 to 1

Width to Thickness Ratio: 2.6-4 to 1

Longitudinal Cross Section: Lenticular (3); thickest near tip (3)

Medial Cross Section: Lenticular

Comments: Similar to Form 3 but wide relative to length.

BB	BS	S	T	ML	MBW	BW	HL	NW	BD
*	*	*	0.8	4.5	2.7	2.7	*	*	-0.4
*	*	**	0.8	4.2	2.1	2.1	*	*	-1.0
*	*	*	0.8	4.2	2.3	2.3	*	*	-0.4
**	**	**	0.7	4.2	2.8	2.8	*	*	-0.7
**	*	*	0.6	4.2	2.3	2.3	*	*	-0.1
**	*	**	0.6	3.7	2.3	2.3	*	*	-0.2

Form 5 (2 specimens; Fig 15*e*)

Type Designation: Untyped

Lithic Technology: Bifacially worked by percussion; pressure retouch along edges and bases.

Description: Subtriangular dart points

Base: Convex

Edges: Convex to recurved (near tips)

Beveling: None

Serration: 1 specimen

Length to Width Ratio: 1.6-2 to 1

Width to Thickness Ratio: 4 to 1

Longitudinal Cross Section: Lenticular

Medial Cross Section: Lenticular

BB	BS	S	T	ML	MBW	BW	HL	NW	BD
*	*	**	0.5	3.9	2.0	2.0	*	*	-0.3
*	*	*	0.6	3.6	2.3	2.3	*	*	-0.7

Form 6 (3 specimens; Fig. 15*f*)

Type Designation: Untyped

Lithic Technology: Bifacially worked by percussion; pressure retouch along edges only.

Description: Leaf-shaped dart points with straight bases and angled convex edges.

Base: Straight

Edges: Slightly convex; distinct angle one-quarter distant toward tip.

Beveling: Slight differential edge-beveling (1)

Serration: 2 specimens

Length to Width Ratio: 2 to 1

Width to Thickness Ratio: 3.2-4.6 to 1

Longitudinal Cross Section: Lenticular (2); thickest near tip (1)

Medial Cross Section: Lenticular

References: *Nogales Triangular* (MacNeish 1958: 63, #13).

BB	BS	S	T	ML	MBW	BW	HL	NW	BD
*	*	*	0.6	4.5	2.4	1.0	0.9	*	-0.9
**	*	**	0.5	4.4	2.3	1.3	0.8	*	-0.8
*	*	**	0.6	3.9	1.9	1.1	1.0	*	-1.0

Form 7 (2 specimens; Fig. 15*g*)

Type Designation: *Desmuke*

Lithic Technology: Bifacially worked by percussion; one specimen is on a flake; pressure retouch along edges only.

Description: Leaf- to lanceolate-shaped dart points with angled convex edges.

Base: Strongly convex to pointed

Edges: Straight (1); slightly convex to slightly concave (1); distinct angle with bases.

Beveling: Differential edge-beveling (1)

Serration: None

Length to Width Ratio: 2.0-2.4 to 1

Width to Thickness Ratio: 3.1-3.5 to 1

Longitudinal Cross Section: Generally lenticular

Medial Cross Section: Lenticular

BB	BS	S	T	ML	MBW	BW	HL	NW	BD
*	*	*	0.7	5.2	2.2	2.2	*	*	-0.9
**	*	*	0.7	5.1	2.5	2.5	*	*	-1.5

Form 8 (2 specimens; Fig. 15*h*)

Type Designation: *Desmuke*

Lithic Technology: Bifacially worked by percussion; pressure retouch along edges only.

Description: Leaf-shaped dart points.

Base: Pointed

Edges: Convex

Beveling: None

Serration: 1 specimen

Length to Width Ratio: 2.1-2.3 to 1

Width to Thickness Ratio: 2.8-3.1 to 1

Longitudinal Cross Section: Lenticular

Medial Cross Section: Lenticular

BB	BS	S	T	ML	MBW	BW	HL	NW	BD
*	*	**	0.7	5.1	2.2	2.2	*	*	-1.2
*	*	*	0.8	4.9	2.3	2.3	*	*	-1.2

Form 9 (8 specimens; Fig. 15*i*)

Type Designation: *Abasolo*

Lithic Technology: Bifacially worked by percussion; 2 specimens are on flakes; pressure retouch along edges and bases.

Description: Thin, generally well-flaked subtriangular dart points with distinct angle between edges and bases.

Base: Weakly to strongly convex; distinct angle with edges.

Edges: Straight to slightly convex

Beveling: Slight differential edge-beveling (2)

Serration: 3 specimens

Length to Width Ratio: 1.5-2.2 to 1

Width to Thickness Ratio: 3.8-5.4 to 1

Longitudinal Cross Section: Generally lenticular

Medial Cross Section: Lenticular to slightly planoconvex

BB	BS	S	T	ML	MBW	BW	HL	NW	BD
*	*	*	0.6	5.0	2.3	2.3	*	*	-0.8
**	*	*	0.7	4.9	2.7	2.7	*	*	-0.6
*	*	**	0.5	4.3	2.3	2.3	*	*	-0.5
*	*	**	0.5	4.2	2.5	2.5	*	*	-0.7
**	*	*	0.5	4.2	2.7	2.7	*	*	-0.8
*	*	**	0.6	4.0	2.5	2.5	*	*	-0.2
*	*	*	0.6	4.0	2.7	2.7	*	*	-0.4
*	*	*	0.5	3.6	2.2	2.2	*	*	-0.5

Form 10 (3 specimens; Fig. 15*j*)

Type Designation: *Abasolo*

Lithic Technology: Bifacially worked by percussion; pressure retouch along edges of one surface; one specimen is on a flake (?).

Description: Lanceolate-shaped dart points.

Base: Pointed to semicircular; thinned.

Edges: Strongly convex; continuous curve (1); slight differentiation of blades and bases (2)

Beveling: True beveling; steep left hand

Serration: None

Length to Width Ratio: 2-3 to 1

Width to Thickness Ratio: 3 to 1

Longitudinal Cross Section: Thickest midblade to tip

Medial Cross Section: Beveled

BB	BS	S	T	ML	MBW	BW	HL	NW	BD
**	*	*	0.8	6.1	2.2	2.2	*	*	-1.9
**	*	*	0.8	5.6	2.5	2.5	*	*	-1.2
**	*	*	0.7	5.4	2.1	2.1	*	*	-0.7

Form 11 (2 specimens; Fig. 15*k*)

Type Designation: Possible *Abasolo*

Lithic Technology: Bifacially worked by percussion.

Description: Leaf-shaped dart points.
Base: Semicircular; irregular
Edges: Straight to slightly convex
Beveling: None
Serration: None
Length to Width Ratio: 2.2 to 1
Width to Thickness Ratio: 2.8 to 1
Longitudinal Cross Section: Irregular
Medial Cross Section: Lenticular

BB	BS	S	T	ML	MBW	BW	HL	NW	BD
*	*	*	0.8	5.1	2.2	2.2	*	*	-0.6
*	*	*	0.6	3.9	1.7	1.7	*	*	-0.5

Form 12 (4 specimens; Fig. 16*a*, *b*)

Type Designation: *Refugio*
Lithic Technology: Bifacially worked by percussion; pressure retouch along edges and bases.
Description: Leaf-shaped to lanceolate dart points or thinned blades.
Base: Semicircular to pointed
Edges: Slightly to strongly convex
Beveling: None
Serration: None
Length to Width Ratio: 2.3-3.5 to 1
Width to Thickness Ratio: 2.1-3.7 to 1
Longitudinal Cross Section: Lenticular
Medial Cross Section: Lenticular

BB	BS	S	T	ML	MBW	BW	HL	NW	BD
*	*	*	0.8	6.9	2.7	2.7	*	*	-1.7
*	*	*	0.8	6.9	3.0	3.0	*	*	-1.5
*	*	*	0.9	6.7	1.9	1.9	*	*	-1.8
*	*	*	0.8	6.2	2.5	2.5	*	*	-1.8

Form 13 (2 specimens; Fig. 16*c*)

Type Designation: Untyped

Lithic Technology: Bifacially worked by percussion; one specimen is on a flake; pressure retouch along edges only.

Description: Large leaf-shaped thinned blades

Base: Semicircular

Edges: Convex

Beveling: Differential edge-beveling (2)

Serration: 1 specimen

Length to Width Ratio: 2.6-2.9 to 1

Width to Thickness Ratio: 3.0-3.3 to 1

Longitudinal Cross Section: Lenticular

Medial Cross Section: Lenticular

Comments: Similar to Form 12 but larger

BB	BS	S	T	ML	MBW	BW	HL	NW	BD
**	*	*	1.0	9.1	3.1	3.1	*	*	-1.9
**	*	**	0.9	8.0	3.0	3.0	*	*	-0.9

Form 14 (2 specimens; Fig. 16*d*)

Type Designation: Untyped

Lithic Technology: Bifacially worked by percussion; pressure retouch along edges and bases.

Description: Thin, well-flaked, leaf-shaped dart points or thinned bifaces.

Base: Slightly to strongly convex

Edges: Slightly to strongly convex; slight angle with base

Beveling: None

Serration: None

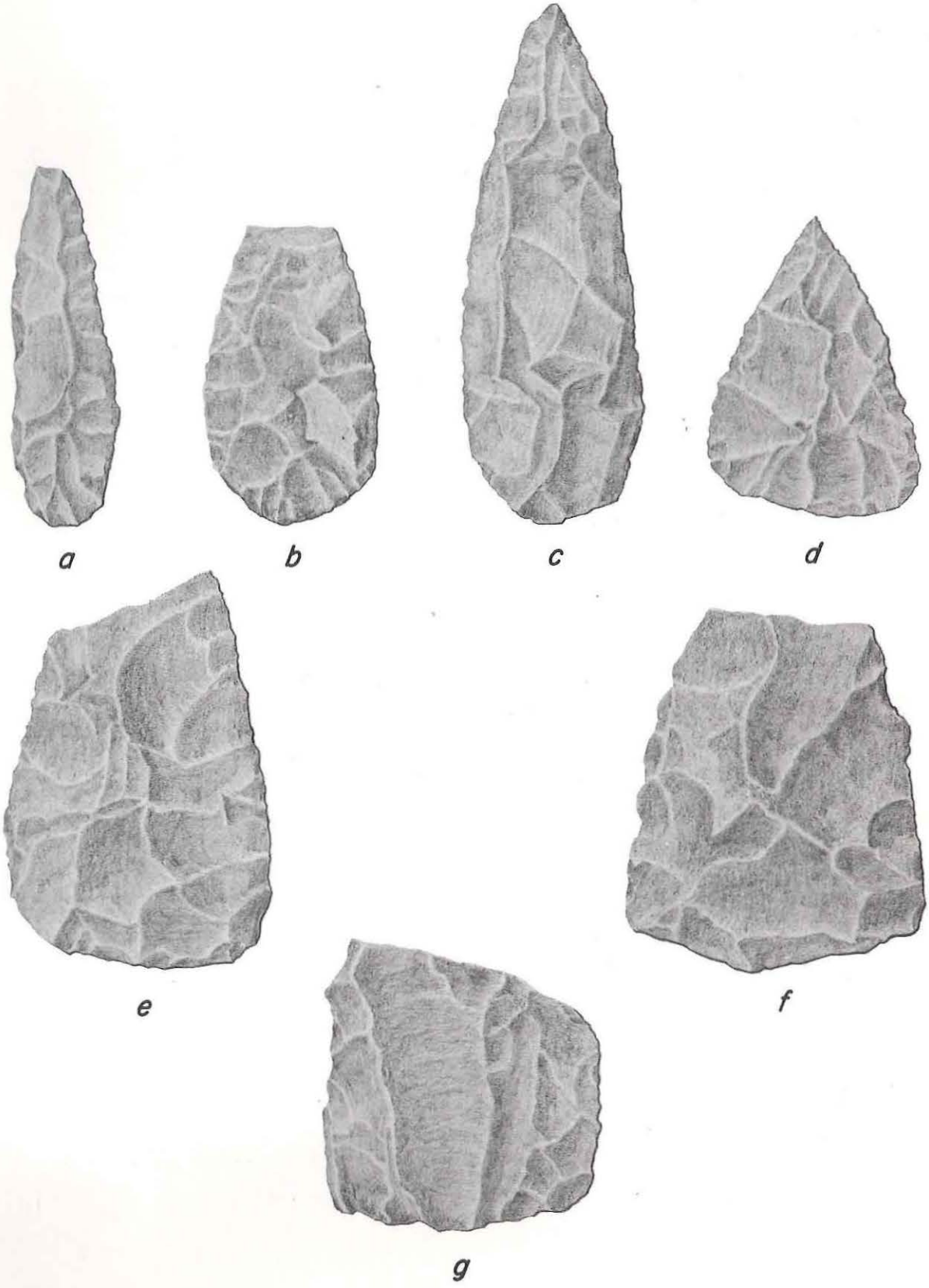
Length to Width Ratio: 1.4 to 1

Width to Thickness Ratio: 4.5-5.0 to 1

Figure 16. Subtriangular to Lanceolate Projectile Points and Thinned Blades

a. Form 12, *Refugio*
b. Form 12, *Refugio*
c. Form 13, Untyped
d. Form 14, Untyped
e. Form 15, Untyped
f. Form 16, Untyped
g. Form 17, Untyped

Figure 16



Longitudinal Cross Section: Lenticular

Medial Cross Section: Lenticular

BB	BS	S	T	ML	MBW	BW	HL	NW	BD
*	*	*	0.8	5.2	3.6	3.6	*	*	-0.7
*	*	*	0.6	4.4	3.0	3.0	*	*	-0.3

Form 15 (2 specimens; Fig. 16*e*)

Type Designation: Untyped

Lithic Technology: Bifacially worked by percussion; one specimen is on a flake; retouch along edges only.

Description: Large leaf-shaped thinned blades

Base: Semicircular

Edges: Convex

Beveling: None

Serration: None

Length to Width Ratio: 2 to 1

Width to Thickness Ratio: 4.5-6.1 to 1

Longitudinal Cross Section: Lenticular

Medial Cross Section: Lenticular

Comments: Outline similar to ovate bifaces but thinner

References: Ovoid bifaces (MacNeish 1958: 84, #15-17).

BB	BS	S	T	ML	MBW	BW	HL	NW	BD
*	*	*	1.0	9.1	4.5	4.5	*	*	-1.5
*	*	*	0.9	nd	5.5	5.5	*	*	-1.6

Form 16 (3 basal fragments; Fig. 16*f*)

Type Designation: Untyped

Lithic Technology: Bifacially worked by percussion; retouch generally along edges only.

Description: Large subtriangular thinned bifaces
Base: Convex
Edges: Slightly convex; distinct angle with base
Beveling: None
Serration: None
Length to Width Ratio: -
Width to Thickness Ratio: 3.4-6.2 to 1
Longitudinal Cross Section: Lenticular
Medial Cross Section: Lenticular

BB	BS	S	T	ML	MBW	BW	HL	NW	BD
*	*	*	1.5	nd	5.1	5.1	*	*	-1.0
*	*	*	0.8	nd	5.0	5.0	*	*	-0.9
*	*	*	1.0	nd	4.8	4.8	*	*	-0.4

Form 17 (1 specimen; Fig. 16*g*)

Type Designation: Untyped
Lithic Technology: Bifacially worked by percussion; retouch along edges only.
Description: Large subtriangular thinned blade with beveled edges and base.
Base: Heavily thinned and beveled; convex
Edges: Slightly convex
Beveling: Steep differential edge-beveling
Serration: None
Length to Width Ratio: -
Width to Thickness Ratio: 4.8 to 1
Longitudinal Cross Section: Lenticular
Medial Cross Section: Beveled

BB	BS	S	T	ML	MBW	BW	HL	NW	BD
**	**	*	1.0	nd	4.8	4.8	*	*	-0.8

Triangular Projectile Points and Thinned Blades (23 forms)

Form 1 (3 specimens; Fig. 17*a*, *b*)

Type Designation: *Starr*

Lithic Technology: Bifacially worked; one specimen is on a flake.

Description: Small triangular arrow points

Base: Deeply concave

Edges: Straight to deeply concave

Beveling: None

Serration: None

Length to Width Ratio: 1.0-1.2 to 1

Width to Thickness Ratio: 7.2-12.5 to 1

Longitudinal Cross Section: Lenticular

Medial Cross Section: Lenticular

BB	BS	S	T	ML	MBW	BW	HL	NW	BD
*	*	*	0.4	3.0	2.9	2.9	*	*	+0.6
*	*	*	0.2	2.9	2.5	2.5	*	*	+0.6
*	*	*	0.3	2.5	2.4	2.4	*	*	+0.3

Form 2 (1 specimen; Fig. 17*c*)

Type Designation: Untyped

Lithic Technology: Bifacially worked; pressure flaking on edges and to a lesser extent on the base.

Description: Small triangular arrow point

Base: Concave in center only; recurved

Edges: Slightly recurved at midblade

Beveling: None

Serration: None

Length to Width Ratio: 1.7 to 1

Width to Thickness Ratio: 4.5 to 1

Longitudinal Cross Section: Lenticular

Medial Cross Section: Lenticular

BB	BS	S	T	ML	MBW	BW	HL	NW	BD
*	*	*	0.4	3.1	1.8	1.8	*	*	+0.1

Form 3 (2 specimens; Fig. 17*d*)

Type Designation: *Matamoros*

Lithic Technology: Bifacially worked; pressure retouch along edges only.

Description: Small thin triangular dart or arrow points

Base: Fluted on one or both sides; slightly concave

Edges: Slightly convex

Beveling: Slight differential edge-beveling (2)

Serration: None

Length to Width Ratio: 1.1-1.6 to 1

Width to Thickness Ratio: 3.5-5.0 to 1

Longitudinal Cross Section: Thickest midblade to near tip

Medial Cross Section: Lenticular

BB	BS	S	T	ML	MBW	BW	HL	NW	BD
**	*	*	0.5	2.7	1.7	1.7	*	*	+0.1
**	*	*	0.4	2.2	2.0	2.0	*	*	+0.1

Form 4 (5 specimens; Fig. 17*e*)

Type Designation: *Matamoros*

Lithic Technology: Bifacially worked by percussion; pressure retouch along edges only.

Description: Small triangular dart points

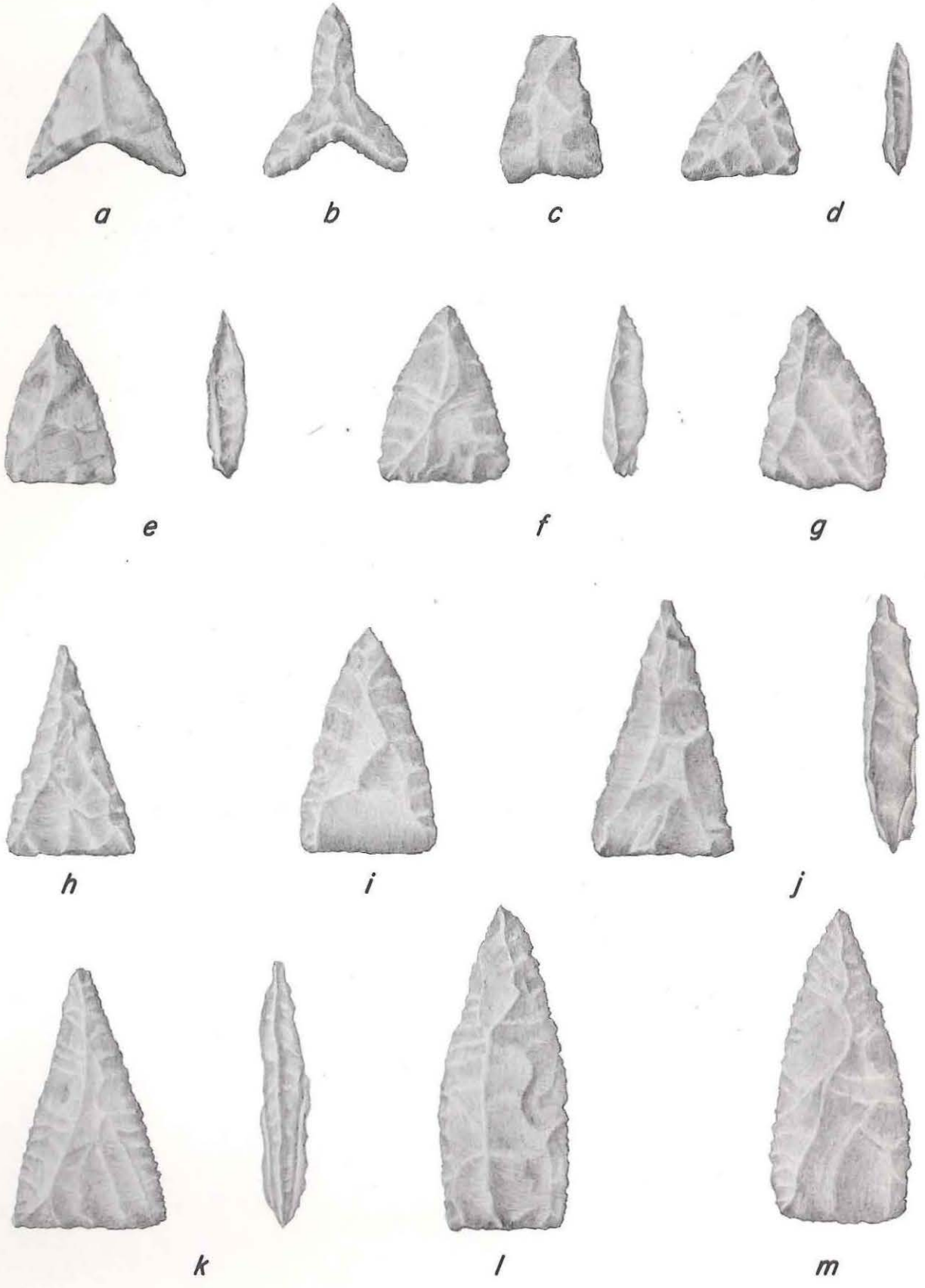
Base: Heavily thinned; slightly convex to slightly concave

Edges: Slightly convex

Figure 17. Triangular Projectile Points and Thinned Blades

a. Form 1, *Starr*
b. Form 1, *Starr*
c. Form 2, Untyped
d. Form 3, *Matamoros*
e. Form 4, *Matamoros*
f. Form 5, *Matamoros*
g. Form 6, *Matamoros*
h. Form 7, Untyped
i. Form 8, *Matamoros/Tortugas*
j. Form 9, *Matamoros/Tortugas*
k. Form 10, *Tortugas*
l. Form 11, Untyped
m. Form 12, Untyped

Figure 17



Beveling: Steep differential edge and true beveling on all specimens

Serration: 2 specimens

Length to Width Ratio: 1.4-1.75 to 1

Width to Thickness Ratio: 3.0-4.0 to 1

Longitudinal Cross Section: Thickest midblade to near tip

Medial Cross Section: Beveled

BB	BS	S	T	ML	MBW	BW	HL	NW	BD
**	*	**	0.5	3.5	2.0	2.0	*	*	+0.1
**	*	*	0.6	3.3	1.8	1.8	*	*	-0.1
**	*	**	0.7	3.1	2.0	2.0	*	*	-0.1
**	*	*	0.6	2.9	1.8	1.8	*	*	-0.1
**	*	*	0.5	2.8	2.0	2.0	*	*	-0.1

Form 5 (8 specimens; Fig. 17*f*)

Type Designation: *Matamoros*

Lithic Technology: Bifacially worked by percussion; pressure retouch along edges only.

Description: Small triangular dart points

Base: Straight to slightly concave; thinned

Edges: Slightly convex

Beveling: Slight differential edge-beveling (3)

Serration: 3 specimens

Length to Width Ratio: 1.3-1.6 to 1

Width to Thickness Ratio: 3.0-4.6 to 1

Longitudinal Cross Section: Lenticular to thickest midblade to tip

Medial Cross Section: Lenticular

BB	BS	S	T	ML	MBW	BW	HL	NW	BD
*	*	*	0.5	3.6	2.3	2.3	*	*	+0.2
*	*	*	0.7	3.4	2.1	2.1	*	*	+0.1
**	*	**	0.6	3.4	2.4	2.4	*	*	-0.1
*	*	**	0.7	3.3	2.2	2.2	*	*	+0.2

BB	BS	S	T	ML	MBW	BW	HL	NW	BD
*	*	*	0.6	3.3	2.3	2.3	*	*	+0.1
*	*	**	0.5	3.2	2.2	2.2	*	*	-0.1
**	*	*	0.7	3.1	2.1	2.1	*	*	+0.1
**	*	*	0.6	3.1	2.4	2.4	*	*	-0.1

Form 6 (4 specimens; Fig. 17*g*)

Type Designation: *Matamoros*

Lithic Technology: Bifacially worked by percussion; two specimens are on flakes; pressure retouch along edges only.

Description: Small triangular dart points; shape generally irregular.

Base: Slightly convex to slightly concave

Edges: Generally slightly convex

Beveling: Slight differential edge-beveling (2)

Serration: None

Length to Width Ratio: 1.3-1.9 to 1

Width to Thickness Ratio: 2.4-4.0 to 1

Longitudinal Cross Section: Thickest near tip

Medial Cross Section: Planoconvex to lenticular

Comments: Miscellaneous *Matamoros* specimens

BB	BS	S	T	ML	MBW	BW	HL	NW	BD
*	*	*	0.8	3.6	1.9	1.9	*	*	+0.1
**	*	*	0.7	3.5	2.2	2.2	*	*	-0.1
*	*	*	0.6	3.2	2.4	2.4	*	*	-0.1
**	*	*	0.6	3.0	2.0	2.0	*	*	+0.1

Form 7 (1 specimen; Fig. 17*h*)

Type Designation: Untyped

Lithic Technology: Bifacially worked by percussion.

Description: Thin triangular dart point

Base: Thinned, straight

Edges: Slightly concave

Beveling: Slight differential edge-beveling

Serration: None

Length to Width Ratio: 1.6 to 1

Width to Thickness Ratio: 5.5 to 1

Longitudinal Cross Section: Irregular

Medial Cross Section: Lenticular

BB	BS	S	T	ML	MBW	BW	HL	NW	BD
**	*	*	0.4	3.6	2.2	2.3	*	*	0

Form 8 (22 specimens; Fig. 17*i*)

Type Designation: *Matamoros/Tortugas*

Lithic Technology: Bifacially worked by percussion; 3 specimens are on flakes; pressure retouch generally is restricted to edges only.

Description: Triangular dart points

Base: Generally heavily thinned, almost fluted; slightly concave to slightly convex

Edges: Straight to slightly convex

Beveling: Slight differential edge-beveling (12)

Serration: 6 specimens

Length to Width Ratio: 1.3-2.9 to 1

Width to Thickness Ratio: 2.6-5.0 to 1

Longitudinal Cross Section: Generally thickest midblade to near tip

Medial Cross Section: Lenticular to beveled; planoconvex (1)

References: *Nogales* and *Tortugas Triangular* (MacNeish 1958).

BB	BS	S	T	ML	MBW	BW	HL	NW	BD
**	*	*	0.6	5.0	1.7	1.7	*	*	-0.3
**	*	*	0.8	4.7	2.1	2.1	*	*	-0.1
*	*	*	0.8	4.7	2.7	2.7	*	*	-0.1
**	*	*	0.7	4.7	2.2	2.2	*	*	+0.1
**	*	**	0.7	4.4	2.0	2.0	*	*	-0.3
*	*	*	0.7	4.3	2.7	2.7	*	*	+0.1
**	*	**	0.6	4.3	2.5	2.5	*	*	-0.3
*	*	*	0.7	4.2	2.3	2.3	*	*	+0.1
**	*	**	0.7	4.2	2.1	2.1	*	*	-0.4
*	*	*	0.5	4.2	2.0	2.0	*	*	+0.1
*	**	**	0.8	4.1	2.5	2.5	*	*	+0.1
*	*	*	0.7	4.0	2.4	2.4	*	*	-0.1
**	*	**	0.7	3.9	2.3	2.3	*	*	-0.1
*	*	*	0.6	3.9	2.2	2.2	*	*	+0.1
**	*	*	0.6	3.8	2.3	2.3	*	*	-0.1
*	*	*	0.7	3.7	2.3	2.3	*	*	+0.1
**	*	*	0.7	3.7	2.4	2.4	*	*	+0.1
**	*	**	0.6	3.7	2.5	2.5	*	*	-0.2
*	*	*	0.5	3.7	2.0	2.0	*	*	+0.2
**	*	*	0.6	3.7	2.8	2.8	*	*	+0.1
**	*	*	0.5	3.6	2.5	2.5	*	*	0
*	*	*	0.5	3.5	2.5	2.5	*	*	+0.1

Form 9 (8 specimens; Fig. 17*j*)

Type Designation: *Matamoros/Tortugas*

Lithic Technology: Bifacially worked by percussion; 4 specimens are on flakes; pressure retouch along edges only (4) and along edges and bases (4).

Description: Steeply beveled triangular dart points

Base: Slightly convex to slightly concave

Edges: Straight to slightly convex

Beveling: Steep; true beveling both edges (1); true beveling one edge, differential edge-beveling one edge (6); differential edge-beveling both edges (1)

Serration: 2 specimens

Length to Width Ratio: 1.3-2.9 to 1

Width to Thickness Ratio: 2.6-5.8 to 1

Longitudinal Cross Section: Generally thickest midblade to tip; lenticular (1)

Medial Cross Section: Beveled

BB	BS	S	T	ML	MBW	BW	HL	NW	BD
**	*	**	0.7	5.2	1.8	1.8	*	*	-0.2
**	*	*	0.6	5.0	1.9	1.9	*	*	+0.1
**	**	*	0.5	4.6	2.9	2.9	*	*	+0.1
**	*	*	0.8	4.5	2.5	2.5	*	*	+0.1
**	*	**	0.7	4.1	1.9	1.9	*	*	+0.1
**	*	*	0.8	4.0	3.0	3.0	*	*	-0.2
**	*	*	0.6	3.8	2.8	2.8	*	*	-0.2
**	**	*	0.8	3.3	2.2	2.2	*	*	-0.2

Form 10 (7 specimens; Fig. 17*k*)

Type Designation: *Tortugas*

Lithic Technology: Bifacially worked by percussion; generally pressure retouch on edges only; pressure retouch along edges and bases on 2 specimens.

Description: Large, thin and well-made triangular dart points

Base: Slightly convex to slightly concave

Edges: Straight to slightly convex

Beveling: None

Serration: 1 specimen

Length to Width Ratio: 1.0-2.0 to 1

Width to Thickness Ratio: 3.5-6.6 to 1

Longitudinal Cross Section: Lenticular

Medial Cross Section: Lenticular

BB	BS	S	T	ML	MBW	BW	HL	NW	BD
*	*	*	0.5	5.8	2.9	2.9	*	*	+0.1
*	*	*	0.6	5.5	2.7	2.7	*	*	-0.2
*	*	*	0.7	5.3	2.5	2.5	*	*	+0.1
*	*	*	0.6	4.9	2.7	2.7	*	*	-0.2
*	*	**	0.7	4.8	2.8	2.8	*	*	-0.2
*	*	*	0.5	4.7	2.4	2.4	*	*	+0.1
*	*	*	0.6	3.9	4.0	4.0	*	*	-0.3

Form 11 (2 specimens; Fig. 17*l*)

Type Designation: Untyped

Lithic Technology: Bifacially worked by percussion; generally pressure retouched along edges only; pressure retouch along bases on one specimen.

Description: Large triangular dart points

Base: Straight to slightly convex; slightly narrower than maximum blade width

Edges: Basal half of blade is parallel-edged; distal is slightly convex.

Beveling: None

Serration: None

Length to Width Ratio: 1.8-2.6 to 1

Width to Thickness Ratio: 3.3-4.8 to 1

Longitudinal Cross Section: Lenticular

Medial Cross Section: Lenticular

BB	BS	S	T	ML	MBW	BW	HL	NW	BD
*	*	*	0.7	5.9	2.3	2.3	*	*	-0.1
*	*	*	0.5	4.5	2.4	2.4	*	*	-0.1

Form 12 (2 specimens; Fig. 17*m*)

Type Designation: Untyped

Lithic Technology: Bifacially worked by percussion; retouch generally along edges only.

Description: Triangular dart points

Base: Slightly convex

Edges: Convex

Beveling: Differential edge-beveling (2)

Serration: 1 specimen

Length to Width Ratio: 2.0-2.2 to 1

Width to Thickness Ratio: 3.2-3.6 to 1

Longitudinal Cross Section: Thickest midblade to near tip

Medial Cross Section: Lenticular to beveled

BB	BS	S	T	ML	MBW	BW	HL	NW	BD
**	*	**	0.7	5.5	2.5	2.5	*	*	-0.1
**	*	*	0.8	5.4	2.6	2.6	*	*	-0.2

Form 13 (5 specimens; Fig. 18*a*)

Type Designation: Untyped

Lithic Technology: Bifacially worked by percussion; pressure retouch generally along edges only; pressure retouch along edges and base on one specimen.

Description: Large, thin triangular thinned blades

Base: Straight to slightly convex

Edges: Straight to slightly convex

Beveling: None

Serration: None

Length to Width Ratio: 1.6-1.9 to 1

Width to Thickness Ratio: 5.0-7.0 to 1

Longitudinal Cross Section: Lenticular

Medial Cross Section: Lenticular

References: Square-based bifaces (MacNeish 1958: 84, #4-6).

BB	BS	S	T	ML	MBW	BW	HL	NW	BD
*	*	*	0.6	8.0	4.2	4.2	*	*	0
*	*	*	0.8	7.3	4.4	4.4	*	*	0
*	*	*	0.8	6.4	4.0	4.0	*	*	-0.3
*	*	*	0.5	6.1	3.4	3.4	*	*	-0.1
*	*	*	0.9	nd	4.9	4.9	*	*	-0.1

Form 14 (8 specimens [1 badly burned]; Fig. 18*b*)

Type Designation: *Matamoros/Tortugas*

Lithic Technology: Bifacially worked by percussion; 3 specimens are on flakes; pressure retouch along edges only.

Description: Triangular dart points

Base: Generally heavily thinned; concave

Edges: Slightly convex

Beveling: 4 specimens with slight differential edge-beveling

Serration: 3 specimens

Length to Width Ratio: 1.3-1.9 to 1

Width to Thickness Ratio: 3.3-5.0 to 1

Longitudinal Cross Section: Generally thickest midblade to near tip

Medial Cross Section: Generally lenticular

BB	BS	S	T	ML	MBW	BW	HL	NW	BD
*	*	*	0.6	4.7	2.5	2.5	*	*	+0.2
*	*	*	0.5	4.3	2.3	2.3	*	*	+0.2
*	*	*	0.6	4.1	2.6	2.6	*	*	+0.1
**	*	**	0.7	4.0	2.3	2.3	*	*	+0.2
**	*	*	0.5	3.6	2.5	2.5	*	*	+0.1
**	*	**	0.6	3.3	2.4	2.4	*	*	+0.1
**	*	**	0.6	3.2	2.4	2.4	*	*	+0.2

Form 15 (6 specimens; Fig. 18*c*)

Type Designation: *Tortugas*

Lithic Technology: Bifacially worked; pressure flaking on both edges and to a lesser extent on the bases.

Description: Thin, well-flaked, triangular dart points

Base: Concave

Edges: Slightly convex

Beveling: None

Serration: 1 specimen

Length to Width Ratio: 1.5-1.9 to 1

Width to Thickness Ratio: 4.1-6.0 to 1

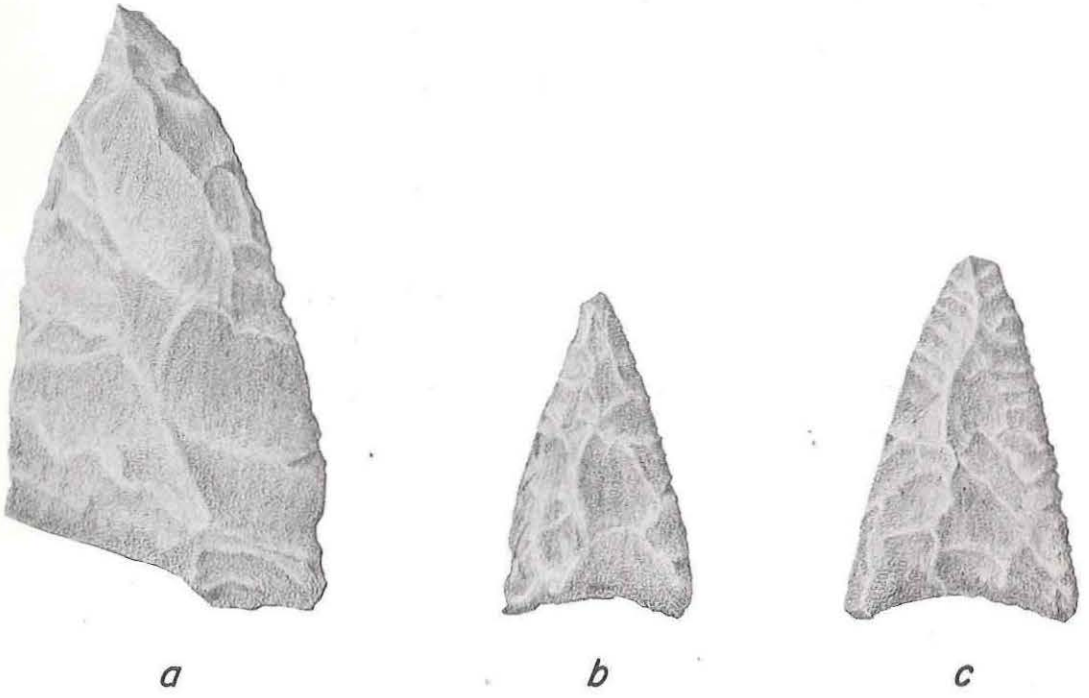
Longitudinal Cross Section: Lenticular

Medial Cross Section: Lenticular

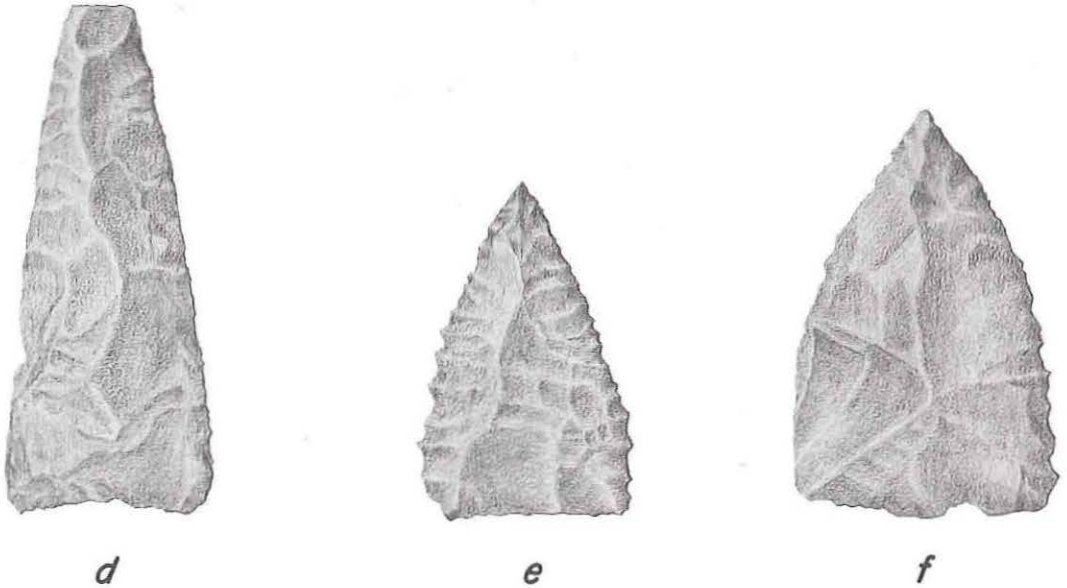
Figure 18. Triangular Projectile Points and Thinned Blades

a. Form 13, Untyped
b. Form 14, *Matamoros/Tortugas*
c. Form 15, *Tortugas*
d. Form 16, possible *Kinney*
e. Form 17, Untyped
f. Form 18, Untyped

Figure 18



a b c



d e f

BB	BS	S	T	ML	MBW	BW	HL	NW	BD
*	*	*	0.5	5.1	3.1	3.1	*	*	+0.3
*	*	**	0.6	4.9	3.2	3.2	*	*	+0.3
*	*	*	0.6	4.8	3.0	3.0	*	*	+0.3
*	*	*	0.7	5.5	2.9	2.9	*	*	+0.2
*	*	*	0.6	4.3	2.8	2.8	*	*	+0.2
*	*	*	0.5	3.3	2.8	2.8	*	*	+0.3

The last specimen listed above has been reworked.

Form 16 (1 nearly complete specimen, 8 basal fragments; Fig. 18*d*)

Type Designation: Possible *Kinney*

Lithic Technology: Bifacially worked; pressure flaking along both edges and bases.

Description: Large thin triangular thinned blades

Base: Concave

Edges: Slightly differential edge-beveling (1)

Beveling: None

Serration: None

Length to Width Ratio: 2.6 to 1 (1 specimen)

Width to Thickness Ratio: 5.0-8.0 to 1

Loogitudinal Cross Section: Lenticular

Medial Cross Section: Lenticular

References: *Kinney* (MacNeish 1958: 72, #25)

BB	BS	S	T	ML	MBW	BW	HL	NW	BD
*	*	*	0.6	7.7	2.9	2.9	*	*	+0.2
*	*	*	0.6	nd	4.7	4.7	*	*	+0.3
*	*	*	0.5	nd	4.1	4.1	*	*	+0.2
*	*	*	0.6	nd	4.6	4.6	*	*	+0.5
*	*	*	0.5	nd	3.4	3.4	*	*	+0.2
**	*	*	0.7	nd	3.5	3.5	*	*	+0.2
*	*	*	0.6	nd	4.0	4.0	*	*	+0.3
*	*	*	0.6	nd	3.2	3.2	*	*	+0.2

The third specimen listed above has been reworked.

Form 17 (4 specimens; Fig. 18*e*)

Type Designation: Untyped

Lithic Technology: Bifacially worked by percussion; pressure retouch along edges only.

Description: Triangular dart points

Base: Thinned; slightly concave

Edges: Recurved

Beveling: Slight differential edge-beveling (3)

Serration: 2 specimens

Length to Width Ratio: 1.5-1.7 to 1

Width to Thickness Ratio: 3.4-5.0 to 1

Longitudinal Cross Section: Thickest midblade to tip

Medial Cross Section: Lenticular

BB	BS	S	T	ML	MBW	BW	HL	NW	BD
**	*	*	0.7	4.6	3.1	3.1	*	*	+0.1
*	*	**	0.7	4.4	2.7	2.7	*	*	+0.1
**	*	**	0.7	4.1	2.4	2.4	*	*	+0.1
**	**	*	0.6	4.0	3.0	3.0	*	*	+0.1

Form 18 (3 specimens; Fig. 18*f*)

Type Designation: Untyped

Lithic Technology: Bifacially worked by percussion; 2 specimens are on flakes; pressure retouch along edges only on 2 specimens and along edges and base on one specimen.

Description: Thin triangular dart points or thinned bifaces

Base: Slightly convex to slightly concave

Edges: Strongly convex to recurved

Beveling: None

Serration: None

Length to Width Ratio: 1.4-1.7 to 1

Width to Thickness Ratio: 5.0-6.0 to 1
Longitudinal Cross Section: Lenticular
Medial Cross Section: Generally lenticular

BB	BS	S	T	ML	MBW	BW	HL	NW	BD
*	*	*	0.6	5.5	3.5	3.5	*	*	-0.1
*	*	*	0.6	5.2	3.1	3.1	*	*	-0.2
*	*	*	0.6	4.9	3.5	3.5	*	*	+0.1

Form 19 (1 specimen; Fig. 19*a*)

Type Designation: Untyped
Lithic Technology: Bifacially worked by percussion; pressure retouch along edges and base.
Description: Thin wide triangular thinned biface
Base: Slightly concave
Edges: Slightly convex
Beveling: None
Serration: None
Length to Width Ratio: 1.3 to 1
Width to Thickness Ratio: 7.2 to 1
Longitudinal Cross Section: Lenticular
Medial Cross Section: Lenticular

BB	BS	S	T	ML	MBW	BW	HL	NW	BD
*	*	*	0.6	5.7	4.3	4.3	*	*	+0.2

Form 20 (4 specimens; Fig. 19*b*)

Type Designation: Untyped
Lithic Technology: Bifacially worked by percussion; retouch generally along edges only.
Description: Long slender triangular thinned blades
Base: Thinned; slightly convex to slightly concave

Edges: Basal one-third of blade is convex; distal two-thirds is straight with a distinct angle between

Beveling: Steep, true and differential edge-beveling

Serration: None

Length to Width Ratio: -

Width to Thickness Ratio: 2.6-3.1 to 1

Longitudinal Cross Section: Blade is beveled; base is lenticular

Medial Cross Section: Generally lenticular

BB	BS	S	T	ML	MBW	BW	HL	NW	BD
**	**	*	1.1	nd	3.2	3.2	*	*	+0.1
**	*	*	1.1	nd	2.9	2.9	*	*	+0.1
**	*	*	0.8	nd	2.7	2.7	*	*	-0.2
**	*	*	0.8	nd	2.5	2.5	*	*	+0.1

Form 21 (1 specimen; Fig. 19*c*)

Type Designation: Possible *Pandora*

Lithic Technology: Bifacially worked by percussion; retouch along edges and base.

Description: Triangular dart point or thinned blade

Base: Slightly concave

Edges: Slightly convex

Beveling: None

Serration: None

Length to Width Ratio: 2.3 to 1

Width to Thickness Ratio: 2.7 to 1

Longitudinal Cross Section: Thickest at midblade

Medial Cross Section: Planoconvex

BB	BS	S	T	ML	MBW	BW	HL	NW	BD
*	*	*	0.9	5.8	2.5	2.5	*	*	+0.1

Figure 19. Triangular Projectile Points and Thinned Blades and Marginally Bifacially and Unifacially Worked Projectile Points

a. Form 19, Untyped
b. Form 20, Untyped
c. Form 21, possible *Pandora*
d. Form 22, possible *Kinney*
e. Form 23, Untyped
f. Form 1, *Young*
g. Form 2, Untyped
h. Form 3, Untyped

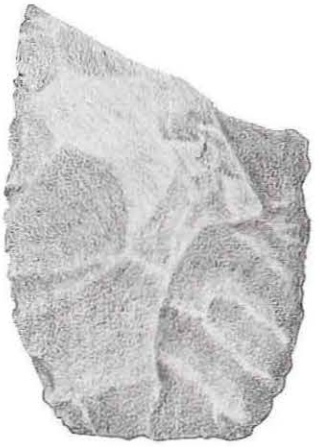
Figure 19

a

b

c

d



e

f

g

h

Form 22 (1 specimen; Fig. 19*d*)

Type Designation: Possible *Kinney*

Lithic Technology: Bifacially worked by percussion; retouch along edges and base.

Description: Long slender triangular thinned blade

Base: Slightly concave

Edges: Convex with slight angle near base

Beveling: None

Serration: None

Length to Width Ratio: -

Width to Thickness Ratio: 3 to 1

Longitudinal Cross Section: Lenticular

Medial Cross Section: Lenticular

BB	BS	S	T	ML	MBW	BW	HL	NW	BD
*	*	*	0.7	nd	2.2	1.5	*	*	+0.1

Form 23 (5 specimens; Fig. 19*e*)

Type Designation: Untyped

Lithic Technology: Bifacially worked by percussion; generally retouched along edges only.

Description: Large triangular thinned blades

Base: Generally slightly convex

Edges: Strongly convex; single curve

Beveling: None

Serration: None

Length to Width Ratio: -

Width to Thickness Ratio: 3.2-4.8 to 1

Longitudinal Cross Section: Lenticular

Medial Cross Section: Lenticular

BB	BS	S	T	ML	MBW	BW	HL	NW	BD
*	*	*	1.0	nd	6.2	4.8	*	*	+0.1
*	*	*	1.0	nd	5.2	4.0	*	*	-0.2
*	*	*	1.0	nd	4.5	3.2	*	*	-0.4
*	*	*	0.8	nd	3.9	2.8	*	*	-0.2
*	*	*	0.9	nd	4.1	2.6	*	*	-0.1

Marginally Bifacially and Unifacially Worked Projectile Points

Form 1 (3 specimens; Fig. 19*f*)

Type Designation: *Young*

Lithic Technology: These specimens are on flakes; smaller triangular specimen is unifacial except for basal thinning; larger triangular specimen shows retouch along both edges of tip and base; leaf-shaped bifacial has retouch along edges and base.

Description: Irregular triangular to leaf-shaped worked flakes

Base: Slightly concave to semicircular

Edges: Slightly convex

Beveling: None

Serration: None

Length to Width Ratio: 1.5-2.3 to 1

Width to Thickness Ratio: 3.7-5.6 to 1

Longitudinal Cross Section: Planoconvex to lenticular

Medial Cross Section: Planoconvex to lenticular

BB	BS	S	T	ML	MBW	BW	HL	NW	BD
*	*	*	0.5	4.7	2.8	2.8	*	*	-1.6
*	*	*	0.4	2.5	1.7	1.7	*	*	+0.1
*	*	*	0.4	3.4	1.5	1.5	*	*	-0.6

Form 2 (1 specimen; Fig. 19*g*, *h*)

Type Designation: Untyped

Lithic Technology: On a flake; limited retouch along edges of dorsal surface and tip and base of ventral surface.

Description: Triangular worked flake

Base: Straight; thinned

Edges: Straight to slightly convex

Beveling: None

Serration: None

Length to Width Ratio: 1.5 to 1

Width to Thickness Ratio: 5 to 1

Longitudinal Cross Section: Planoconvex

Medial Cross Section: Planoconvex

BB	BS	S	T	ML	MBW	BW	HL	NW	BD
*	*	*	0.5	4.0	2.6	2.6	*	*	-0.1

Stemmed Projectile Points (17 forms)

Form 1 (3 [1 fragmentary] specimens; Fig. 20*a*)

Type Designation: *Perdiz*

Lithic Technology: Bifacially worked; 3 specimens are on flakes; pressure flaking along both edges and bases.

Description: Small triangular-blade arrow points with long contracting stems. Only two of the six shoulders are well-barbed; bases are pointed. Edges are generally straight.

BB	BS	S	T	ML	MBW	BW	HL	NW	BD
*	*	*	0.5	3.8	1.7	0.2	1.7	0.8	-0.1
*	*	*	0.4	3.6	1.4	0.1	1.2	0.8	-0.1

Form 2 (1 specimen; Fig. 20*b*)

Type Designation: *Alba*-like

Lithic Technology: Bifacially worked; pressure retouch along edges and base.

Description: Triangular arrow point with corner-notching and a slightly contracting stem. Blade edges are concave to recurved; shoulders are prominent and well-barbed. Base is slightly convex.

BB	BS	S	T	ML	MBW	BW	HL	NW	BD
*	*	*	0.3	2.8	2.6	0.6	0.7	0.8	-0.1

Form 3 (2 fragmentary specimens; Fig. 20*c*)

Type Designation: Untyped

Lithic Technology: Bifacially worked; pressure retouch along edges and bases.

Description: Small triangular arrow points with contracting but incomplete stems. Blade edges are concave with a distinct angle just proximal of the barbs. Shoulders are prominent with barbs at approximately right angles to the blade. One specimen exhibits true blade-beveling.

BB	BS	S	T	ML	MBW	BW	HL	NW	BD
*	*	*	0.4	nd	2.0	nd	nd	0.9	nd

Form 4 (1 specimen; Fig. 20*d*)

Type Designation: Resembles *Scallorn edwards*

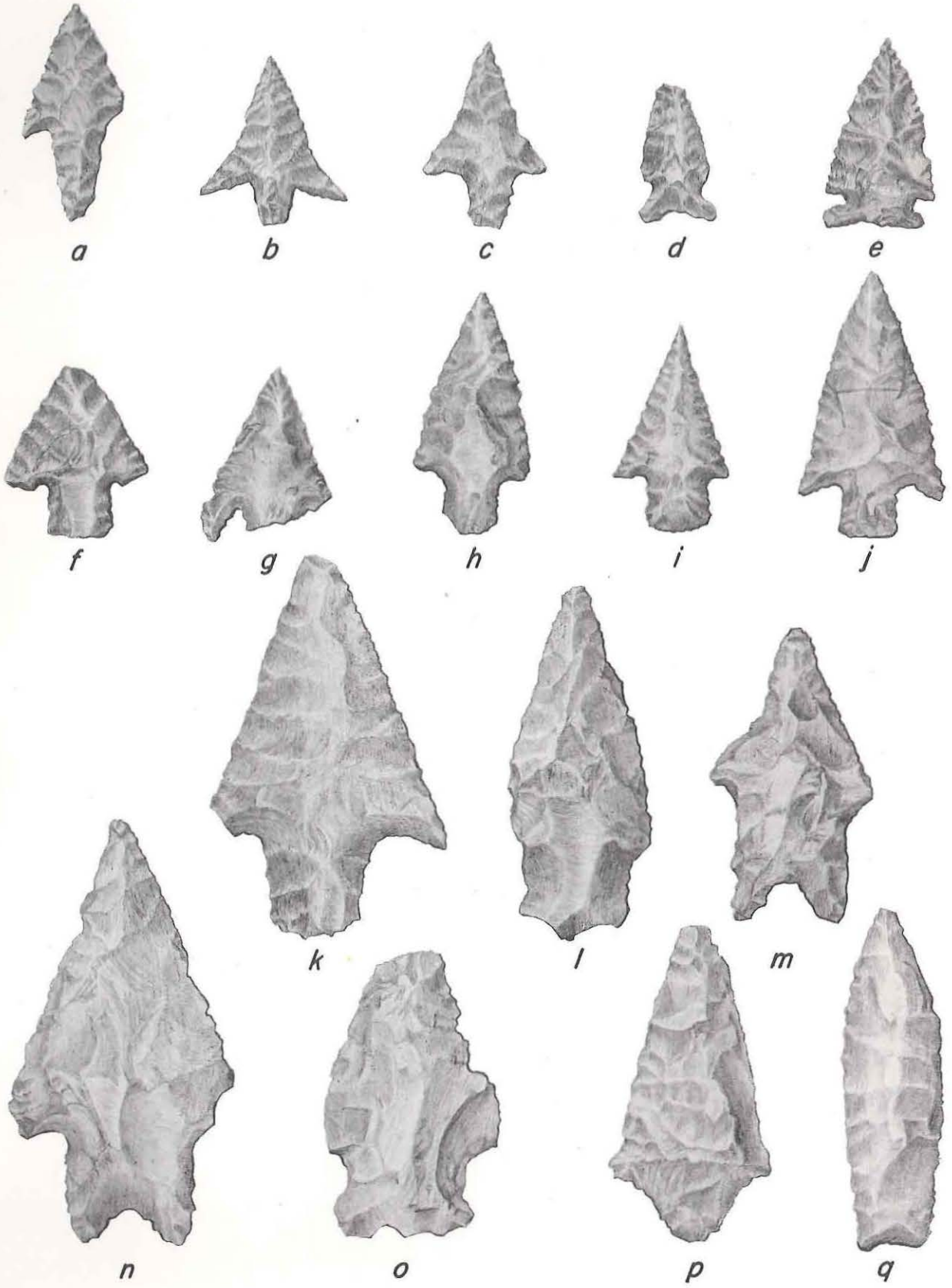
Lithic Technology: Bifacially worked; pressure retouch along edges and base.

Description: Side-notched triangular arrow point. Blade edges are straight; shoulders are weak and unbarbed. Base is convex.

Figure 20. Stemmed Projectile Points

a. Form 1, *Perdiz*
b. Form 2, *Alba*-like
c. Form 3, Untyped
d. Form 4, resembles *Scallorn edwards*
e. Form 5, Untyped
f. Form 6, *Shumla*
g. Form 7, possible *Shumla*
h. Form 8, *Shumla*-like
i. Form 9, *Shumla*-like
j. Form 10, Untyped
k. Form 11, *Langtry*
l. Form 12, *Nolan*
m. Form 13, *Gower*
n. Form 14, *Pedernales*
o. Form 15, Untyped
p. Form 16, similar to *Almagre* and/or *Gary*
q. Form 17, *Buda/Pandale*-like

Figure 20



BB	BS	S	T	ML	MBW	BW	HL	NW	BD
*	*	*	0.4	2.8	1.3	1.1	0.6	0.9	+0.2

Form 5 (4 specimens; Fig. 20*e*)

Type Designation: Untyped

Lithic Technology: Bifacially worked; pressure retouch along edges and bases.

Description: Triangular side-notched arrow points. Blade edges are straight to slightly convex. Shoulders are generally prominent but not barbed; bases are slightly concave.

BB	BS	S	T	ML	MBW	BW	HL	NW	BD
*	*	*	0.4	3.1	1.8	1.7	0.6	1.1	+0.1
*	*	*	0.6	2.9	1.6	1.2	0.9	0.7	+0.2
*	*	*	0.4	2.2	1.3	1.3	0.5	0.9	+0.1
*	*	*	0.3	2.2	1.3	1.3	0.7	0.7	+0.1

Form 6 (2 specimens; Fig. 20*f*)

Type Designation: *Shumla*

Lithic Technology: Bifacially worked by percussion; pressure retouch along edges and bases.

Description: Small triangular dart points with expanding stems and corner-notching. Blade edges are straight to slightly convex. Both specimens are fragmentary but apparently well-barbed. Bases are slightly convex.

References: *Shumla* (Word and Douglas 1970: 32, 34)
Shumla and *Devils Series Misc 1* (Ross 1965: 41-44)
Shumla (Dibble 1967: 40-41)
Shumla (Alexander 1970: 24-26)

BB	BS	S	T	ML	MBW	BW	HL	NW	BD
*	*	*	0.6	3.4	2.6	1.1	1.1	1.0	-0.3
*	*	*	0.4	3.2	2.5	1.2	1.0	0.9	-0.2

Form 7 (2 [1 fragmentary] specimens; Fig. 20*g*)

Type Designation: Possible *Shumla*

Lithic Technology: Bifacially worked by percussion; pressure retouch along edges and base.

Description: Small triangular dart points with corner-notching. Blade edges are straight to slightly concave; shoulders are well barbed. Bases are fragmentary.

BB	BS	S	T	ML	MBW	BW	HL	NW	BD
*	*	*	0.4	2.9	2.3	nd	0.6	0.8	nd

Form 8 (2 specimens; Fig. 20*h*)

Type Designation: *Shumla*-like

Lithic Technology: Bifacially worked by percussion (1); one surface bifacially worked by percussion, one surface marginal pressure retouch only (1); both specimens are on flakes. Pressure retouch along edges and bases.

Description: Small triangular dart points with slightly contracting stems and corner-notching. Blade edges are slightly convex; bases are rounded. Shoulders are prominent but not well-barbed.

BB	BS	S	T	ML	MBW	BW	HL	NW	BD
*	*	*	0.6	4.5	2.4	0.9	1.3	1.3	-0.5
*	*	*	0.3	3.4	2.2	0.7	0.9	0.8	-0.3

Form 9 (2 specimens; Fig. 20*i*)

Type Designation: *Shumla*-like

Lithic Technology: Bifacially worked by percussion; pressure retouch along edges and bases.

Description: Small triangular dart points, corner-notched, with slightly expanding stems. Blade edges are

slightly convex to slightly concave. Shoulders are prominent but not well-barbed. Bases are slightly convex.

BB	BS	S	T	ML	MBW	BW	HL	NW	BD
*	*	*	0.65	4.0	1.8	1.0	1.1	0.8	-0.3
*	*	**	0.5	3.4	1.9	0.9	0.9	0.9	-0.1

Form 10 (1 specimen; Fig. 20*j*)

Type Designation: Untyped

Lithic Technology: Bifacially worked by percussion; pressure retouch along edges and base.

Description: A corner-notched triangular dart point with slightly expanding stem. Blade edges are recurved by flaking midblade just proximal of shoulders. Shoulders are prominent and barbed; base is slightly convex.

BB	BS	S	T	ML	MBW	BW	HL	NW	BD
*	*	*	0.6	4.5	2.5	0.9	0.9	0.7	-0.1

Form 11 (5 specimens; Fig. 20*k*)

Type Designation: *Langtry*

Lithic Technology: Bifacially worked; pressure flaking along both edges and bases.

Description: Very thin triangular dart points with contracting stems. Edges are straight to slightly convex. Shoulders are prominent and usually well-barbed. Stems are contracting with bases slightly convex to slightly concave.

References: *Langtry III* (Word and Douglas 1970: 28-29)
Langtry I and *II* (Ross 1965: 34-36)
Langtry I (Alexander 1970: 22-23)
Langtry (Specimens A and B) (Dibble 1967: 51)

BB	BS	S	T	ML	MBW	BW	HL	NW	BD
*	*	*	0.4	7.1	4.4	1.5	1.8	2.0	-0.4
*	*	*	0.4	6.7	3.8	0.9	1.2	1.4	+0.1
*	*	*	0.5	5.8	2.8	0.9	1.6	1.4	-0.2
*	*	*	0.6	5.5	3.8	1.2	1.8	2.0	+0.1
*	*	*	0.6	5.1	3.2	0.9	1.6	1.7	0

Form 12 (2 specimens; Fig. 20*l*)

Type Designation: *Nolan*

Lithic Technology: Bifacially worked; one specimen is on a flake; pressure flaking on both edges and bases.

Description: Triangular dart points with slightly convex edges and expanding stems. Shoulders are strong and barbless. Bases are slightly convex (specimen with convexity of 0.5 cm may be incomplete). Stems are steeply beveled on right-hand edges. On one specimen, left-hand blade edges show differential edge-beveling.

BB	BS	S	T	ML	MBW	BW	HL	NW	BD
*	**	*	0.8	6.3	2.8	1.7	2.1	2.1	-0.1
*	**	*	0.9	6.2	2.6	1.9	1.6	1.9	-0.5

Form 13 (1 specimen; Fig. 20*m*)

Type Designation: *Gower*

Lithic Technology: Bifacially worked; pressure flaking along both edges and base.

Description: A triangular dart point with a rectangular stem. Blade edges are slightly to deeply concave. Shoulders are prominent and unbarbed; base is deeply concave.

References: *Gower* (Shafer 1963: 57-81)
Group 1 and 2 dart points (Crawford 1965: 71-97)
Unnamed (Prewitt 1966: 206-224)

BB	BS	S	T	ML	MBW	BW	HL	NW	BD
*	*	*	0.8	5.0	2.7	1.9	2.0	1.8	+0.7

Form 14 (1 specimen; Fig. 20*n*)

Type Designation: *Pedernales*

Lithic Technology: Bifacially worked; pressure flaking along both edges and base.

Description: A large thin triangular dart point with corner-notching and a rectangular stem. Blade edges are straight to slightly concave; shoulders are prominent and barbed. Base is strongly concave.

BB	BS	S	T	ML	MBW	BW	HL	NW	BD
*	*	*	0.7	7.6	4.3	2.0	2.0	2.4	+0.6

Form 15 (1 specimen; Fig. 20*o*)

Type Designation: Untyped

Lithic Technology: Unfinished or manufacturing reject; bifacially worked by percussion.

Description: A large triangular dart point with expanding stem and corner-notching. Blade edges are slightly convex; shoulders are prominent but not barbed. Base is concave.

BB	BS	S	T	ML	MBW	BW	HL	NW	BD
*	*	*	0.9	5.7	3.2	2.4	1.5	1.9	+0.2

Form 16 (3 specimens; Fig. 20*p*)

Type Designation: Similar to *Almagre* and/or *Gary*

Lithic Technology: Bifacially worked by percussion; pressure retouch along edges and bases.

Description: Triangular bifaces or dart points with contracting rounded bases. Blade edges are straight

to slightly convex. Shoulders are prominent and unbarbed; one specimen (the smallest) is reworked.

References: *Gary* (MacNeish 1958)

BB	BS	S	T	ML	MBW	BW	HL	NW	BD
*	*	*	0.8	6.0	2.8	1.0	1.1	1.7	-0.4
*	*	*	0.8	4.0	2.3	0.7	0.8	1.2	-0.3
*	*	*	0.5	3.7	1.7	0.6	0.7	0.9	-0.3

Form 17 (2 specimens; Fig. 20*q*)

Type Designation: *Buda/Pandale*-like

Lithic Technology: Bifacially worked; pressure retouch along edges and bases.

Description: Long slender dart points with lanceolate outline and slight differential edge-beveling on blade edges. Blade edges are straight to slightly convex and shoulderless. Stem differentiations are slight to nonexistent; bases are slightly concave to slightly convex.

References: *Buda* (Alexander 1970: 22-23)
Buda (Weir 1979: 24-27)

BB	BS	S	T	ML	MBW	BW	HL	NW	BD
**	*	*	0.9	6.6	1.6	1.6	0.8	1.6	-0.9
**	*	*	0.7	5.7	1.8	1.8	*	*	+0.2

PECKED AND ABRADED COBBLES

Pecked Cobbles (1 specimen)

This large cobble is elongate with an oval cross section. It has been pecked on most of the cobble surface except the ends but shows no evidence of use-smoothing. Its function is unknown. The cobble is 35.0 x 8.7 x 6.0 centimeters.

Pecked Cobbles with Use-Smoothing (2 specimens)

Two rounded cobbles show evidence of pecking and use-smoothing on one surface and are interpreted as hand-held manos.

Length	Width	Thickness
9.5	8.2	5.0
10.5	8.1	4.5

Hammerstones (2 specimens)

Two cobbles, one elongate with an oval cross section and one subtriangular with a lenticular cross section have pecking and/or use on one or both ends. Use is not extensive.

Length	Width	Thickness
19.0	5.4	4.9
11.0	6.3	2.4

Pitted Stone (1 specimen; Fig. 7*b*)

This rectangular, probably shaped, cobble has pits developed from use at both ends and on one surface. Two of the other surfaces exhibit use-smoothing, probably as a result of use as a hand-held mano.

Length	Width	Thickness
8.7	5.3	4.2

CERAMICS

Two ceramic sherds are included within the Shelton Collection which, due to the small sample size, the confusion resulting from the Spanish occupation and the lack of published comparative data, are untyped.

One sherd is 1.4 cm in thickness with a reddish-brown smoothed exterior, a greyish core and a blackish smoothed interior. The other sherd is 1.0 cm in thickness with a reddish-tan smoothed and polished exterior, a tan core and a tan unsmoothed interior. Both sherds have grog tempering.

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