

BULLETIN

OF THE

**Texas Archeological and
Paleontological Society**

**VOLUME 23
1952**

TEXAS
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SOCIETY

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Foreword

The society was organized and chartered in pursuit of a literary and scientific undertaking; for the study of the history, pre-history and the major artifacts of man and the fossils representing the past floras and faunas of Texas; for the encouragement of the proper collection and preservation of such artifacts and fossils in museums and their study and classification and the publication of the results of the researches incident thereto.

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TRINITY ASPECT OF THE ARCHAIC HORIZON: THE CARROLLTON AND ELAM FOCI

WILSON W. CROOK, JR., AND R. K. HARRIS

Two manifestations of the archaic type culture, so widespread elsewhere in Texas, have recently been established in the Upper Trinity River region of Northeast Texas. This extends the recognized area of this great complex completely across the state, the Big Bend and Edwards Plateau aspects having been previously described from West Texas and Central Texas, respectively. (See Fig. 1).

As proposed, the Carrollton focus and the Elam focus will constitute the basis for the new Trinity aspect of the Archaic Horizon. The two individual foci are composed of a combination of published descriptions, together with a large amount of unpublished material long in the hands of local investigators. Their assemblages of artifact types and traits will form the subject of this paper, along with certain conclusions, comparisons with other archaic units, and indicated affinities with adjacent areas whose cultures have not yet been fully defined.

Description of the Region

The Trinity aspect of the archaic centers in the Dallas County region where the three forks of the Trinity flow together to form the main stream. A large number of archaeological sites in this area provide the type stations of both the Carrollton and Elam foci; to these are added others extending up the Elm Fork of the Trinity to the vicinity of Gainesville, Cooke County, and downstream on the Trinity at least to Trinidad, Henderson County. There are further indications that a close relationship may exist between the Carrollton and the multitudinous Waco sinker sites enumerated by Watt¹ extending the general region to include the mid-reaches of the Trinity, Chambers Creek in

1. Watt, Frank H., The Waco sinker, *Central Texas Archaeologist*, IV, 21-70, 1938.

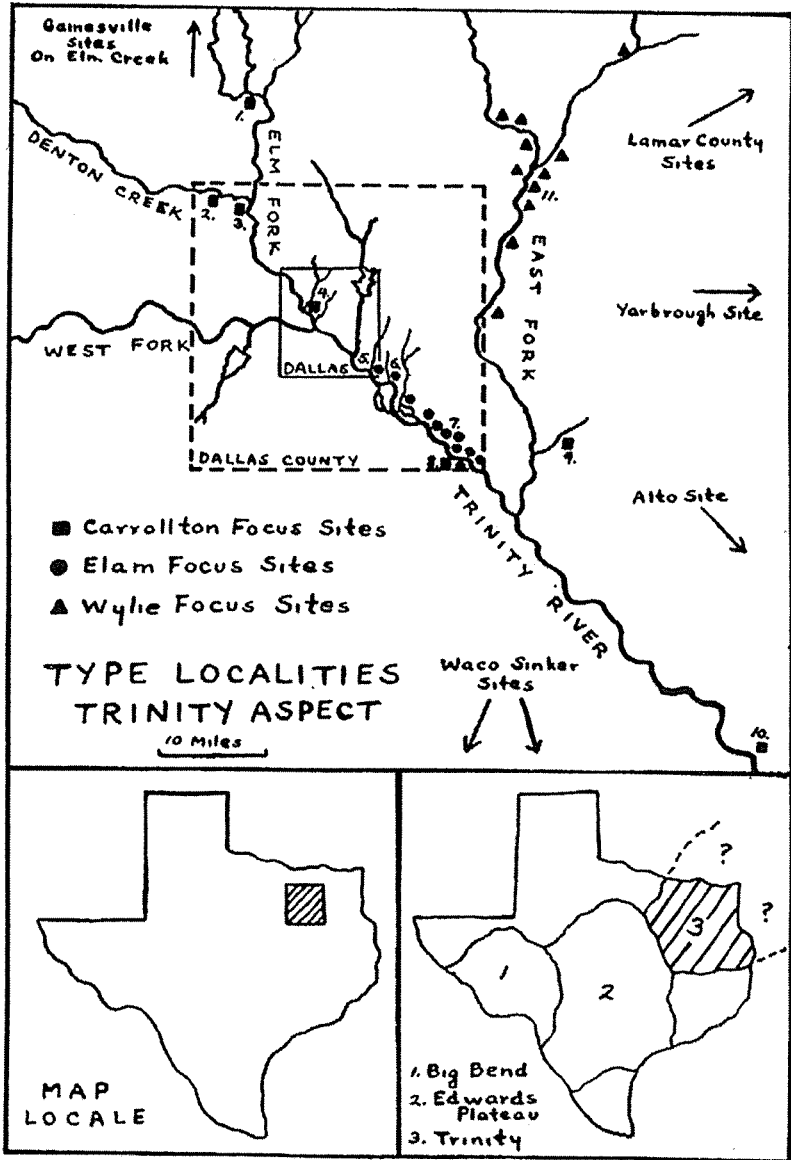


FIGURE 1

Location of Trinity Aspect.

Navarro County, Aquilla Creek in Hill and McLennan Counties, and west to the Brazos near Waco. Likewise there are distant, less-pronounced similarities between the Carrollton and the Yarbrough² site in Van Zandt County, and materials from near Lufkin in Angelina County; there are still additional resemblances to certain features of the archaic cultures of Northwest Louisiana and Eastern Oklahoma as well. The Elam focus shows a number of similarities to archaic materials known from Lamar County and otherwise throughout East Texas. The close ties with the Edwards Plateau foci to the west and southwest will be self-evident in the ensuing sections. Thus the Trinity aspect occupies Northeast Texas and possibly extends into Louisiana and Oklahoma, as will be seen in Fig. 1.

A pronounced three-terrace system is evident along the Trinity near Dallas, and along the lower reaches of its major tributary, the Elm Fork, northwestward. The typical vertical section of the low or first terrace (T-1), and the floodplain (T-0), is shown in Fig. 2; the first terrace is called the Union Terminal at Dallas³ and the Carrollton on the Elm Fork in northwest Dallas County⁴, the two having been proven continuous and identical. This Union Terminal-Carrollton terrace is of complex origin, the two lowermost formations (A and B) called the Hill and Shuler, having been definitely identified as representing the Wisconsin stage of the Pleistocene; apparently after considerable erosion and sloping along the stream valleys during the Altithermal period, the two upper formations (C and D), named the Albritton and Pattillo, were deposited on the eroded flanks of the old terrace during early Medithermal times of the Recent. A very late period of deposition laid down a fifth formation (E), the Carter, in the present floodplain below.⁵

2. Newell, H. Perry and A. D. Krieger. The George C. Davis site, Cherokee County, Texas, *American Antiquity Memoir* No. 5, 1949.

3. Shuler, E. W. Terraces of the Trinity River, Dallas County, Texas, *Field and Laboratory*, III, 44-53, 1935.

4. Pattillo, L. Gray. River terraces in the Carrollton area, Dallas County, Texas, *Field and Laboratory*, VIII, 27-32, 1940.

5. Crook, Wilson W., Jr. The floodplain and first terrace alluvial chronology of the Trinity River-Elm Fork system, Dallas County, Texas, ms. for *Field and Laboratory*, 1952.

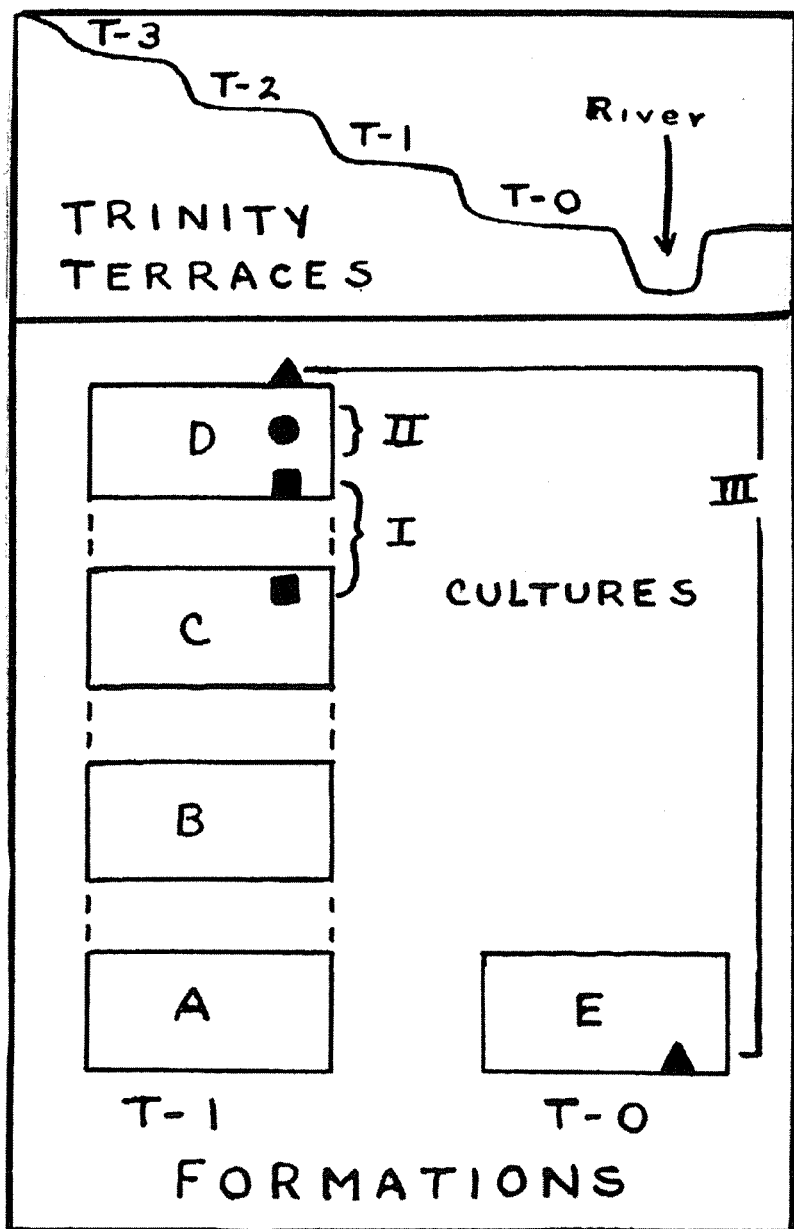


FIGURE 2

The elevation of the Union Terminal-Carrollton terrace varies from 10 feet above the floodplain along the Elm Fork to as much as 30 feet above the bottoms on the main Trinity; both the Elm Fork and Trinity now run in intrenched channels cut some 20 feet below the floodplain.

Without exception, the known sites of the Carrollton and Elam foci are contained within the top two formations of the Union Terminal-Carrollton terrace, usually in a buried condition. Almost without exception, these sites also occur in the vicinity of a small tributary stream where it cuts through the terrace deposits to reach the floodplain below; many of these secondary streams are definitely intermittent today, some being totally dry washes, poorly situated for camp sites at the present. Therefore, the age of the cultures and the environment in which they existed are inextricably bound up with the geology and the climatic cycles responsible for the Albritton and Pattillo formations.

The dual depositional sequence exemplified by these two formations occupying an intermediate position between the terminal Pleistocene and the latest deposition has been roughly equated with the similar sequences observed in other sections. Thus the Albritton and Pattillo are thought to correspond with the lower and upper components of the Calamity formation in the Big Bend⁶, the lower and upper Elm Creek silts (or Nugent silts 1-4) at Abilene⁷, and the lower and upper Cienega clays at Whitewater Draw, Arizona.⁸ These two formations are interpreted as being indicative of climatic periods of greater moisture than that of very late times, yet demonstrably younger and less than those of the Pleistocene, yielding an assignment to the period of the "Little Pluvial" or the Medithermal.

An estimate of "about 3,000 years ago" for the "Little Pluvial" is common amongst geologists, and radiocarbon

6. Kelley, J. Charles, T. N. Campbell and D. J. Lehmer. The association of archaeological materials with geological deposits in the Big Bend region of Texas, *West Texas Historical and Scientific Society Publication*, X, 1940.

7. Ray, Cyrus N.; Kirk Bryan; M. M. Leighton, et al. Various publications.

8. Antevs, Ernst. Climate and early man in North America, in *Early Man* by G. G. MacCurdy, 1937.

datings of about 4,000 years ago for materials in the Lower Cienega, and about 2,500 years ago for others in the Upper at Whitewater Draw, generally prove out this assumption. On this basis and certain other comparisons, the Albritton formation has been tentatively dated at 4,000-6,000 years ago, and the Pattillo at 1,750-3,500 years ago. As Carrollton focus materials have been recovered *in situ* in the upper part of the Albritton, on the Albritton-Pattillo contact line, and in the basal six inches of the Pattillo above, the period that this focus predominated is considered to extend from the last of Albritton times, across the intervening hiatus, and into the first stages of Pattillo depositional times. This is estimated as being roughly 4,000-3,000 years ago. Elam focus materials occur *in situ* in the middle and upper portions of the overlying Pattillo formation, hence their span is considered to be from 2,500 to 1,500 years ago.

Reports on the age of a Carrollton focus charcoal sample from the base of the Pattillo at the Wheeler site have not yet been received, but should eventually greatly clarify the time estimates on the duration of the cultures.

The Carrollton Focus

Two major sites, the Wheeler near the confluence of Denton Creek and the Elm Fork (See Station 3, Fig. 1) and the Lake Dallas just below the old Lake Dallas dam (Station 1, Fig. 1), form the type localities for the Carrollton focus. Both are on the Elm Fork, both lie *in situ* at the base of the Pattillo formation in the Union Terminal-Carrollton terrace, and the two are but 10 miles apart, directly north and south of each other. Artifact assemblages from the two sites are practically indistinguishable from each other, and with one possible exception, exactly duplicate each other in the various divisions.

FIGURE 2

Top: Ideal section of Trinity River terraces. T-0, Floodplain; T-1, Union Terminal-Carrollton terrace; T-2, Travis School-Farmer's Branch terrace; T-3, Love Field-Bethel terrace.

Bottom: Ideal sections of T-0 and T-1 formations and included archaeological remains. A, Hill formation; B, Shuler formation; C, Albritton formation; D, Pattillo formation; E, Carter formation; I, Carrollton focus; II, Elam focus; III, Wylie focus.

The Wheeler site, as previously described⁹, is exposed in the walls of a multiple gravel pit operation cut into the Union Terminal-Carrollton terrace just south of Denton Creek as it enters the Elm Fork floodplain. The site lies almost precisely at the edge of the terrace where it drops off 10 feet to the floodplain below; Denton Creek and the Elm Fork, both some hundreds of yards away, are themselves incised below the floodplain some 20 feet, making the total elevation of the terrace surface at the site 30 feet above present-day stream level. At this point the Pattillo formation is five feet thick, as usual composed of a brown, fluvial sand; the cultural materials and occupation zone occur definitely *in situ* from the underlying Albritton-Pattillo contact line upwards for about six to eight inches, leaving a sterile overburden of some four and a half feet above. No human evidences whatsoever occur upon the terrace surface.

The Lake Dallas site is contained in a cut-off segment of the Union Terminal-Carrollton terrace lying between an old abandoned channel and the present channel of the Elm Fork, just below the old Lake Dallas dam. The geologic sequence of formations and their individual lithic composition is almost precisely identical with that described for Wheeler; this has been determined from two gravel pit exposures in the vicinity and from Smithsonian River Basin Surveys test pits and trenching by the authors.¹⁰ The elevation of the terrace at Lake Dallas is very similar to that at Wheeler, although the slope toward the stream channels is more gentle. The former cultivation of the surface Pattillo formation sands for a peanut field has created a "blow-sand" situation in which great quantities of the sand have been stripped away and shifted—as evidenced by the high banks and fresh dunes concentrated along fence lines—and the combined removal and sifting action has exposed great numbers of artifacts formerly buried. This would have pro-

9. Crook. The Wheeler site: a 3500 year-old culture in Dallas County, Texas, *Field and Laboratory*, XX, 2, 43-65, 1952.

10. Harris, R. K. Ms. in preparation.

duced an uncertain interpretation so common to such sites had it not been for the striking identity of the geology and archaeological materials with those found *in situ* and undisturbed at the Wheeler site. As further convincing proof, the Smithsonian test pits encountered flint chips down to the base of the Pattillo sands and even into the upper Albritton clays beneath; test-trenching by the authors produced one large archaic type projectile point *in situ* in the Pattillo sand just two inches above the Albritton-Pattillo contact line, absolutely identical to the situation at Wheeler.

At neither site was there any indication of extinct fauna in either the Pattillo or Albritton formations, as is true without exception everywhere else in the Dallas region. Indeed, animal remains were quite rare in both sites, although charred bone from hearths at the Wheeler location yielded fragments of deer antler and several teeth of *Bison bison*. Also, the Wheeler site produced one fragmentary human skull *in situ* in the cultural zone in the basal six inches of the Pattillo formation. This was completely decalcified but not fossilized. It is of the extremely long-headed, slab-sided, keeled-vaulted human physical type already well-known from the Abilene area, the Texas Coast, Val Verde County on the Rio Grande, and from the California Early Horizon, the Pericu in Lower California, and Punin and Lagoa Santa in South America.¹¹ It is therefore not surprising that the other Texas remains are accompanied by or are located in regions of archaic type cultural materials.

All materials of the Carrollton focus are lithic, no others having seemingly survived, if originally present. Projectile points constitute the vast majority of the artifact assemblage, and thereby need must comprise the majority of index, or distinctive, traits. Next in importance are the scrapers, particularly the "gouges" so definitive of early archaic complexes elsewhere. Pottery is non-existent, grinding

11. MacGowan, Kenneth. What have the bones to say? in *Early Man in the New World*, 1950.

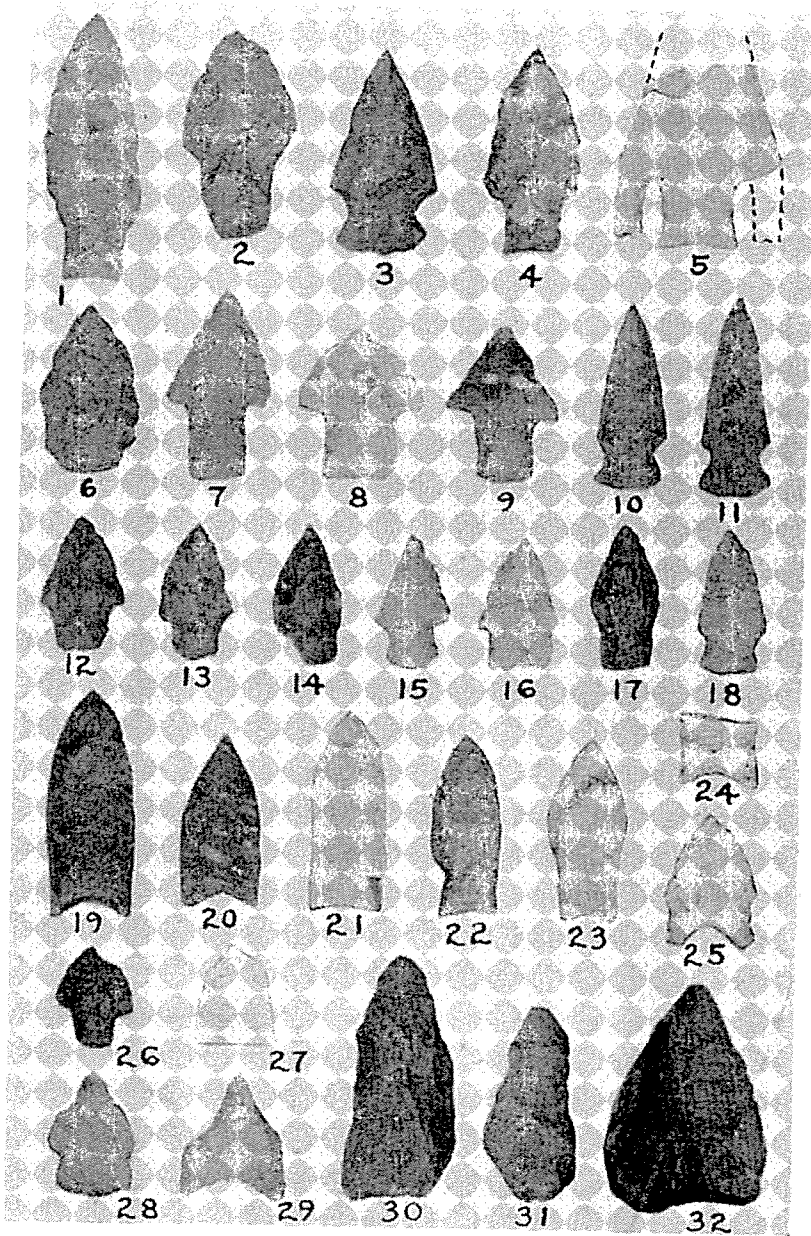


PLATE 1

Carrollton focus. Nos. 2-6, 8-9, 13-14, 16-18, 22-23, 25-27, 30 32 Wheeler Site.
 Nos. 1, 10-12, 15, 19-21, 28-29, 31 Luke Dallas Site. No. 7 Denton Creek Site. No.
 24 Bachman's Dam Site. All specimens $\frac{1}{2}$ size.

stones exceedingly rare, and ground stone work restricted to sinkers, certain worked stones, and the smoothed edges of projectile points. Percussion chipping is the rule, with one exception, and a most striking feature is the heavy predominance of flint—totally absent as a native material in Northeast Texas!—as much as 80% in the projectile point, knife, and borer classifications, while the local quartzite provides the basic material for the majority of the utilitarian implements.

Projectile points, shown in Plate I, are mainly of the archaic types. A large variety, over 50 mm in length, constitutes almost 50% of the total (Nos. 1-4, Plate I); medium-sized and small points comprise an equal number, being 35-50 mm, and under 35 mm in length, respectively. These are all percussion chipped, very thick in cross-section, and with a certain crudeness of manufacture apparent. Some are stemmed with parallel sides and a square base (Nos. 7-9, Plate I); some roughly-shouldered and of a version of the Gary Contracting Stem type (Nos. 12-13, Plate I); a few are leaf-shaped (Nos. 6, 17, Plate I); some possess basal indentions to form the stem (Nos. 10-11, and No. 22 which has been obviously reworked to add one basal indentation, Plate I); others are slightly-shouldered or one-shouldered (Nos. 1, 14, 17, Plate I); and the smaller types most commonly fall within the specifications of the Ellis Stemmed point (Nos. 15-16, Plate I).

A constant minor percentage (about 5%) of the total projectile point assemblages from nearly all Carrollton sites is composed of Plainview-like, unfluted-Folsom, or other "early" types (Nos. 19-25, Plate I). These are virtually indistinguishable from those recovered in pure "early" sites on the High Plains, yet are intermixed and plainly associated with the archaic types at these Carrollton sites. They are marked by their excellent pressure flaking (the one exception mentioned earlier), thinness in section, and consistent grinding of the edges along the lower sides and base; the familiar concave base and leaf-shape further charac-

terize this type—all in obvious contrast with the percussion-chipped, stemmed-and-shouldered, thick archaic forms.

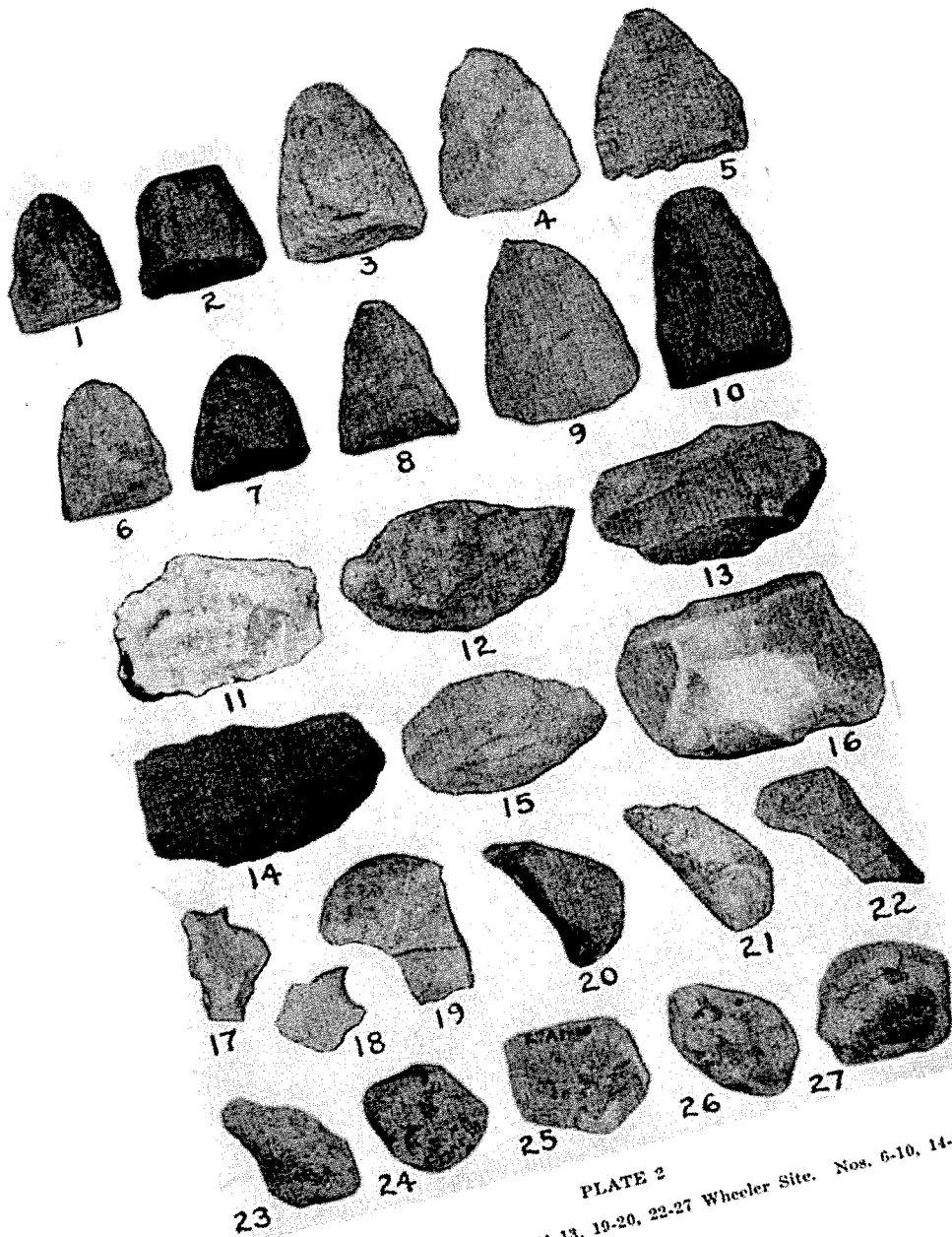
Ground edges are also present on the stems and in the indentions of a number of other forms (Nos. 3, 7, 9, 10, 11, Plate I), a technique thought to be connected with Early Man. This is almost assuredly a “carry-over” trait in the process of disappearance—only 10% of the archaic-type points have this feature in the Carrollton focus—which entirely vanishes in the later complexes. Sanding of the edges for attachment is most common in the forms with basal indentions (Nos. 10-11 and No. 22 as reworked), but also occurs on the parallel-sided stemmed types (Nos. 7-9) and a few others; as mentioned previously, all the Plain-view-like points exhibit this feature. In contrast to the percussion-chipped edges of the archaic points, the smoother edges are most striking.

Drilling and boring tools fashioned from broken projectile points or fragments of broken points are another definite trait. These are often reworked from those seemingly of the “early” variety, although some from broken archaic points are also present. Most commonly the basal fragment was utilized for this purpose, possibly indicating hafting. Some of these are illustrated as Nos. 26 and 28 (reworked archaics) and Nos. 27 and 29 (reworked early types), Plate I.

Two forms of knives are generally present. One is superior in workmanship to the archaic percussion technique of the projectile points, being well-flaked and fashioned, while the other is of the rough blade-like type. Unfortunately, most of the better types are found as fragments, but it is possible to determine that they were usually of a leaf-shaped design and were not of the famous “corner-tang” type.¹² Nos. 30-32, Plate I, are typical.

Of the scrapers, the “gouges” are by far the most common and provide one of the real index traits of the complex.

12. Patterson, J. T. The corner-tang flint artifacts of Texas, *University of Texas Bulletin*, No. 8618, 1936.



Carrollton focus. Nos. 1-5, 11-13, 19-20, 22-27 Wheeler Site. Nos. 6-10, 14-18, 21
 Lake Dallas Site. All specimens $\frac{1}{2}$ size.

Gouges constitute almost 60% of all scrapers at both the Lake Dallas and Wheeler sites (some 84 specimens from the two combined), and are always present in all other Carrollton focus sites. They are very similar to Ray's Clear Fork gouges¹³, especially the type 2 or planer-gouge (although others are present), but appear to be a smaller version. The technique is typically plano-convex, with a roughly-triangular form and a steeply-beveled working edge; it is remarkable that the Carrollton gouges are almost universally made from the same grey quartzite material. Types are shown as Nos. 1-10, Plate II.

Side-scrapers are generally large, roughly-flaked, and most consistently of a reddish quartzite. They present no unique features except size. (See Nos. 11-16, Plate II.) Flake-scrapers and cutting-scraping tools are also included, with one or more sides showing secondary chipping and evidences of use; these tend more commonly to be re-utilized flint flakes. (Examples are Nos. 20-22, Plate II.)

A few intentionally fashioned implements which probably performed the functions of graving, spokeshaving, etc., are present, though quite rare. These are illustrated as Nos. 17-19, Plate II.

Hammerstones and choppers are fairly common, being usually made from quartzite nodules. The hammerstones display battered areas, while the choppers are very roughly made with large, crude, percussion flaking. These are typified by Nos. 1-3, Plate III.

Worked-stone and ground-stone implements consist of several categories. Sinker stones, identical to types depicted as the "Waco Net Sinker" by Watt¹⁴, are made from quartzite cobbles and are present in varying numbers at nearly all sites; 33 come from the Lake Dallas site alone. Some are shown as Nos. 4-5-7-8, Plate III. Several worked cobbles of quartzite, comparable in technique but not in precise form, may represent this classification at Wheeler; this is the one

13. Ray, *The Clear Fork Culture complex*, *Texas Archaeological & Paleontological Society Bulletin*, VIII, 1938.

14. Watt, *Op. cit.*

division in which exactly duplicating artifacts cannot be matched from the two sites, but one Wheeler specimen is of identical material and poorly worked upon the ends almost identical to crude sinker forms recovered from other true sinker sites. Two of these worked stones are Nos. 6, 9, Plate III.

Grinding stones are quite rare, but *are* present. Only one has been found at Wheeler (since previous publication), three from Lake Dallas, out of a combined total of more than 500 artifacts. These are one-hand size, somewhat rectangular with shaped rounded corners, both uniface (Wheeler) and biface (Lake Dallas), and always of sandstone. Two examples are Nos. 10-11, Plate III.

One other prominent "trait" should be included—the unusual fireburnt clay "blobs" prevalent in Carrollton sites. Although very numerous in the cultural debris, their meaning is vague. No evidence has yet been found of wattle-markings or finger-impressions to indicate either a connection with huts or squeezings. Most of them display a burnt area or actually include charcoal, hence they may be remnants of floors or hearth linings, or, simply, the burned area where fires were built upon the formerly-exposed Albritton clay surface. Several are shown as Nos. 23-27, Plate II.

The large broken point depicted as No. 5, Plate I, is *not* a common type nor a trait form; only this single example has been found (Wheeler), but its unique and unmistakable design is of great value in correlation and for this purpose has been illustrated.

Other, smaller, Carrollton sites are shown in Fig. 1 as Station 2 on Denton Creek upstream from Wheeler, Station 4 below Bachman's Dam in Dallas, Station 8 near Seagoville in Southeast Dallas County, Station 9 on Bachelor's Creek in Kaufman County, and Station 10 near Trinidad in Henderson County, downstream on the Trinity—all referable to this focus. Though few in numbers, their artifact assemblages contain practically all of the typical forms de-

scribed and their geologic conditions of occurrence are likewise quite comparable. Of interest in this respect is the Bachman's Dam site which lies *in situ* wholly within the upper 30 inches of the Albritton clays and is thus the earliest example of the complex known so far.

The Elam Focus

One major site, the Wood, and a nearby smaller one, the Milton, provide the type stations for the Elam focus¹⁵ Typologically, and in the geologic sequence of occurrence, this complex is later than the Carrollton and is a direct outgrowth of it, representing the continued development *in situ* of the same basic culture pattern (and by inference, thereby, of the same human physical type) over a long period of time. Although the derivation from the Carrollton is undeniable, the differences are pronounced enough to be recognizable as a separate entity and to deserve designation as a separate focus.

The Wood site is located adjacent to Elam Creek where it cuts through the Union Terminal-Carrollton terrace to reach the Trinity River floodplain southeast of Dallas. (Station 5, Fig. 1) Large gravel pits at the site reveal the common first terrace stratigraphic sequence previously described. The Pattillo sand formation overlies the Albritton clay as usual, but varies in depth from as much as five feet on the lower, eroded slopes nearest the stream valleys, to as little as six inches on the high, unaltered portions. This is construed as the combined result of differential deposition determined by the maximum elevation to which the Pattillo period flooding attained, and the present-day "blow-sand" stripping now going on where cultivation has affected the higher parts of the terrace. Three fairly well separated occupational zones are present at the site, giving a stratified sequence. The lowermost component lies *in situ* at the base of the Pattillo formation, more than four feet deep at one exposure, and appears to be a late vestige of the Carrollton

15. Crook. The Wood and Milton sites: two late archaic occupation sites near Dallas, Ms. for Field and Laboratory, 1953.

focus; the middle component comprises the Elam focus materials and is observed *in situ* in the middle and upper Pattillo at depths ranging from 15 to 30 inches from the surface; a small and apparently early Wylie focus component is found directly upon the surface.

Just a mile southeast is the Milton site, situated adjacent to a small, unnamed, intermittent stream where it cuts through the Union Terminal-Carrollton terrace to reach the Trinity. (Station 6, Fig. 1.) Gravel pits expose an almost identical stratigraphic sequence as at the Wood site, with the Pattillo formation here being two to three feet in depth. The elevation of the terrace is the same as at the Wood site, both lying roughly 20 to 30 feet above the floodplain. Only the Elam focus is present at this locality, occurring *in situ* at an average depth of 15 inches in the Pattillo; this is very similar to the middle component Elam focus situation at Wood. Artifacts are few in total number, but their striking identity with those of the Wood middle component—and here not confused by the presence of any other materials—is confirmation of the stratigraphic separation interpreted for the other site.

In general the Elam focus assemblage follows the characteristics of the Carrollton; definitely non-pottery and archaic in type, entirely lithic, and with a great scarcity of bone fragments. In this last wise, only the modern species of bison, deer, and wild turkey can possibly be suggested as present, and no human remains have been identified. A number of the Carrollton traits seem to have disappeared by Elam times, while a few new ones have been added; certain other Carrollton traits have diminished in percentage of occurrence, while other surviving forms display a definite diminution in size. Very apparent is the increasing popularity of the native local quartzite as a material, now even constituting over 50% of the projectile points whereas in the Carrollton it provided a scant 20%. This is interpreted as a further removal in time from former flint sources and an increasing adaptation to the Dallas County

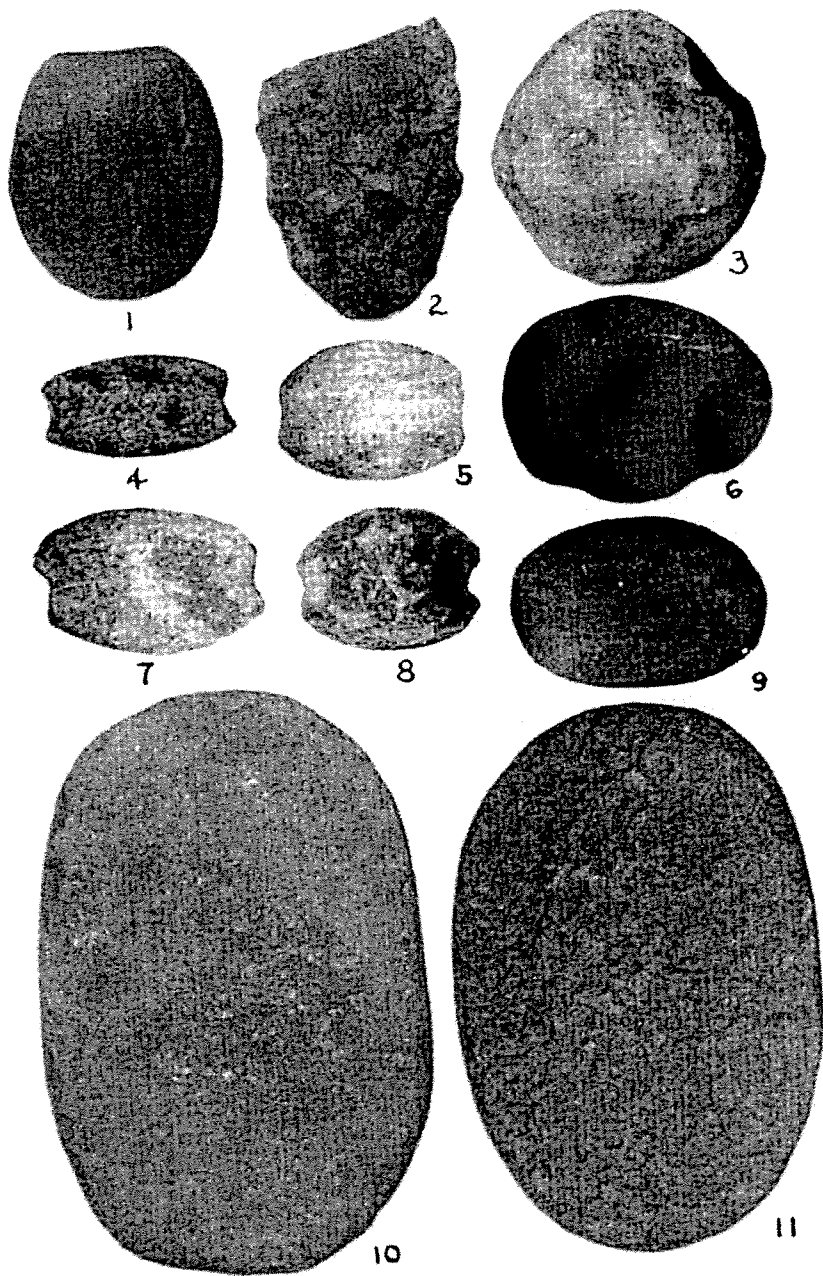


PLATE 3

Carrollton focus. Nos. 1-2, 6, 9, 10 Wheeler Site. Nos. 3-5, 7-6, 11 Lake Dallas Site. All specimens $\frac{1}{2}$ size.

region environment. (It is interesting to note that in the later Wylie focus sites, flint becomes exceedingly rare!)

Again projectile points are dominant, Elam types being shown in Plate IV. Early-type, Plainview-like, etc., points and archaic type points with ground edges have both disappeared. The large archaic types, which constituted almost 50% of the Carrollton forms, are practically gone. In their stead are medium-sized (35 mm to 50 mm) and small (under 35 mm) archaic types, rather evenly divided in numbers, though the medium slightly predominates. Percussion chipping with a relatively thick cross-section is still the rule. The technique of stemming and shouldering-or-barbing is advanced over the Carrollton with more definite features, some even foreshadowing the "cornered" type known from the later Wylie focus; the very slightly shouldered and leaf-like shapes are almost completely replaced. A number of Yarbrough Stemmed points occur, this being a type elsewhere attributed as a late archaic form in Northeast Texas (Nos. 28-31, Plate IV).

The drills made from reworked broken projectile points are gone, and replacing them are definitely-fashioned drills made for that sole purpose originally. Two of these are shown as Nos. 32-33, Plate IV, with No. 32 exhibiting a right-beveled technique.

Thick, rough, leaf-shapes become the dominante knife form (Nos. 36-37, Plate IV), with one double-ended leaf-shaped specimen also known. These are all of quartzite, the poorer flaking qualities of which perhaps accounting for the cruder form of the implements over those of the Carrollton; these last, as described, were mostly of flint.

Scraping and cutting flakes continue in use much as before, being still normally of flint waste materials. Two are pictured as Nos. 34-35, Plate IV. Gravers seem to be absent.

Gouges have nearly disappeared, in contrast to their predominance in the Carrollton, and the few still surviving are greatly diminished in size, though still exhibiting the same technique, design, and quartzite material. (Compare Nos.

1-3, Plate V, with Nos. 1-10, Plate II.) More important is the new scraper form shown as Nos. 4-6, Plate V, which now appears. This type is roughly ovate, plano-convex, and very highly "turtle-backed" in form; without exception it is made of quartzite, usually yellowish in color.

Side-scrapers retain their indeterminate form and are quite generally indistinguishable from those of the Carrollton. (Nos. 7-9, Plate V.)

Sinker stones and worked stones no longer constitute part of the complex, having disappeared entirely. Grinding stones are still rare, three from the Wood site, none from Milton. One is shown as No. 13 in Plate V, being unifaced and similar to those from Carrollton and fashioned from an iron-impregnated East Texas sandstone. Hammerstones and choppers continue present, made from large quartzite nodules and similar in all respects to those of the earlier focus. (Nos. 10, 14, Plate V.) The strange clay "blobs" have disappeared, perhaps as a result of Elam sites occurring *after* the Pattillo formation had commenced its deposition and therefore no longer being situated directly upon the clay surface of the underlying Albritton.

The Loving site near the mouth of Prairie Creek, southeast of Milton, is another Elam focus location. Continuing below it and shown generally as Station 7 in Fig. 1 are the 18 archaic, non-pottery sites described by Kirkland¹⁶ which almost certainly belong to the Elam focus. These present very similar geologic occurrences and the description and illustration of their combined total of 460 artifacts conform most closely in typology and percentage of importance of the various forms.

Comparisons and Conclusions

Materials collected along Elm Creek (the beginning of the Elm Fork of the Trinity) near Gainesville, Cooke County, bear a suspicious resemblance to the Carrollton focus.¹⁷

16. Kirkland, Forrest. A series of non-pottery sites in Dallas County, Texas, *The Record, Dallas County Archaeological Society*, III, 6, 1942.

17. Moss, Hubert. Personal communication, July, 1952.

These present a seeming mixture of Plainview-like points and large archaic types, and several hearths and burials have been recorded at some depth in a sand formation, possibly an extension of the Pattillo. The sinker sites in the Waco region include identical sinkers to those of the Carrollton focus, and an illustration of "typical projectile points accompanying sinker sites" shows many archaic types which can be matched almost point-for-point in the Wheeler-Lake Dallas groups, *including the illustration of one Plainview-like point*. In addition, gouges in "small numbers" are known to occur with them. A very close relationship with the Carrollton is indicated. The Yarbrough site in Van Zandt County, just 60 miles east of Dallas beyond *Kaufman County* (where one Carrollton site is known!), is famous for its mixture of Plainview-like points and archaic points in a non-pottery complex. This, coupled with the seeming *sporadic* occurrence of early-type points over Northeast Texas and Northwest Louisiana, leads to the possibility that a version of the Carrollton focus extends in that direction as well.

Non-pottery levels and sites in Lamar County and elsewhere in Northeast Texas resemble the Elam focus archaic materials of a later stage. Substantiating this late assignment are several of the early pottery cultures of the region. It is a known fact that most of the Wylie focus¹⁸ sites, shown generally as Station 11 in Fig. I, along the East Fork of the Trinity (Collin, Rockwall, and Kaufman Counties) seem to be a mixture of late archaic elements with a pottery-and-agricultural complex. Generally, pottery and associated pottery culture type projectile points occur in the topmost six inches or so of the sites, grading downward into an underlying, non-pottery, archaic zone to depths of 30 inches or more. The archaic projectile points in the underlying zone, as well as the remnant ones mixed with the pottery type ones above, are very close to Elam focus types; in addition, an occasional gouge is found on a Wylie site, and the Elam

18. Stephenson, Robert L. The Hodge Bridge site and the Wylie focus, *American Antiquity*, XXVII, 4, 1952.

“turtle-back” ovate scrapers become common in a more evolved and better-developed form. That the Wylie focus represents a continuation of the Carrollton-Elam sequence, whereby a very late manifestation of the latter became mixed with incoming pottery culture traits, is strongly suggested. The Wood site with its three components may well represent the entire sequence in stratigraphic succession.

The Alto focus ¹⁹ in its lowest level appears to represent somewhat the same mixture of late archaic with new pottery culture elements. Some of its materials may indicate an evolution out of a late archaic similar in a number of respects to the Elam focus.

On the basis of pottery types in the Wylie focus attributed to trade-contact, an age of between 1,000 and 500 years ago may be postulated, carbon dating of early Alto focus corn gives an age of roughly 1,500 years ago. Thus it would appear that Elam focus traits survived beyond the conclusion of the Pattillo depositional period (estimated 1,750 years ago), and sometime in the hiatus before the Carter deposition began (ca. 650 years ago), became mixed with arriving pottery elements—doubtlessly, at varying times in different areas. It is considered that this time of mixture terminates the Elam focus, and thereby the Trinity aspect of the archaic.

At the other end of the occupational span, the Plainview-like points and the archaic points with ground edges indicate some sort of “carry-over” or very late contact between the early archaic and the Early Man hunting cultures. The projectile points are much too consistent in all sites to be the result of fortuitous collecting from earlier sites, they are much too differently made to be a variant archaic form, and as mentioned before are practically indistinguishable from those at true sites. Possibly the early cultures lingered on into archaic times; the earliest archaic people may have intermixed with late remnants somewhere in their migra-

19. Newell and Krieger, *Op. cit.*

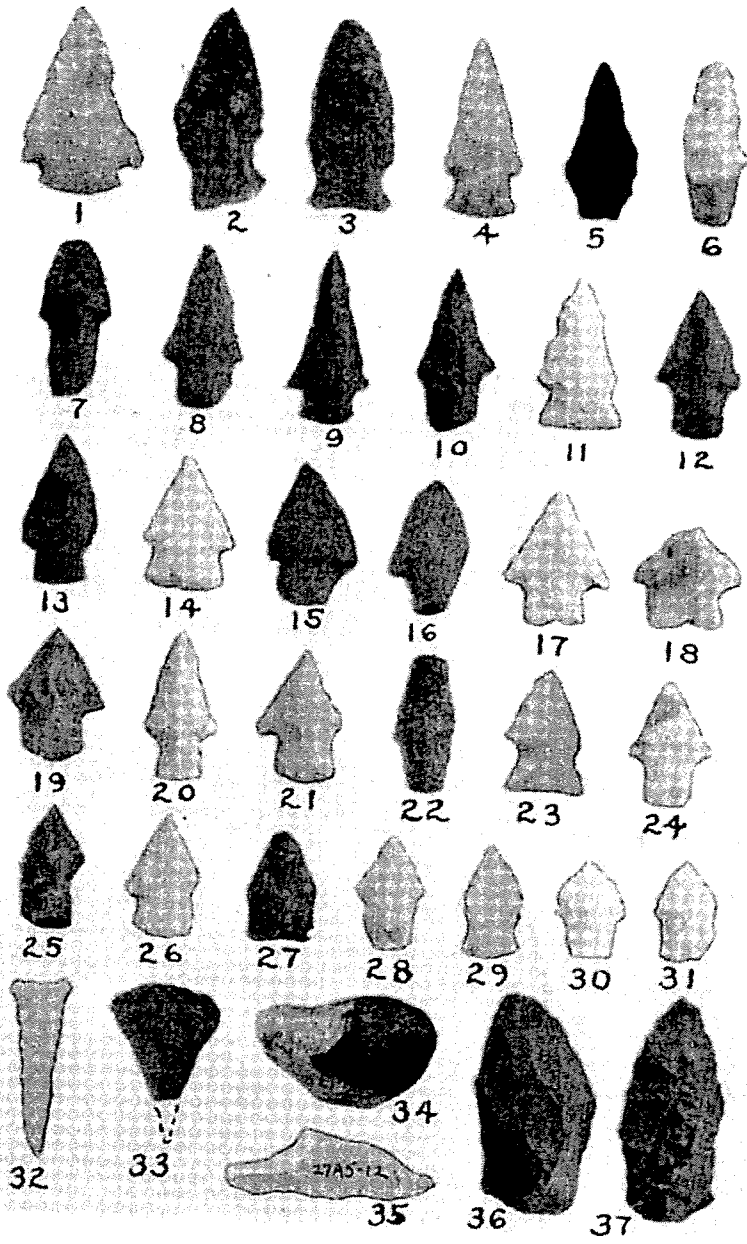


PLATE 4

Elam focus. Nos. 1-4, 8-11, 13-21, 23-24, 26-28, 30-36 Wood Site. Nos. 5-7, 12, 22, 25, 29, 37 Milton Site. All specimens $\frac{1}{2}$ size.

tions, gradually absorbing them entirely; or the dessication of the Altithermal may have driven the last early survivors down off of the High Plains along the river courses, where they encountered the early archaics already in occupation. It places an interesting speculation upon the beginning of the archaic and the termination of the early hunting cultures.

Correlations are possible between the Trinity aspect and other archaic materials in Texas, as well as with archaic cultures outside the state. In general, the Edwards Plateau and Big Bend aspects give evidence of long-continued occupation of the same basic cultural type, gradually developing and changing *in situ*; both possess numerous examples of being buried in formations of some considerable geologic antiquity, though inevitably referable to the early Medithermal or "Little Pluvial" period rather than the Pleistocene, and none has as yet presented a proven association with extinct fauna. In all these respects, they are comparable to the Trinity aspect.

Specifically, the Merrill site²⁰ on Brushy Creek near Round Rock, Williamson County, contained a number of similarities to the Carrollton focus—important, as this is the type station of the Round Rock focus. There, materials occurred deeply buried in the first terrace in a four-segment sequence: top, a surface midden with late artifacts; next below, a four-and-a-half foot gravel layer with earlier archaic materials; then a two foot midden with earlier archaic artifacts; and beneath that, a six foot silt layer with earlier archaic types. The lower three zones are considered a mixture of Round Rock and Clear Fork foci by the investigators, with a large time gap between them and the surface midden; suggested dating has been "either 6,000 or 4,000 years ago" for the lower portions, about A. D. 1500 for the surface midden. As no extinct fauna occurred in the formations, the geologic structure seems roughly comparable to the Dallas sequence, with the gravel corresponding to the Patillo and the underlying silt to the Albritton—thus placing

20. Campbell. The Merrill site: archaeological remains associated with alluvial terrace deposits, *Texas Archaeological & Paleontological Society Bulletin*, XVIII, 1948.

the buried midden in the equivalent to the Albritton-Pattillo hiatus. The Carrollton focus has been shown to extend in time from the upper Albritton, across the hiatus, into the lower Pattillo, with the Wheeler site occupation seemingly coeval with the Merrill buried midden and the lower portion of the overlying gravel. Hence, it is no surprise to see in the Merrill site illustrations straight-sided, square-based, stemmed points very close to Nos. 7-9, Plate I; a "Yuma-like" point somewhat similar to Nos. 19-23, Plate I; two gouges similar in technique, though larger, to those on Plate II; and another of those remarkable points like No. 5, Plate I. Significantly, these are all from the buried midden or in the overlying gravel as though washed in from it. Thus a rough contemporaneity can be assumed between the Carrollton focus and the lower portions of the Merrill site.

Additionally, Watt observes that "sinkers are reported from the middle level of the Burnt Rock Mounds of Central Texas"—the term "Burnt Rock"²¹ being the common name for that phase of the archaic before the Round Rock focus was so designated. However, no sinkers were found at the Merrill site, the Round Rock type site.

The Carrollton gouges are a smaller, quartzite version of the larger flint ones of the other early Edwards Plateau aspect focus, the Clear Fork of the Abilene region—hence an implied relationship here, along with some projectile point similarities. As the Round Rock and Clear Fork foci have been recorded as mixed both at the Merrill site and in Jackson's deep site²² on the Colorado River above Austin in Travis County, the two are regarded as contemporaneous, and thus the logical interlocking affinities with both as seen in the Carrollton materials. Incidentally, both of these Edwards Plateau complexes also exhibit a few grinding stones and many choppers, in general comparable to the Carrollton. Not much comparison exists between the Carrollton and the

21. Pearce, J. E. Present status of Texas archaeology, *Texas Archaeological & Paleontological Society Bulletin*, IV, 1932.

22. Jackson, A. T. A deep archaeological site in Travis County, Texas, *Texas Archaeological & Paleontological Society Bulletin*, XI, 1939.

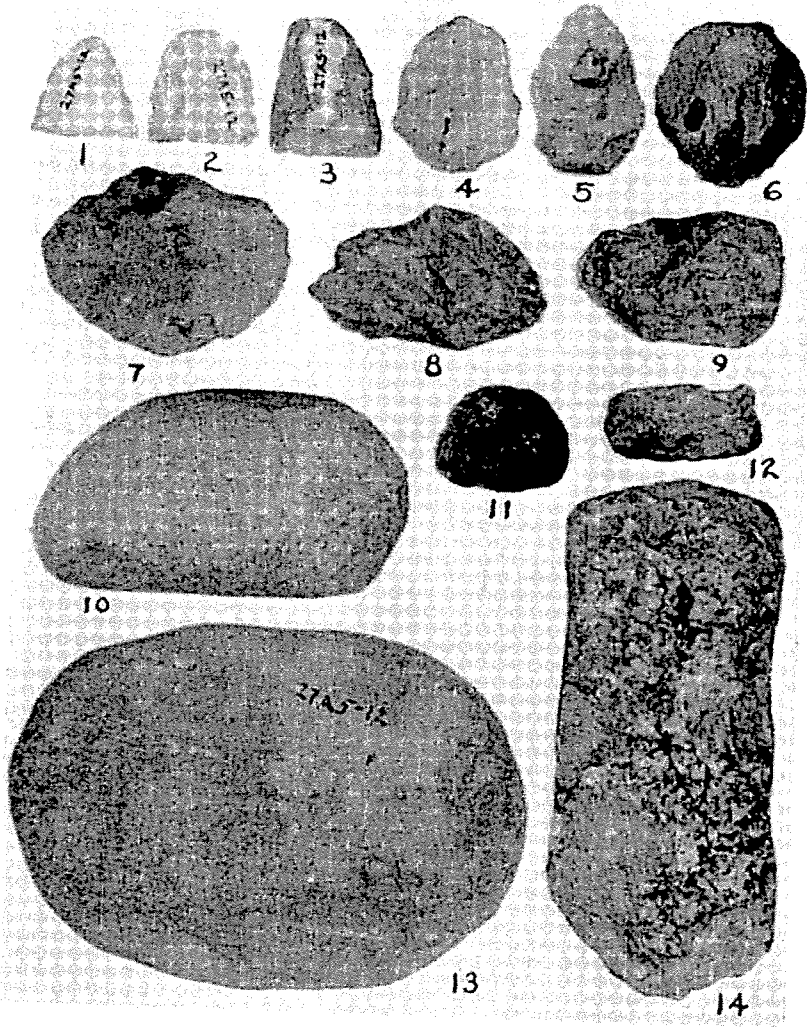


PLATE 5

Elam focus. Nos. 1-6, 9, 11-14 Wood Site. Nos. 7-8, 10 Milton Site. All specimens $\frac{1}{2}$ size.

foci of the Big Bend aspect, other than roughly equivalent geologic position throughout the Medithermal or "Little Pluvial" depositions; however, other authors have recognized similarities between the Big Bend and Edwards Plateau manifestations, gouges are known from along the Pecos River sites, and a type of sinker has been found in Val Verde County. As mentioned previously, the long-headed, slab-sided, keeled-vaulted human type is most prominently known from the Abilene and Val Verde areas as a further comparison.

Certain of the projectile point forms in the Grove focus²³ (archaic) of Oklahoma show similarity to those of the Carrollton; especially noteworthy is the appearance of Plainview-like points as well in the Middle Grove. However, no gouges or sinkers are present²⁴. Further afield, a number of the Carrollton point types resemble those of the Borax Lake-Pinto Basin-Silver Lake-Lake Mojave desert cultures of California.²⁵ Nos. 7-9, Plate I, especially resemble Borax Lake points according to Harrington.²⁶ The general geologic assignment of these cultures and estimated datings now conform roughly with the early archaic. A vague resemblance in several categories can also be noted with some of the Eastern archaic manifestations.²⁷

As for the Elam focus, Kirkland observed²⁸ that the materials from his 18 non-pottery sites, now incorporated as Elam, "resemble those from the middle and upper levels of the Burnt Rock Mounds." In this, the authors concur, the artifacts being obviously derived from the earlier Carrollton and developed from it at a later period quite in line with the observed long-continued evolution in the various Edwards Plateau sites. The Elam ovate "turtle-back" scrap-

23. Bell, Robert E. and David A. Baerreis. A survey of Oklahoma archaeology, *Texas Archaeological & Paleontological Society Bulletin*, XXII.

24. *Ibid.* Personal communication, April, 1952.

25. Harrington, M. R.; Elizabeth W. Crozier and William H. Campbell; Malcolm J. Rogers, et al. Various publications.

26. Harrington. Personal communications, May, 1952.

27. Ritchie, W. A. New evidence relating to the archaic occupation of New York, *Researches and Transactions of the New York State Archaeological Association*, VIII, 1, 1936.

28. Kirkland. *Op. cit.*

ers bear a marked similarity to those shown as typical of the Early Woodland of Oklahoma (which follows the Grove archaic), while the point types more closely match, in some instances, those of the late Grove focus—again in line with the observed sequences.

In time, though not in typology, the Carrollton focus roughly equates with the Chiricuhua, and the Elam focus with the San Pedro, of the Cochise culture of Arizona; likewise with the corresponding elements at Ventana Cave.^{29, 30}

Actually, the archaic of Texas appears to have arrived perhaps as far back as the Altithermal (6,000-8,000 years ago), certainly by the beginning of the Medithermal depositions as demonstrated in so many sites. The earliest manifestations of it, especially in the Edwards Plateau region, show a very heavy flint industry with exceptionally large average projectile point and gouge-and-scrapers forms; this is true also of the early Grove in Oklahoma. If the geologic interpretation of the Dallas area is correct, the archaic arrived here—still in the early Medithermal—but somewhat after its beginning; therefore the Carrollton focus should be slightly later than the very earliest Round Rock-Clear Fork (and Maravillas in the Big Bend, and possibly the early Grove), and the artifact typology bears this out with a number of smaller forms. Thus if one would *arbitrarily* divide these other complexes into an Early-Middle-Late classification, the Carrollton would conform more closely to the Middle division and the Elam to the Upper—not precise, but a fairly workable comparison.

The establishment of the Trinity aspect does much to fill in a gap in the Northeast Texas chronology which has long proven a hindrance in the understanding of many other problems in this region.

Dallas, Texas
August 13, 1952

29. Antevs. *Op. cit.*

30. Haury, Emil W. The stratigraphy of Ventana Cave, Arizona, *American Antiquity*, VIII, 3, 1943.

THE KENT-CRANE SITE: A SHELL MIDDEN ON THE TEXAS COAST

T. N. CAMPBELL

In a previous volume of this bulletin¹ I published a report on the Johnson site, which was designated as the type site for the Aransas focus of the Texas coast. That report also included a brief summary of the Aransas focus based upon the excavation of the Johnson site and two additional sites on Live Oak Peninsula, the Live Oak Point site and the Kent-Crane site. The purpose of the following paper is to present an analysis of the archaeological materials from the Kent-Crane site and to show the place of this site in the current conception of the Aransas focus.

Site Location and Description

The Kent-Crane site, an extensive shell midden, lies on the west side of Live Oak Peninsula about five miles north of Rockport, Aransas County, Texas (Fig. 3, B). Live Oak Peninsula, which extends northward between Copano Bay and Aransas Bay, is in the middle section of the Texas coast. This locality is a part of what is known to physiographers as the Coastal Prairie.² The terrain of the Coastal Prairie is very flat and in places marshy. As the name implies, it is predominantly grassland; but there are local areas of woodland, notably along stream courses and on sandy ridges. Live Oak Peninsula is a sandy wooded area, being covered with a chaparral or thorny brush vegetation, but there is evidence which indicates that in aboriginal times Live Oak Peninsula was a grass-covered prairie. Within the past hundred years chaparral vegetation has moved northward and eastward along the Texas coast,³ and Price and Gunter⁴ have presented historical evidence which shows that as

1. Campbell, 1947.

2. Fenneman, 1938, pp. 100-120.

3. Tharp, 1939, p. 8.

4. Price and Gunter, 1943, pp. 12-13; Gunter, 1950, pp. 366-367.

FIGURE 3

Kent-Crane Site, Texas Coast. A, cross-section of midden deposit; B, map showing location of Kent-Crane Site and other excavated sites on Live Oak Peninsula, Aransas County, Texas.

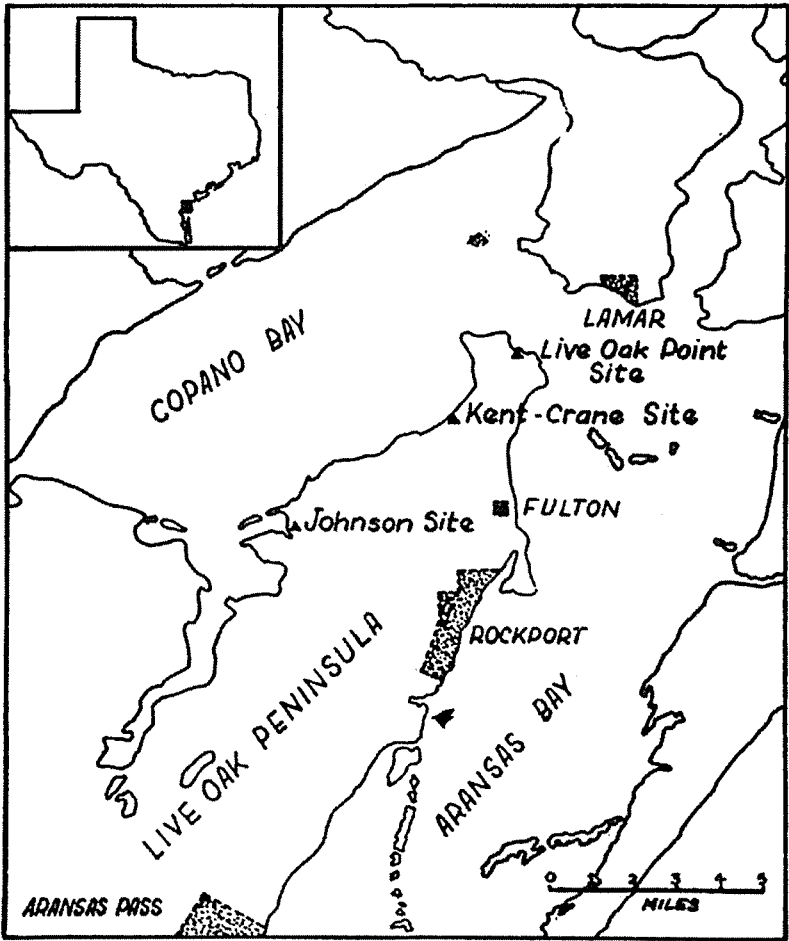
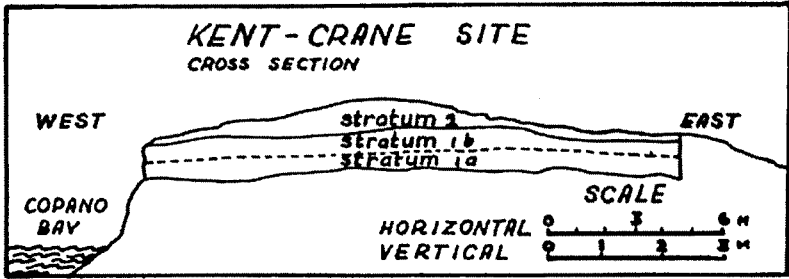


FIGURE 3

late as 1870 the entire Aransas Bay coast line was truly a prairie.

The climate of the Aransas Bay area has certain unfavorable aspects from the point of view of human occupation under aboriginal conditions. Temperatures are mesothermal, but precipitation is unreliable. Little rainfall occurs in winter, limiting the surface water supply during that season; and in some years rainfall is so deficient that such years may be classified by climatologists as desert years.⁵

The Kent-Crane midden forms a low ridge that closely parallels the beach of Copano Bay for some 600 meters. It is 20 to 30 meters wide and varies in thickness from a few centimeters to a maximum of approximately 1.8 meters. The greater part of the deposit, however, appears to vary between .9 and 1.2 meters. It rests on a bed of clay, probably the Beaumont formation, which attains an elevation of about 1 meter above mean high tide (Fig. 3, A).⁶ In certain places wave action has exposed the midden deposit in vertical section, and here artifacts and shell from the midden litter the beach. No record exists of disturbance by cultivation, but a drainage ditch is said to have been cut through the midden about the year 1922. Today the midden is covered by a dense thicket composed of shrubs and small trees, the latter principally oak.

Excavation

This site was visited by George C. Martin and Wendell H. Potter in their archaeological survey of the Rockport area in 1927-1929.⁷ On April 13, 1930, Martin and Potter made a test excavation at one of the vertical sections facing Copano Bay. They dug a strip 15 feet wide some 3 feet back into the midden, at which place they found the deposit to exceed 1.2 meters in thickness.

During the period of January 2 to March 29, 1941, a Uni-

5. Russell, 1945, pp. 43, 46-47.

6. At one locality a bed of fossil oyster and clam shells is exposed in section, showing it to be included in the clay formation. There is no evidence which suggests that man had anything to do with its origin.

7. Martin, n. d., p. 6, Site 46.

versity of Texas-Works Progress Administration field party,⁸ under the direction of William A. Duffen, extensively tested the Kent-Crane site. Near the central part of the long midden a trench 100 feet (30.47 meters) wide was carried from the beach directly across the site, a distance of 75 feet (22.85 meters). Some 275 meters to the north a trench 45 feet (13.71 meters) wide was similarly excavated for a distance of 20 feet (6.09 meters) into the midden deposit. Finally, a short distance south of the main excavation a test block 10 feet (3.04 meters) square was removed at a point lying on the longitudinal axis of the midden.

Shortly after excavation began it became apparent that there was a stratigraphic break in the midden deposit. Two distinct layers could be traced on any given profile (Fig. 3, A). Stratum 1, the lower, rested on basal clay and was black, ashy, and rather compact. In the main excavation near the center of the midden Stratum 1 averaged between 60 and 75 centimeters in thickness. Stratum 2, the upper layer, contrasted with Stratum 1 in both texture and color. It was loose and quite brownish. Stratum 2 was not represented everywhere in the areas excavated, being notably thin or absent in the eastern part. Near the central part, however, it showed a thickness that varied from 30 to 45 centimeters. Roughly speaking, Stratum 1 comprised the lower two-thirds of the deposit, Stratum 2 the upper one-third. The clay base upon which the midden rested had a surface that was relatively flat, very few irregularities being observed.

In the main excavation the artifacts were segregated into three groups based on their vertical distribution. In Stratum 1 the artifacts from the lower half (Stratum 1a) were separated from those in the upper half (Stratum 1b); and those from Stratum 2 were kept separate from the others. In the two smaller excavations to the north and

8. Work Project No. 16770. In the files at the University of Texas this site is known as 72D9-13. The land upon which the site lies belongs to the Kent and Crane Estate, whence the hyphenated name Kent-Crane. Permission to excavate was given by Mr. William Kent of San Francisco, California.

south the vertical position of each artifact in its layer was recorded.

Contents of the Midden

Excavation revealed that the midden was composed principally of marine shells and soil, with the former predominating. The shells were rather densely packed, and the soil filled the interstices between the shells and shell fragments. There was no evidence of alternating shell and soil layers. In addition to shells, which were mainly conch (*Busycon perversum* Say and *Fasciolaria papillosa* Sowerby) oyster (*Ostrea virginica* Gmelin), and clam (*Macrocallista nimbosa* Solander),⁹ there was also a liberal sprinkling of animal bones, identifiable bones and fragments indicating fish, birds, such mammals as deer and peccary, and one reptile, a turtle.¹⁰ Scattered rather uniformly throughout the midden deposits were artifacts of shell, bone, and stone, as well as small fragments of asphalt; and near the surface, as well as on it, were a few potsherds. Badly disturbed remains of at least two burials were also included. A few fossil bone fragments were mixed with the midden debris, evidently having been collected by the inhabitants of the site.¹¹

Burials

Martin¹² reports that a human skeleton was found at the Kent-Crane site in 1922, apparently during or shortly after the time when the drainage ditch was cut through the midden. He estimates that the bones came from a depth of approximately 30 centimeters, but he gives no data concerning the type of burial. Martin also reports the occurrence of a human skull fragment containing three teeth that seems

9. No sample collection of shells from the Kent-Crane site was made. The species listed here are those indicated by shells used in the manufacture of artifacts. The identifications were made by Mr. Richard W. Foster, Assistant Curator of Mollusks, Museum of Comparative Zoology, Harvard University. At the nearby Johnson site (Campbell, 1947, p. 45) a sample collection of shells was made which gives an indication of the shellfish forms used for food by the people responsible for the two middens.

10. These identifications were made in the field by W. A. Duffen.

11. These fragments were examined by Dr. A. S. Romer, Director of the Museum of Comparative Zoology, Harvard University. One is the tooth of a fossil horse (Pliocene or later) one is possibly a turtle bone, and the three remaining fragments are unidentifiable.

12. Martin, n. d., p. 6.

to have come from near the base of his excavation, some 15 centimeters above the clay layer at the bottom of the midden. He states specifically that it was not part of a burial.

In Duffen's main excavation a disturbed burial was encountered at the base of the midden. It rested on the surface of the clay stratum and was 50 centimeters below the midden surface at that point. Portions of the lower half of the skeleton remained, consisting of a part of the pelvis, all of the right leg bones, and the lower half of the left leg. There seemed to be a north-south orientation of these bones, the pelvis being to the north. Lying near the left knee was the clam shell scraper shown in Plate 6, L.

This information is too scant to permit us to make a statement about the burial customs of the inhabitants of the Kent-Crane site. All that can be said is that some burials were placed in the midden deposit.

Description of the Artifacts

A total of 689 objects showing human handiwork was obtained during the course of Duffen's excavation.¹³ Of this number only 596 are complete enough to be identified and included in the various categories of a trait list. Omitting the potsherds, which are very few in number, and also the lumps of asphalt showing impressions of basketry and matting, all of these objects are made from three classes of material—shell, bone, and stone. Percentages of these materials run approximately as follows: shell 31%, bone 33%, and stone 36%.

Before proceeding with a description of these artifacts, a brief preview of the conclusions will be presented. This will help to give perspective to the descriptive material that follows. Materials from two cultures are represented at the Kent-Crane site, namely, the Aransas focus and the Rockport focus. The Aransas material is stratigraphically overlain by the Rockport material, which is scant in nature and consists of the potsherds and two small arrowpoints, all of

13. The few objects collected from the site by Martin and Potter have not been examined and thus do not enter into the frequency figures given in this section.

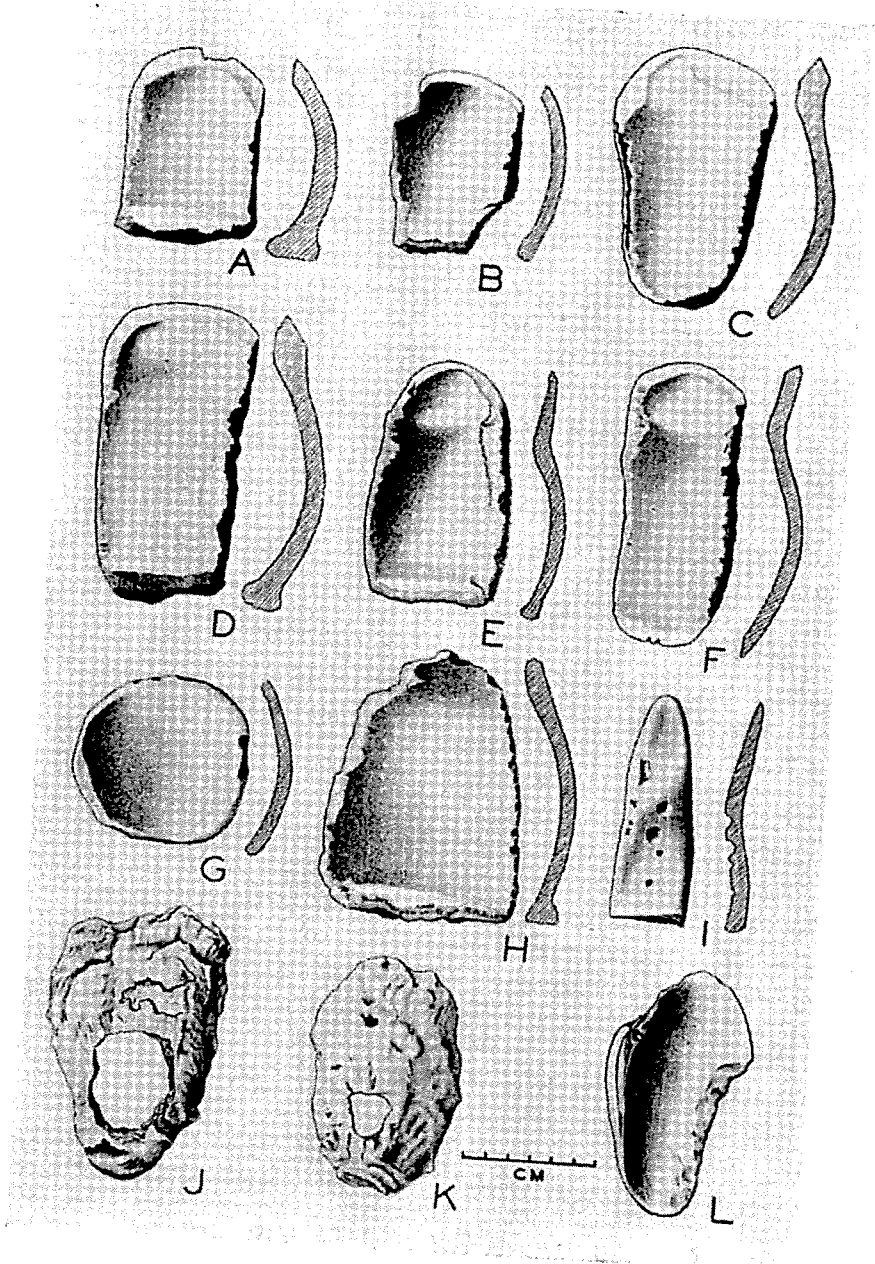


PLATE 6

Shell artifacts from Kent-Crane Site, Texas Coast. A-F, conch shell adzes, G, conch shell disk; H, conch shell scraper; I, unidentified conch shell artifact; J-K, perforated oyster shells; L, clam shell scraper.

which occur near or on the surface of the shell midden. In effect, we almost have a pure site of the Aransas focus, which is the main pre-pottery horizon in this section of the Texas coast.

SHELL OBJECTS. The shell objects, 175 in number, are made from three kinds of shell—conch, oyster, and clam. Objects made from conch shell predominate (88%), and consist principally of cutting, scraping, piercing, and percussion tools made either from the body whorl or the columella. No clearly identifiable ornaments of conch shell are included. Oyster shells were perforated and probably used for digging tools, and clam shells were occasionally used for cutting or scraping purposes.

Conch Shell Adzes. In Stratum 1 occurred fifty-four adzes made from conch body whorls. Twenty-four of these came from Stratum 1a, thirty from Stratum 1b. Many of these are now damaged in some way, but all bear the characteristic ground cutting edge. As far as it is possible to tell, and it is possible in most cases, these adzes were made from one species of conch, *Busycon perversum* Say. The large body whorl was always utilized, and there was a general tendency to select large conchs with thick shells. All of these tools show the marked natural curvature of the shell.

Adzes in various stages of completion were found, and these indicate the steps taken in the manufacture of an adze. First a large, roughly triangular body-whorl fragment was removed from the conch shell and then trimmed to a general rectangular form, usually leaving the thick body-whorl angle. It was possible, in forty-six out of fifty-four cases, to determine that the ground edge was formed at the anterior end of the shell fragment.¹⁴ Thus the longitudinal axis of the adze corresponds to the longitudinal axis of the original shell, and the cutting edge of the adze was made at right angles to this axis. The lateral edges of these adzes

14. By anterior is meant the anterior part of the shell, or that end of the shell which points in the normal direction of movement of the living conch. This is the narrow or pointed end of the shell.

show little evidence of having been ground. Instead they are roughly finished, apparently by percussion, and only in rare instances do they show any traces of smoothing. There is no evidence of cutting or sawing of the shell in order to remove and shape the whorl sections. It looks as though they were broken off in some way and then roughly shaped by percussion.

The cutting edge invariably shows strong beveling on the inner or concave face of the shell (Plate 6, A-F). In addition it was customary to grind the opposite or convex face just enough to give a smoothly convex cutting edge. In forty of the fifty-four adzes this exterior grinding of the cutting edge is clearly visible. That the adzes were hafted or used with the convex surface or face of the shell outward is suggested by the minor fracture scars along the cutting edge. In almost all cases where fracturing of this sort has occurred it has taken place on the convex face of the cutting edge.

Plate 6, A-F, shows some of the variations in size and outline of these shell adzes. The smallest (Plate 6, A-B) occur in Stratum 1a, but large ones are present there also. In shape little stratigraphic segregation is ascertainable. The general rectangular form is most common (Plate 6, A, D), but a few (six instances) show a cutting edge that is somewhat wider than the opposite end, giving a trianguloid appearance (Plate 6, C). Sometimes the cutting edge is ground closer to the canal of the conch shell, in which case it has a strongly convex outline (Plate 6, E). In two specimens both ends of the adze are ground to a cutting edge (Plate 6, F).

The smallest adze in the series has a width of 5.6 centimeters and a length of 8.6 centimeters; the largest a width of 8.1 centimeters and a length of 17.5 centimeters. The common variations in proportions of length and breadth are suggested by Plate 6, A-F. Thickness varies with the age and size of the conch utilized. For the series in Stratum 1 it averages between 4 and 5 millimeters.

In addition to the adzes there are nine conch whorl frag-

ments which have irregular outlines and appear to have been struck from the original shell, nothing further having been done to them. These are larger than most of the adzes in the series, and it would have been a comparatively simple matter to continue the work and fashion them into adzes. Two of these occur in Stratum 1a and seven in 1b.

With these should be considered five adze blanks (one in Stratum 1a, four in Stratum 1b) that are complete in every respect except that the cutting edges have not been provided. The outlines are duplicated in the series of completed adzes. Finally, there are thirteen whorl fragments (four in Stratum 1a, nine in Stratum 1b) which seem to be parts of broken adzes, for they have the appropriate sizes and outlines for adzes and are broken cleanly across between the mid-section and the cutting edge. None of these bears a beveled cutting edge.

In Stratum 2 only five shell adzes are represented, and all of these are fragments. They differ in no respect from those of Stratum 1. The cutting edges are heavily ground on the inner sides and lightly ground on the outer. It is evident that the conch shell adze tradition fades out in this horizon, but no comparable cutting tool replaces it. This layer also contained three shell fragments that could be poll ends of adzes.

Four shell adzes and one shell fragment of what was probably an adze were collected from the beach at the Kent-Crane site. These had evidently eroded from that portion of the site nearest the beach. They duplicate forms from the excavation.

Conch Columella Gouges. Forty-seven gouges, made from the columellae of large, heavy conch shells, came from Stratum 1, twenty-nine from 1a and eighteen from 1b. Twenty-one were made from the columellae of *Fasciolaria papillosa* Sowerby (Plate 7, D; note the spiral fluting which is characteristic of this species of conch), and twenty-six were made from columellae of *Busycon perversum* Say (Plate 7, A, C). These gouges were made by removing the

body whorl and spire of the conch and then grinding the anterior or canal end of the columella to a chisel-like edge (Plate 7, D, gives two views of this cutting edge). The cutting edge is always obliquely ground on the side which bears the canal, so that the facet extends backward on both sides of the canal and has a general U shape. In most cases the opposite face is lightly ground to give the cutting edge a smoothly convex outline. The ragged whorl margin that spirals up the columella is commonly ground a little to give a certain amount of smoothness, suggesting that this tool was probably not hafted but used in the hand.

Most of the gouges are heavy and have broad cutting edges (Plate 7, D), but they vary from this toward a narrower edge (Plate 7, C), a few being almost pointed. Only one has any appreciable portion of the whorl still attached (Plate 7, A), and the broad poll end of this particular gouge is neatly finished and slightly ground to give smoothness.

These gouges vary considerably in length, but many are now rather short, evidently because they were broken while in use. The longest complete specimen is 15.1 centimeters. A few show a certain amount of battering or damage to the cutting edge.

In Stratum 2 only four gouges occur, all broken transversely. They duplicate those from Stratum 1 in every particular; in fact, they may have originally come from Stratum 1, the later occupants of the site having collected them. Like the conch shell adzes described in the preceding section, the conch columella gouges also fade out in Stratum 2; and no comparable cutting tool takes the place of this tool type.

Conch Shell Hammers. In his field report Duffen mentions that the Conch shell hammers came only from the lower part of the deposit, but no specimens are included in the collection obtained from the Kent-Crane site. Presumably they are of the same sort as those found at the Johnson site, which is placed in the same focus as the Kent-Cane site. All

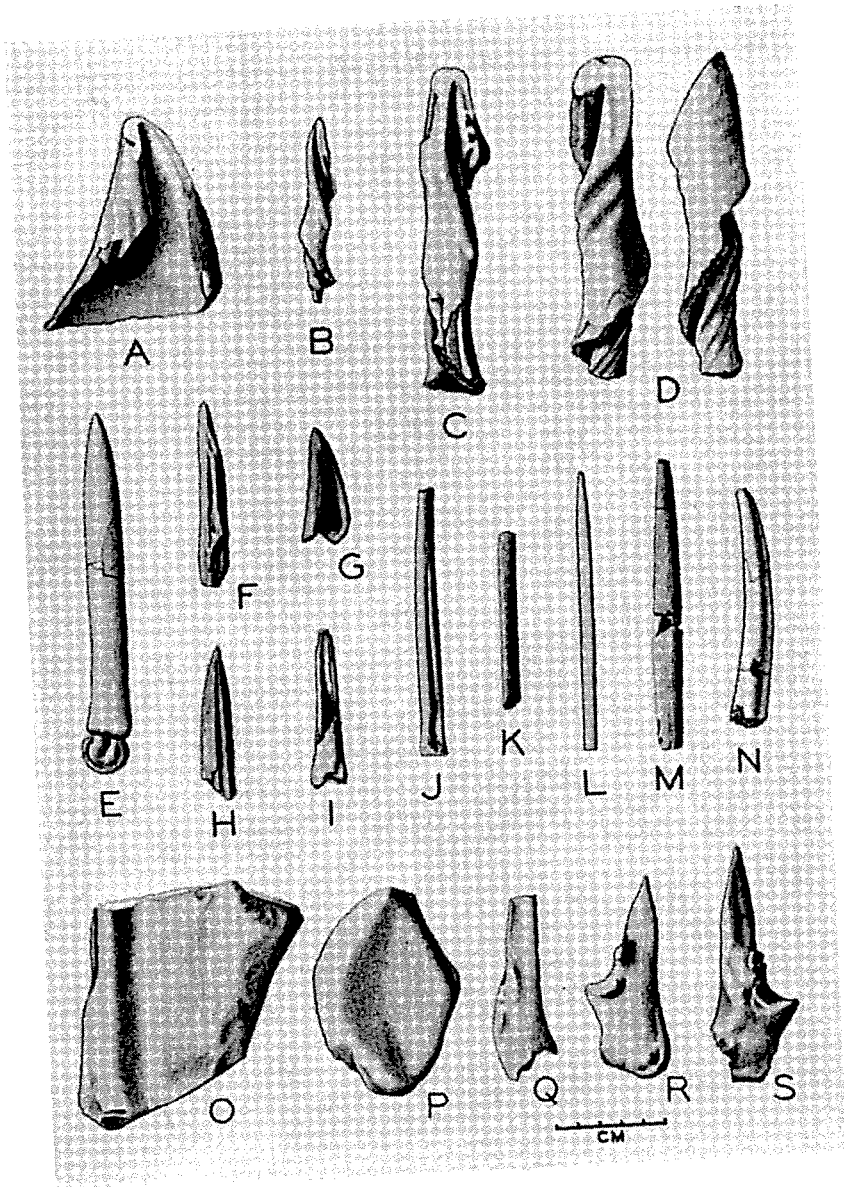


PLATE 7

Shell, bone, and stone artifacts from Kent-Crane Site, Texas Coast. A, C-D, conch columella gouges; B, conch columella awl; E-J, M, Q-S, bone awls; K, spatulate bone object; L, bone pin; N, antler flaking tool; O-P, abrading stones.

we can do here is record the presence of conch shell hammers.¹⁵

Conch Columella Awls. Only one of these is represented (Plate 7, B), a small columella (length 8.7 centimeters) with the anterior end ground to a strong, relatively sharp point. This was found in Stratum 1a. One large beach-rolled columella from Stratum 1b may have served as an awl, but it shows no traces of having been ground to a point by human hand.

Conch Shell Scrapers. Five scrapers made from the lip portion of the conch body whorl occur in Stratum 1, four from 1a and one from 1b. In each specimen the lip shows signs of heavy usage in the form of chipping and abrasion. Two of these are made from light, thin-walled conch shells, one from a very thick, heavy-walled whorl, and two are intermediate between these two extremes. The scraper illustrated in Plate 6, H, is the largest in this small series of scrapers, having a width of 8.5 centimeters and a length of 12 centimeters.

Conch Shell Discs. Two small discs made from the whorl of the conch were found in Stratum 1 (one each from 1a and 1b). A third disc was collected from the beach adjacent to the midden. In each of these specimens the circumference has been ground to a somewhat smooth and rounded edge. The smallest has a diameter of 6.5 centimeters, the largest a diameter of 7.8 centimeters. There is no indication of perforations or surface decoration, such as might be expected in a gorget. The disc illustrated in Plate 6, G, has much more curvature than the remaining two and could have been used very well as an eating implement.

Unfinished Conch Shell Object. One well-worked fragment of an unidentified conch shell object was found in Stratum 1b (Plate 6, I). Originally it seems to have had a lanceolate form, and its present maximum width is 3.5 centimeters. On its concave surface are four conical pits, two large and two small, which are roughly aligned and which

15. See Campbell, 1947, pp. 51-52, for description of the conch shell hammer.

evidently represent attempts to drill holes through the wall. The largest of the four pits reached a point about two-thirds through the wall. The edges of this object are ground down to a smoothly rounded form.

Clam Shell Scraper or Knife. Associated with the burial at the base of the midden was a clam shell scraper or knife (Plate 6, L). A portion of the outer margin has been roughly chipped to a slightly concave edge. The clam has been identified as *Macrocallista nimbosa* Solander.

Perforated Oyster Shells. Stratum 1a produced twenty perforated oyster shells (*Ostrea virginica* Gmelin); none was found in the layers above. The perforations (Plate 6, J-K) vary from small and rounded to large and roughly oval, a few being quadrangular. These holes are located at or near the highest point of the shell, and the edges of the holes are quite rough. Apparently the hole was made by a series of sharp blows on the convex face of the shell. The shells selected for this treatment range from 9.2 to 14.4 centimeters in length. It is difficult to decide whether or not the shell margins show signs of wear or use, for all are eroded to a considerable degree. Martin¹⁶ states that he found perforated oyster shells on the surface at this site. They are described as "pierced with a single hole, sometimes round, sometimes square," and are stated to be fairly numerous.

Disc-shaped Beads. Duffen's excavation revealed no ornaments of this type, but Martin¹⁷ reports and illustrates a disc-shaped bead of shell. It is described as having a diameter of 1.3 centimeters, and the illustration shows it to have a small hole through the center. It was found on the beach at the extreme southern edge of the site.

BONE OBJECTS. The bone artifacts from the Kent-Crane shell midden number 193 and, so far as it is possible to tell, were made from the bones of birds and mammals, particularly the deer. Mammal bones were used principally for awls and pins, and bird bones bulked large in the making

16. Martin, *ibid.*: 1929, p. 54 and plate opposite.

17. Martin, n. d., p. 6.

of beads. Aside from pottery, which is not considered to belong to the major cultural complex at this site, bone objects constitute the only medium of artistic expression. Some bone awls, pins, and beads bear incised and drilled designs of a simple geometric character.

Awls. These are fairly numerous among the artifacts made from bone at this site. They number fifty-four and are made principally from mammal bones. The most popular type is an awl made from a deer ulna, but running it a close second is an awl made from split bone. The bone splinter awl runs a poor third. One awl appears to have been made from a deer mandible, and another was made from an unsplit bird bone shaft. This assemblage of awls is described below.

Twenty-nine deer ulna awls are present in the collection, twenty-one from Stratum 1a and eight from Stratum 1b. Ten of these are represented by distal fragments of sufficient length to permit fairly accurate identification. In general these awls are short but have a very thin sharp point (Plate 7, R-S). The shortest complete awl is 9.5 centimeters in length, the longest 11.2 centimeters.

From Stratum 1a came a fragment of what appears to be an awl made from a deer mandible. Although damaged at both ends, the presumed distal end bears a glossy polish (Plate 7, Q).

Seventeen awls of split mammal bone are included in the series of awls. The mammal is probably deer in all cases. These awls are all confined to Stratum 1, nine coming from 1a, eight from 1b. One awl is a deer metapodial which has been split through the middle of the articular head and on through the shaft (Plate 7, E). This awl is the longest (16.6 centimeters) in the whole series; it has a groove encircling the shaft near the articular head, and it is also well ground and polished along the shaft edges and near the point. Another awl is made from the proximal end of a small deer femur (Plate 7, I). Five awls consist of long slivers split upward from the distal articular surface of a deer metapodial (Plate 7, J). The surfaces are smoothly ground and polished.

All of these were damaged in some way, and the longest fragment, apparently about 80% complete, measures 12.6 centimeters. Four awls were made from deer metapodial shafts (Plate 7, H: Plate 8, Q), but all have been broken near the mid-section. With one exception the points are broad and somewhat blunt. Another awl in this group is polished over its entire surface and has a small notch in its base (Plate 7, M).

Six split bone awl fragments are unique in that they are decorated. They were evidently made from split shafts of mammal long bones. In five of these the shaft slivers were first ground down so that the implements had a flatly oval cross section; then they were highly polished and decorated on both flat surfaces. Of these decorated awls three are rather similar in that hatching and crosshatching are used to isolate undecorated triangular areas (Plate 8, T-V). One has what appears to be a zigzag design formed by small shallowly drilled pits (Plate 8, Y). One (Plate 8, Q) bears a series of short parallel incised lines, as well as what appears to be the beginning of a zigzag design. Finally, there is one awl fragment which is crudely hatched on both flat surfaces (Plate 8, W). These lines tend to be clustered in groups of three.

Martin¹⁸ reports and illustrates two split bone awls from the Kent-Crane site. Both were found in his test excavation, one coming from a depth of 60 centimeters, the other from about 15 centimeters above the clay base of the midden. Judging from these depth figures, Martin's awls came from our Stratum 1. They have lengths of 7.1 and 8 centimeters respectively.

Six awls were made from splinters of long bone shafts (one from Stratum 1a, five from 1b). One of these is apparently made from bird bone, but the others are made from mammal bones (Plate 7, F-G). Only the points of these awls show grinding and polishing. They vary in length from 4 to 8.7 centimeters.

18. Martin, n. d., p. 6; 1229, p. 57 and plate opposite.

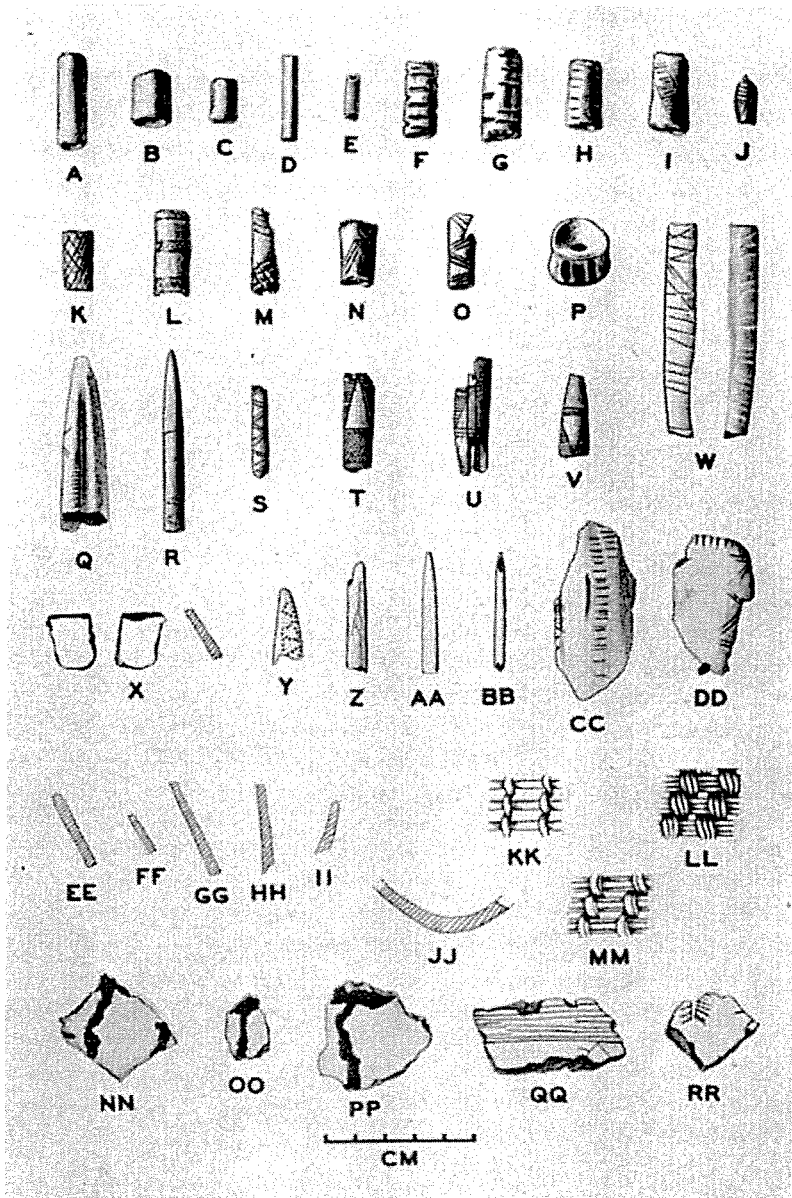


PLATE S

Bone artifacts, pottery, and evidences of basketry from Kent-Crane Site, Texas Coast. A-P, bone beads; Q-W, Y-BB, bone awls and pins; CC-DD, incised bone fragments; X, EE-JJ, NN-RR, potsherds; KK-MM, basketry techniques derived from impressions in asphalt. In pottery rim profiles vessel interiors are to the left.

One awl from Stratum 1b was made from a small unsplit bird bone shaft (Plate 8, BB). The point was formed by grinding the end of the shaft obliquely.

Pins. In Stratum 1 were fifteen fragments of what appear to have been long, slender, rod-like implements, pointed at one end and possibly both ends. These are here called pins to distinguish them from the awl fragments described above. They differ from the awl fragments only in being narrower and less flatly oval in cross section, and in one specimen there is evidence which suggests that it was pointed at both ends. Eleven of these pins are undecorated, but four are decorated in the same techniques and designs (with one exception) as the awls that have just been described.

The decorated fragments (seven from Stratum 1a, four from 1b) include only one which is relatively complete (Plate 7, L), and this specimen shows tapering at both ends, suggesting that some or even possibly all of these pins were originally pointed at both ends. Seven fragments are pointed tips only (Plate 8, AA), and three are medial fragments. An additional fragment has a bluntly rounded point, perhaps indicating that one end sometimes may not have been so sharp as the other. In cross section these undecorated pins vary from oval to round, and they have evidently been made from the split shafts of mammal long bones. All are smoothly ground, and several even have a glossy polish. It is impossible at present to say how long these pins were originally, but the most nearly complete specimen has a present length of 13.2 centimeters.

The four decorated pin fragments (two each from Stratum 1a and 1b) have incised and drilled designs. They are flatly oval in cross section and are decorated on only one of the two flat surfaces. The designs are simple, consisting of zig-zag lines (Plate 8, R-S) in three specimens; the fourth is decorated with a series of small, closely spaced drilled pits forming a lozenge pattern (Plate 9, Z).

Spatulate Bone Objects. Two bone fragments are much like the pins except that they have parallel sides, are much

flatter in cross section, and have thin, spatulate ends (Plate 7, K). It is quite likely that their missing opposite ends were pointed and that they should be included with the pins or awls.

Tubular Beads. Among the various bone objects from the Kent-Crane site tubular beads are the most numerous. Eighty such beads were found, of which sixty-seven were undecorated and thirteen decorated with incised designs. Of the undecorated beads, twenty-three are from Stratum 1a, forty-three from 1b, and one from Stratum 2. Four of the undecorated beads were made from the small long bones of mammals, but the remainder were fashioned from the much lighter shafts of bird bones. They vary in diameter from 3 to 5 millimeters, and in length from 1.4 to 6.3 centimeters. In Plate 8, A-E, are shown examples from each of the main size groups. Most of these beads have smooth and well-finished ends, but some are rather rough. On the latter the method of cutting bone is evident: the bone was encircled with a groove and then broken at this weakened zone. Some beads have a glossy finish, presumably due to long wear and considerable handling. The single bead from Stratum 2 is poorly finished and made from mammal bone.

Like the undecorated beads, the decorated ones are cylindrical and, with one exception, made from bird bones. The exceptional one is made of mammal bone. These beads differ from the undecorated beads only in being a little larger in size on the average, in being better finished and smoothed at the ends, and in having incised designs. Execution of the design varies from very crude to fine, precise work, strictly comparable to that on the incised awls and pins described above. The designs are simple and geometric in character. Three beads are crosshatched over the entire surface (Plate 8, K), and another has a design consisting of three zones of crosshatching, one encircling each end and a third in the middle (Plate 8, L). One bead is made from a bone with a triangular cross section, and on each of the three surfaces three parallel lines zigzag

back and forth the full length of the bead (Plate 8, O). Another has a similar zigzag design, but it runs around the bead rather than along it (Plate 8, N.) Still another has a diagonal band of crosshatching at one end and four diagonally hatched lines at the other (Plate 8, M). Two beads have parallel lines filled with hatching that run diagonally along the bead (Plate 8, I); these diagonal elements are two in number and located on opposite sides of the bead. One bead fragment, which exhibits the most precise incising in the series, has broad bands of hatching outlined by parallel lines. These bands run diagonally across the bead and are separated by narrow undecorated bands which stand out negatively (Plate 8, J). Finally, there are three beads that have short, transverse hatch marks running the length of the bead. The marks vary somewhat in width, depth, and regularity, as may be seen in Plate 8, F-H).

There is no significant stratigraphic change in bead design and technique of execution. The only important observation that needs to be made is that bone bead making, like other traits previously noted, almost dies out in the last stage of occupation at the Kent-Crane site.

Miscellaneous Bone and Antler Objects. Two shafts of mammal long bones, represented by fragments, have incised decoration. One fragment (Plate 8, DD) has two parallel zigzag lines and marginal notching; the other (Plate 8, CC) has two rows of transverse hatch marks. Both fragments are from Stratum 1b.

From each stratum came a number of bird bones showing evidences of having been worked (ten from Stratum 1a, eight from 1b, and four from 2). All appear to be articular and adjoining shaft sections of bird long bones and were unquestionably the residue from the manufacture of bone beads. In every specimen the shaft end shows a clean transverse break. A groove had been cut into the bone, which was then broken by force.

Eight fish vertebrae are included in the collection of bones from this site. They may have been used as beads, but of

this there is no clear proof. The only supporting evidence is the fact that the thin central septum seems to have been perforated. These vertebrae vary from tiny (7 millimeters in diameter) to fairly large (1.9 centimeters in diameter). Six of these came from Stratum 1b, and one each came from Stratum 2 and the surface (Plate 8, P).

Antler flakers are represented by five specimens, of which four are tip fragments. All have bluntly rounded points, and one in particular (Plate 7, N) shows considerable wear on an area about 1.5 centimeters from the tip on the longitudinally convex side. Stratigraphically these are distributed as follows: three in Stratum 1a, one each in 1b and 2. In Stratum 1a there were nine antler tips, two showing evidences of having been cut, rather than broken, from the antler shaft. In each case a deep groove had been cut around the antler, and the tip was then snapped off by force. In Stratum 2 was one small but complete, unworked antler, the base still attached.

STONE OBJECTS. At the Kent-Crane site 208 objects of stone were found. These include 172 objects of chipped stone—projectile points, knives, blades, and a drill. The material used for these was almost entirely flint, though an occasional projectile point was made of quartzite. Among the other stone objects are twenty abrading stones of coarse limestone and sandstone, seven hammerstones of flint nodules or quartzite pebbles, four pieces of pigment showing striations, and five fragments of silicified fossil bone, some of which appear to show attempts at chipping. These various rocks are not found on the Coastal Prairie. The people who lived at this site must have gone inland for their stone or else have obtained it through trade with inland groups.

Projectile Points. The Kent-Crane site yielded 103 projectile points of chipped stone. This figure does not include twenty fragments whose size and partial outlines indicate that they are surviving portions of projectile points. The stone used for manufacturing these projectile points is almost entirely flint. This flint is of a good grade for chipping purposes, and it occurs in a variety of colors and shades,

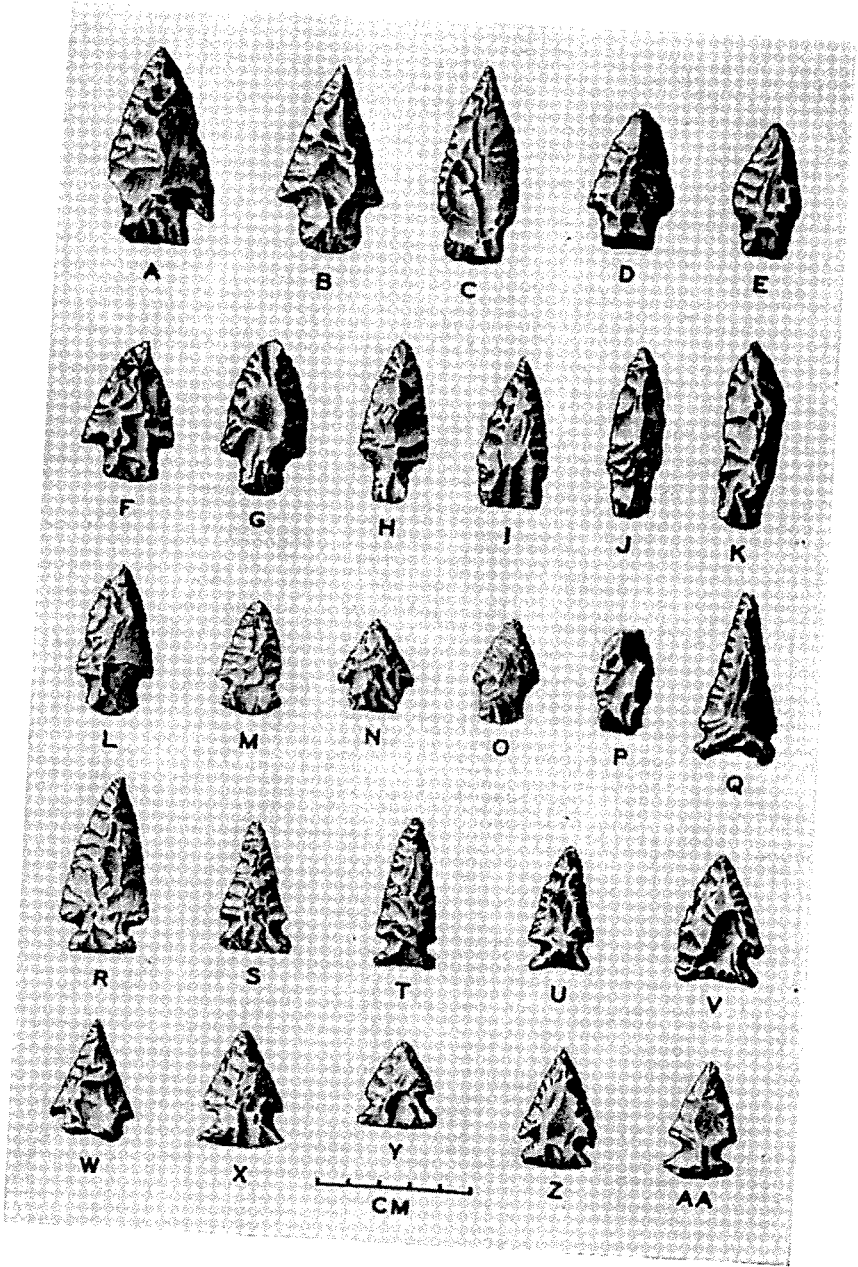


PLATE 9

Flint projectile points from Kent-Crane Site, Texas Coast.

gray and buff predominating. Two projectile points are made of quartzite.

One feature present in some projectile points requires brief comment. This is the presence of dark stains and small bits of asphalt on the stems of fourteen dart points. In a few cases it is possible to discern the total area covered by this substance, which is evidently used as an adhesive to facilitate hafting. This area covers the whole stem up to a line drawn across the shoulders. No trace of asphalt occurs on any of the unstemmed points.

In this group of 103 projectile points only two specimens can be identified as arrowpoints (Plate 10, M and Q); the remainder are considered to be dart points. Martin¹⁹ implies that no chipped projectile points were found in his test pit, but he says that the surface of the ridge has frequently yielded "finely made arrowheads and spearheads." He adds that at the northern and southern ends of the site "birdpoints" are the most common projectile points found. By "birdpoints" he means small arrowpoints as opposed to the larger forms, for which we are using the term "dart point." Thus there is evidence of a greater frequency of arrowpoints at the Kent-Crane site than our data here shows. Inasmuch as the evidence from excavation points conclusively toward the occurrence of arrowpoints only at the very top of the cultural deposit, Martin's statement about finding them on the surface is not surprising. He does not state just how many projectile points of the various forms were found on the surface, and he does not illustrate any from this site which can be identified in his plates. As stated previously, the arrowpoints represent Rockport focus occupation at the Kent-Crane site, and Martin's remarks suggest that Rockport focus materials are more common at the northern and southern ends of the midden.

The projectile points from this site have been sorted out into small groups on the basis of rather close similarities in outline and size. Plates 9 and 10 illustrate every one of

19. Martin, n. d., p. 6.

these small groups, as well as a number of single occurrences whose forms are judged to be distinctive, and Table I shows the provenience by strata of each of these groups and single occurrences. It is believed that this method of presentation will provide a satisfactory basis for later comparative studies of projectile point forms.

The largest general class of dart points in the Kent-Crane series consists of those which have stems with lateral edges that are more or less parallel and bases that vary from slightly concave to slightly convex. In this class are placed forty-eight points represented by specimens shown in Plate 9, A-P. The main variations are in size, relative proportions of stem and blade, and shoulder treatment. Thirty of these occur in Stratum 1, eighteen in Stratum 2. Those in Stratum 2 are notably smaller in size.

TABLE I
PROVENIENCE OF PROJECTILE POINTS SHOWN IN
PLATES 9 AND 10

Plate	Stratum 1a	Stratum 1b	Stratum 2	Surface	Total
9, A	1	—	—	—	1
9, B	2	1	—	—	3
9, C	—	2	—	—	2
9, D	3	2	—	—	5
9, E	3	4	—	—	7
9, F	2	1	3	—	6
9, G	3	2	1	—	6
9, H	2	1	—	—	3
9, I	2	—	—	—	2
9, J	1	—	—	—	1
9, K	1	—	—	—	1
9, L	2	2	1	—	5
9, M	—	—	2	—	2
9, N	—	1	—	—	1
9, O	—	1	—	—	1
9, P	1	—	1	—	2
9, Q	1	—	—	—	1
9, R	—	2	—	—	2
9, S	1	2	1	1	5

9, T	—	1	—	—	1
9, U	1	—	2	—	3
9, V	—	2	2	—	4
9, W	1	—	—	—	1
9, X	—	1	2	—	3
9, Y	—	1	2	—	3
9, Z	—	3	—	—	3
9,AA	1	1	—	—	2
10, A	—	1	—	—	1
10, B	2	1	—	—	3
10, C	7	2	1	—	10
10, D	—	1	—	—	1
10, E	—	1	—	—	1
10, F	—	—	1	—	1
10, G	1	—	—	—	1
10, H	—	1	—	—	1
10, I	1	—	—	—	1
10, J	1	—	—	—	1
10, K	1	—	—	—	1
10, L	—	1	—	—	1
10, M	—	—	1	—	1
10, N	1	—	—	—	1
10, O	—	1	—	—	1
10, Q	—	—	—	1	1
Totals	42	39	20	2	103

The next largest class consists of dart points which are characterized by a triangular outline with diagonally directed side notches that form an expanding stem. These points are rather short and broad of blade; they have well-developed shoulders which are frequently barbed; and they differ from one another chiefly in basal outline, which may be straight, slightly concave, or slightly convex. The greatest width is usually at the base, rather than across the shoulders. In this group are twenty-seven specimens illustrated by Plate 9, R-AA. Seventeen of these are from Stratum 1, nine from Stratum 2.

A third class, represented by sixteen dart points, con-

sists of stemless, triangular points with pronounced basal thinning (Plate 10, A-D, O). All except one of these occur in Stratum 1. At least four variants are recognizable, of which the most common (ten cases) is a triangle with straight to slightly convex base and lateral edges (Plate 10, C). This is very similar to type Taylor Thinned Base of the Clear Fork focus.²⁰ A second variant differs from the first by having alternately beveled lateral edges (Plate 10, B) and is similar to type Baird Beveled Blade of the Clear Fork focus.²¹ A third variant has an elongated triangular form, and the base and lateral edges are slightly convex (Plate 10, A and D). The fourth variant is similar to the third, but has a concave base and large basal flake scars (Plate 10, O).

Two dart points from Stratum 1 are probably intrusive from the Edwards Plateau aspect of Central Texas. One of these (Plate 10, K) appears to be a variant of type Peder-nales Indented Base, diagnostic of the Round Rock focus²²; and the other is a Nolan Beveled Stem point (Plate 10, L), which is diagnostic of the Clear Fork focus.²³ Other dart points in the Kent-Crane series may eventually be recognized as intrusive from South Texas cultures that have not yet been clearly defined. The arrowpoint shown in Plate 10, M, belongs to type Perdiz Pointed Stem, a type which has a very wide distribution in late prehistoric times in the Texas area.

To summarize, stemmed and triangular points are favored in the early part of the occupation at the Kent-Crane site. The diagonally notched group later increases in favor as the stemmed and triangular points decline. True arrowpoints are in use only in the final stage of occupation (Rockport focus).

Knives and Blades. Only six chipped flint knives are complete enough to permit grouping on the basis of out-

20. Kelley, 1947, p. 99 and Plate X, b.

21. *Op. cit.*, p. 99 and Plate X, a.

22. *Op. cit.*, p. 99 and Plate X, c.

23. *Op. cit.*, p. 99 and Plate X, d.

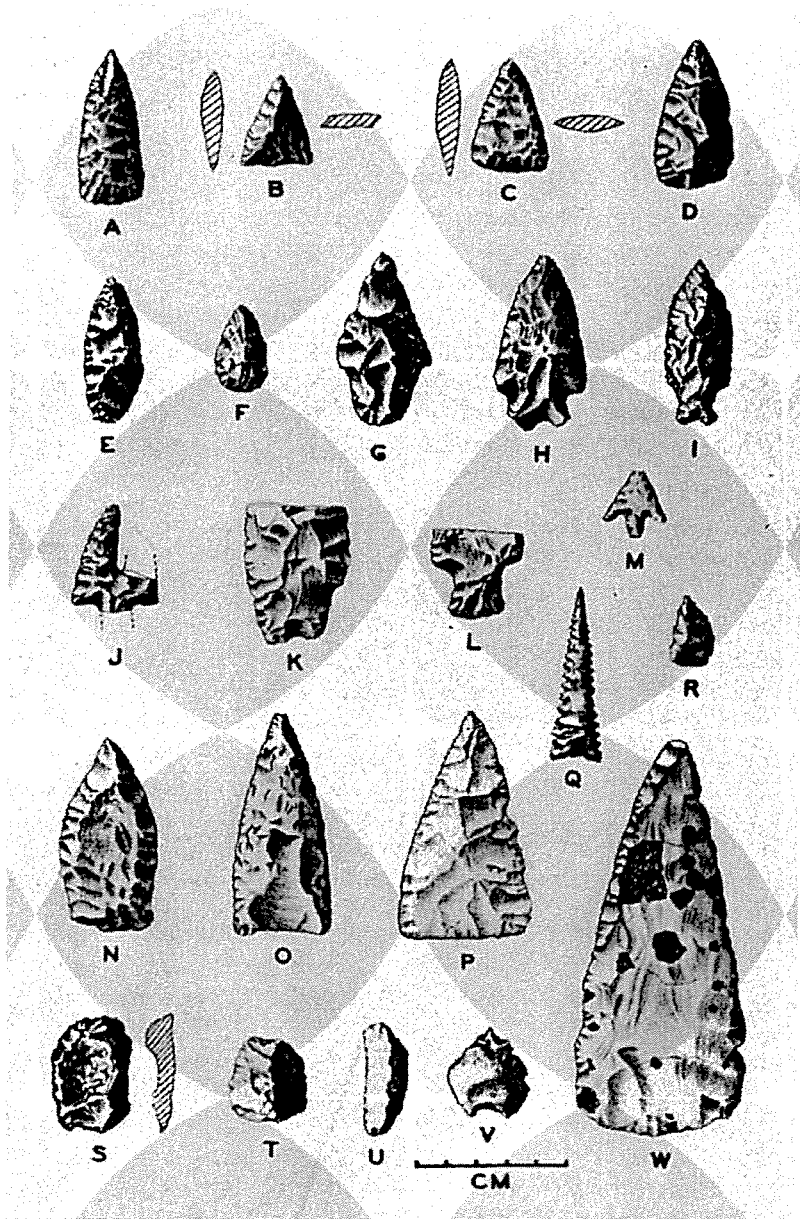


PLATE 10

Flint artifacts from Kent-Crane Site, Texas Coast. A-I, K-O, Q, projectile points; P, W, knives; S, plano-convex end-scrapers; T-U, side-scrapers; V, scraper-graver.

line. Two of these came from Stratum 1a, four from 1b. But there are sixteen fragments whose size and general appearance seem to indicate that they can be classed as knives. Seven of these came from Stratum 1a, seven from 1b, and two from Stratum 2.

The six fairly complete knives are all triangular in outline, and the lateral edges are slightly convex. The differences are chiefly those of size and slight modifications of the base, which varies from straight (Plate 10, P) to slightly convex (Plate 10, W, showing thermal fracture scars). The extremes of size are illustrated in Plate 10, P and W. These knives are relatively thin, none being over 8 millimeters in thickness.

The term "blade" is here used to refer to chipped flint artifacts which have the general form of knives but are very thick and crudely chipped. Seven such artifacts were found at the Kent-Crane site, and they are about evenly distributed stratigraphically (two in Stratum 1a, two in 1b, and three in 2). These blades are oval in outline and are very roughly chipped out by the percussion technique. All are rather small, the largest having a maximum length of 5.4 centimeters; in thickness they vary from 1 to 2.3 centimeters.

Drills and Gravers. One small flint flake with a thin, sharp point (Plate 10, R) came from Stratum 1b. Both faces bear flake scars. Presumably this was used for purposes of perforation; the point is thin and does not seem strong enough to have been used for engraving.

Six small flint flakes with beak-like protuberances are probably engraving tools and doubtless were used in carving designs on bone. In each case the small protuberance or point shows minute pressure flake scars on each lateral edge. One of these gravers is a combination scraper-graver (Plate 10, V), for the side opposite the point has a small, neatly chipped concave scraping edge. Two gravers came from Stratum 1a and four from 1b.

Scrapers. Only one end-scraper of the plano-convex type appears in the series (Plate 10, S), and it has one lateral

edge that is also steeply retouched. The bulbar face bears several large flake scars, and the dorsal surface shows two large thermal fracture scars. This scraper came from Stratum 1b.

The remainder of the scraping tools are side-scrapers with varying amounts of retouching along one or two long edges. Two of these are from Stratum 1a, seven from 1b, and four from Stratum 2. Of these thirteen scrapers only three show very much chipping (Plate 10, T). The rest are flakes which show a certain amount of careless retouching along portions of one or two long edges. One (Plate 10, U) is a lunate flint flake with slightly concave lateral edge which bears minute serrated chipping.

Abrading Stones. Twenty limestone and sandstone fragments, principally the latter, show that they were used for purposes of abrasion. Fifteen of these stones were found in Stratum 1a, five in 1b. Seven show long, shallow grooves (Plate 7, O), and the remainder bear very shallow, oval, basin-like areas (Plate 7, P). These stone fragments have no consistent shapes, and they range in size from small, thin, water-worn stones 5 centimeters long to thicker, heavier fragments 16.4 centimeters long. Small size and portability seem to have been their chief prerequisites. There can be little doubt that they were used in the manufacture of bone and shell artifacts, so numerous at this site.

Hammerstones. Seven hammerstones may be grouped on the basis of the kind of material used. Two (one each from Stratum 1a and 1b) are oval, stream-rolled pebbles which show battering along their edges. One is made of quartzite and the other of a very heavy bluish stone. The five remaining hammerstones consist of heavily battered flint nodules. All of these are relatively small and tend to be oval in outline; the largest has a maximum diameter of 6.2 centimeters. These nodular hammerstones were all found in Stratum 2.

Pigment. In Stratum 1 were four pieces of soft stone that appear to have been used as sources of pigment. Two pieces

of reddish brown pigment came from 1a, and one of these shows striations in three small, basin-like areas. Apparently the pigment was removed in minute quantities by scratching with a sharp instrument, probably of stone. Two pieces of a soft, yellowish stone bear abraded facets which seem to indicate use as a source of pigment. Both came from Stratum 1b.

Worked Fossil Bone. Five fragments of highly silicified fossil bone were obtained from the Kent-Crane midden, and two of these show traces of what appears to be attempted chipping. From Stratum 1a is a rib fragment (length 9.2 centimeters) with rough flake scars at both ends. From Stratum 2 is a horse tooth which has been split longitudinally, and one of the resulting sharp edges has a small, roughly chipped concavity that could have served as a concave scraping edge. It cannot be proved that these two bones were actually chipped by man, but the evidence is strongly suggestive of it. If it is assumed that man did this work, the most likely explanation of the presence of such bones in the midden is to be found in the local shortage of stone for making tools and implements. Any material that even looked suitable might have been collected.

ASPHALT. Martin²⁴ reports finding a lump of asphalt "several pounds in weight" near the base of the test pit which he dug at the Kent-Crane site. Duffen's excavations revealed no lumps of this size, but a large number of smaller lumps were scattered throughout the shell deposit. Twenty-three of these small lumps are of special interest because they bear impressions of basketry and matting. These fragments are small, but a few show unmistakable evidences of the twined technique in basketry (Plate 8, KK-MM, drawn from squeezes). No impression in any way suggested coiled basketry. Specific information on techniques used in matting could not be obtained, the evidence for matting consisting only of impressions of coarse parallel

24. Martin, n. d., p. 6.

elements without any indicating of transverse elements tying them together.

The fragments of asphalt showing basketry impressions range in thickness from 7 to 18 millimeters, and it is reasonable to conclude that they represent a heavy coating for waterproofing purposes. It has already been shown that asphalt was also used as an adhesive for attaching dart points to their shafts.

POTTERY. The pottery from the Kent-Crane site includes three types which are being designated as Rockport Black-on-gray, Rockport Plain, and Rockport Incised. Full descriptions of these types are to be given in another publication. The sherds from the Kent-Crane site number only ninety-six and, as stated above, all came from the surface or in the upper 15 centimeters of Stratum 2. Martin²⁵ mentions that potsherds were found in the area where the drainage ditch was cut through the site in 1922. He does not describe the sherds which he found.

The Rockport Black-on-gray fragments include one rim sherd (Plate 8, X) from a vessel with an incurved rim and flat lip, the latter being painted with asphalt; and fifteen body sherds, eight having a wavy line decoration (Plate 8, NN-PP) and the remainder bearing parts of unrecognizable designs. Four of the last group show asphalt-coated interiors.

Eight Rockport Plain rim sherds (Plate 8, EE-II) are from vessels with incurved or straight rims. All lips are flat save one, which is rounded. None of this group of sherds shows any trace of asphalt coating.

The majority of sherds are body sherds from either Rockport Plain or Rockport Black-on-gray vessels, but more likely the former, as they seem to belong to the same vessels as the rim sherds of Rockport Plain. Only about four vessels appear to be represented. Sixty-seven body sherds are placed in this group. One is a bottom sherd (Plate 8, JJ)

25. *Ibid.*

indicating a vessel base which is very close to being conical. Only four sherds show any trace of asphalt coating. Light scoring on the interior is exhibited by one set of these body sherds.

Finally there are five sherds of Rockport Incised pottery, all obviously from the same vessel. They are reddish-brown in color, and the paste is very sandy, showing tiny white inclusions. Three sherds which fit together (Plate 8, QQ) show roughly parallel incised lines, apparently forming a zone just below the lip, and just below this zone two lines form an angle. A fourth sherd (Plate 8, RR) exhibits a pair of fringed lines.

Conclusions

All except the upper few centimeters of deposit at the Kent-Crane site is referred to Aransas focus occupation. The only Rockport focus traits present at this site are potsherds and arrowpoints, and these occur in the upper 15 centimeters of deposit or on the surface. The Rockport occupation in the areas tested by excavation is therefore very slight. Further excavation in other parts of the site would undoubtedly result in the accumulation of much more data on Rockport focus occupation, and this is borne out by Martin's surface collections at the site, which show more Rockport projectile point types at the extreme northern and southern parts of the site.

The Kent-Crane site furnishes us with the largest sample to date of Aransas material culture. The various bone, shell, and stone objects which characterize the Aransas focus occur here in large enough numbers to give the main outlines of the culture. The Kent-Crane site and the smaller Johnson site nearby provide the greater part of the evidence which supports the concept of an Aransas focus.

The Kent-Crane site has some traits not found at the other Aransas focus sites and thus adds to our knowledge to that extent. These include conch shell disks, a few types of bone awls and pins, carving on bone, and a rather large number of projectile point forms. Intrusive dart points from

the Edwards Plateau aspect of Central Texas also occur in the Kent-Crane site.

There is no way of safely estimating the length of occupation at this site. It must have been used over a longer period of time than most of the sites in this section of the Texas coast, for the midden deposit, although not notably thick, is the thickest on record. The occupation was long enough for some modification in culture to have taken place within the Aransas component. Projectile point forms, for instance, show significant percentage shifts. Then there is the somewhat perplexing diminution in the frequencies of all types of artifacts in Stratum 2. The deposit continued to accumulate, but the number of objects found is low relative to Stratum 1. Some sort of a decline appears to have taken place. It is possible that the stratigraphic break between Stratum 1 and 2 represents a period when the site was unoccupied, and that later it was used by an Aransas group whose culture had undergone some modification. It is barely possible that the upper part of the Kent-Crane site records a slow transition from an Aransas to a Rockport culture. This is speculation, but it raises a question which future field investigators must keep in mind.

No objects of European origin were found at the Kent-Crane site, and there is no reason to suspect that any part of the Aransas occupation is of post-European date. The Rockport occupation, however, very likely was late prehistoric or historic in date, as European objects have been found in association with Rockport materials at a number of sites on the Texas coast.

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THE BONNELL SITE

JANE HOLDEN

The Bonnell Site is situated in an area where the present archaeological picture is not clear. Thus far only a few sites have been excavated in the area, and the cultural context is largely hypothecated. In order to add to the archaeological knowledge of the area and to define the relationship with other cultures, field expeditions were organized by Texas Technological College in the summers of 1950 and 1951.

Site Location. The site is located on the Bonnell Ranch, Lincoln County, in Southeastern New Mexico. This ranch is fourteen miles east northeast of Ruidoso. The site lies on a mesa across Highway 70 from the ranch house and overlooks the Ruidosa valley near the junction of Fort Stanton Creek and the Ruidoso River.

Physiography. The Bonnell Ranch is located in the Sacramento region of the Basin and Range Province, only eight miles west of the line which divides this Province from the Pecos section of the Great Plains Province.¹

The Sacramento section is a long north-south strip that is three hundred miles long, but nowhere over seventy miles wide. It is more or less plateau-like throughout, faulted and strongly sloping. It contains mature block mountains of gently tilted strata and block plateaus. Bolsons generally characterize the Basin and Range Province, and are present in this section. The line of mountains that dominate this section of the Province are, from north to south, the Jicarilla, Sierra Blanca, Sacramento, Guadalupe, and the Delaware. All are monoclinical ranges bounded on the west by fault scarps and consisting largely of eastward dipping carboniferous limestones. Sierra Blanca peak reaches a height of 12,003 feet. The Capitan Mountains represent an eastward volcanic spur. The Bonnell Ranch is east of the Sierra Blanca and south of the Capitan Mountains.

1. Fenneman, Nevin M., *Physiography of the Western United States*, New York: McGraw Hill Book Company, 1931, pp. 47-50, 327-395.

Less than ten miles to the east is the border of the Pecos section of the Great Plains Province. The central part of the Pecos section is an alluvial filled basin. This plain stretches fifty miles north and a greater distance south of Roswell. It has a width of five to thirty miles. The soil is similar to that of the High Plains. The topography is suited to irrigation and a water supply is available from the Pecos and from abundant artesian water constantly replenished by rains on the nearby mountains to the west.

The Ruidoso River Valley varies in width from one-eighth to one-half mile in the vicinity of the site. The valley bottom is covered with an alluvial soil, and at the present time, supports a heavy growth of fruit orchards and fields of grains, such as wheat, oats, rye, and barley.

*Geology.*² The mesa on which the Bonnell Site is located is forty-seven feet high, and is composed entirely of Pleistocene stream gravel, capped with one to four feet of finer alluvial deposits. The stream gravel was evidently deposited by a large river with a high velocity; this is indicated by the large size of the boulders in the deposit and by the cross bedding which shows that the river changed its course. The present valley could be the result of a fault or of down cutting by the stream. There was formerly less difference between the valley floor and the mesa than at the present time, since the stream is now cutting down instead of filling.

Climate. The climate is characterized by cold winters, and summers with hot days and cool nights. There is a marked variation in climate and life zones within this area, which is due almost entirely to the range in altitude. Because of the high evaporation in the low country, effective precipitation increases, with altitude. There is a decided variation in the seasonal distribution of rainfall. For example, at Fort Stanton, which is about ten miles from the site and has an elevation of 6,331 feet, the rainfall is .50 inch in January and 3.21 inches in July. The nearest weather recording station is

2. Information about the geological formations of the mesa was supplied by Glenna Keesee and Selman Cooke, graduate geology students in the 1950 field school.

located at Fort Stanton; there the average annual precipitation is fifteen inches, with the recorded extremes varying from six inches to twenty-five inches. The average for the Bonnell Ranch is somewhat lower, due to the lower altitude.

Biotic Province. The site is in the eastern periphery of the Navahonian biotic province as defined by Dice.³ Some fifty miles to the east is the Kansan Province, which is the short-grass region covering the southern part of the semi-arid Great Plains. The Navahonian Province is characterized by pinon and juniper woodland. The pinon-juniper growth is in clumps, with the intermediate area being covered by grasses and small scrub bushes. The most common grass is blue gama, associated with which are a number of other plants, such as narrow leafed yucca, prickly pears, and milk-weeds.⁴

Game animals that inhabit the immediate vicinity are deer, antelope, mountain sheep, and cougar. There are also numerous small animals such as rabbit, squirrel, skunks, porcupines, and bats.

Growing Season. The growing season is somewhat related to altitudes, but sheltered valleys give a longer growing season than would be expected at high altitudes. The growing season at Bonnell extends from May 2 to October 20, or one hundred and sixty-one days. The temperature ranges from 0° F. to 110° F.⁵ Below zero temperatures are rare in the valley, although they are common in the hills and in the Pecos Valley.

Water. In the general area of southeastern New Mexico surface water is not plentiful at the present, and probably little was available to the aboriginal population. A few springs occur. Away from the main rivers, the few permanent mountain streams are quickly lost in the pourous valley

3. Dice, Lee R., *The Biotic Provinces of North America*, Ann Arbor: University of Michigan Press, 1943, p. 39.

4. Bailey, Vernon, *Life Zones and Crop Zones of New Mexico*, Washington: U. S. Department of Agriculture, No. 15, 1913, pp. 7-74.

5. Culver, C. A., Co-op Observer, Ruidoso, New Mexico, personal correspondence, October, 1950.

fill. The numerous shallow depressions which collect surface run-off during the rainy season must have been the main prehistoric water supply. Many contain water for several months.

Contrary to the general situation, the water supply at the Bonnell Ranch in prehistoric times may have been less serious than elsewhere in the area, because there are springs across the Ruidoso River from the ranch which have not dried up since 1856, when weather records were begun in the area. The Ruidoso River is considered a permanent stream, although in dry years it only flows as far as Glencoe or San Patricio. This means that even in dry years the Bonnell Site was only a short distance from water, since it is only two miles to Glencoe upstream, and San Patricio is four miles downstream. The snow cover on the Sierra Blanca range is available for stream flow after the spring thaws.

Excavation. The Bonnell Site consists of a number of low knolls, the result of successive occupations in local areas, scattered over an area of approximately five acres along the edge of the mesa. The knolls are generally less than four feet above the surrounding area. Five of the knolls are well defined. The largest elevation, which is the easternmost, was chosen for excavation. It is approximately one hundred feet north and south and ninety feet east and west.

Excavation was done by members of three archaeological field schools from Texas Technological College, under the supervision of Dr. W. C. Holden. Actual field work was directed by the author. The field schools were held in the summers of 1950, 1951, and 1952, and each school had a duration of five weeks. Fill was removed in sections four feet square and six inches deep. All dirt was troweled and screened.

Previous Work in the Area. Archaeological investigation of this area started in 1925; however few scientific excavations have been carried out. A definite archaeological picture has not been formed to date. Since excellent sum-

maries of the pertinent published material are available to the reader in other bulletins,⁶ such an anotated bibliography will be omitted here.

Houses

There was probably a long occupational period at Bonnell as is evidenced by the depth of the fill, which reaches five and one-half feet in thickness. There was a superimposition of house floors throughout the fill. A basic pattern is discernable in the structure of most of the houses. Not all of the houses show all of the features, and each of the features has a wide range of variations; however, there is enough consistency in construction to allow the definition of a basic pattern, which follows:

1. The house is usually partially subterranean, with the floors being from three inches to twenty-two inches below the ground surface at the time of occupation. Some of the pits have straight, well-plastered walls and level floors. others have irregular walls and rough floors.

2. Four central posts carry the weight of the roof. These are fairly large posts that are set in the soil at a depth of eight to twenty-five inches. Usually these posts are pine or cottonwood. Cross beams are placed between these central posts, and these cross beams carry the roof (Figure 5).

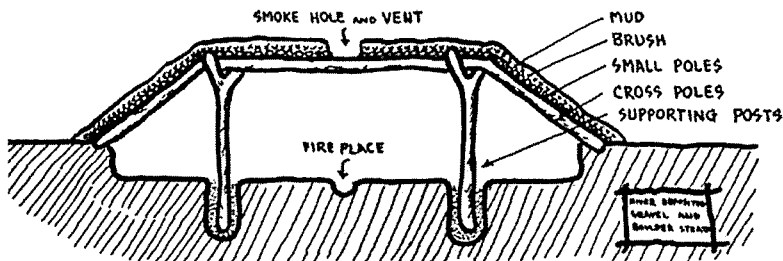


FIGURE 5

Diagram of house-type, Bonnell Site.

6. Consult: Lehmer, Donald J., *The Jornada Branch of the Mogollon*, Tucson: The University of Arizona Press, Social Science Bulletin, No. 17, 1948.

Mera, H. P., *An Outline of Ceramic Developments in Southern and Southeastern New Mexico*, Santa Fe: Laboratory of Anthropology, 1943, Technical Series, Bulletin No. 1.

3. Secondary posts of cedar are set in the room at irregular intervals. These are sometimes used in the wall; in this case, the posts were set close to the wall, and slanted toward the cross beams. Small wall posts could be set at the floor level or in the ground outside of the pit. Many small posts were found that could not have been used in wall construction; they were probably associated with the various domestic affairs.

4. The fire area is centrally located. Construction varies from deep, well-plastered pits of less than a ten inch diameter to large shallow depressions with an irregular outline covering an area thirty-six inches across.

5. The superstructure of the building was made by placing poles at intervals of eight to twenty inches apart at the outer edge of the building. Presumably the walls were completed by interweaving brush through the poles and plastering. These small poles were usually not deeply embedded in the earth, but set in shallow depressions. Evidence for the covering of brush and clay is found in the form of large pieces of baked clay with reed and brush impressions on them, and layers of charred reeds in the roof fall-in of buildings.

Construction Timber. The timber used in house construction consists of cedar, pine, and cottonwood. Cottonwoods grow along the Ruidoso River at the present time, and hence were available within one-quarter of a mile. The cedar is native to these hills, and is also readily available; however the nearest pine at the present time is on the higher slopes of the Sierra Blanca Mountains.

Discussion of Individual Houses. House 1 (See Figure 4). This is the largest pit house encountered. This floor level is five feet five inches below the present ground surface. It measures twenty-one feet eleven inches by twenty-two feet two inches. In depth, the pit varies from twenty-one inches to twenty-two inches. Walls are straight and well-plastered with a light colored clay. The floor has been likewise plas-

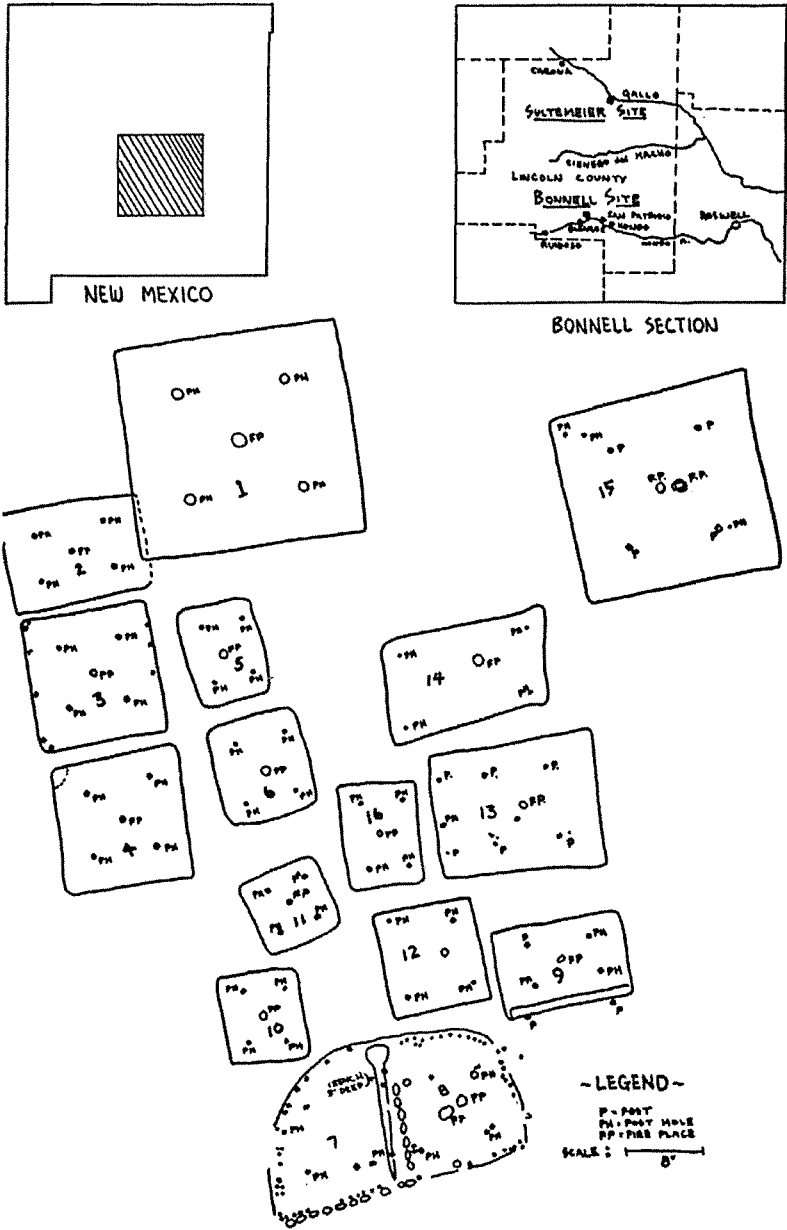


FIGURE 4

Floor plans of Bonnell Site rooms.

tered until hard and level. The walls of the building are placed nearly square to the points of the compass.

Four large posts formed a square in the central part of the room. All of these post holes had a diameter of between eleven inches and sixteen inches. These formed the basis for the cross beams of the roof. A few disintegrated fragments of the wood remained in each hole. On the east side, between the two major posts, was a large supporting post of white pine which had not been set in a post hole, but merely rested on the floor. It is about ten inches in diameter and had been burned to within some two inches of the floor.

Secondary posts were located around the edge of the walls, and some were in the room proper. Wall posts were placed both at the floor level and at the top of the pit. Often, the post was embedded at the floor level, and recessed into the wall, so that the wall plaster covered the pole. Cedar was used for these posts.

Five small posts were set in the room (Figure 4). These could have been used to hang things on, or they could have been used for some domestic purpose that is not now discernable.

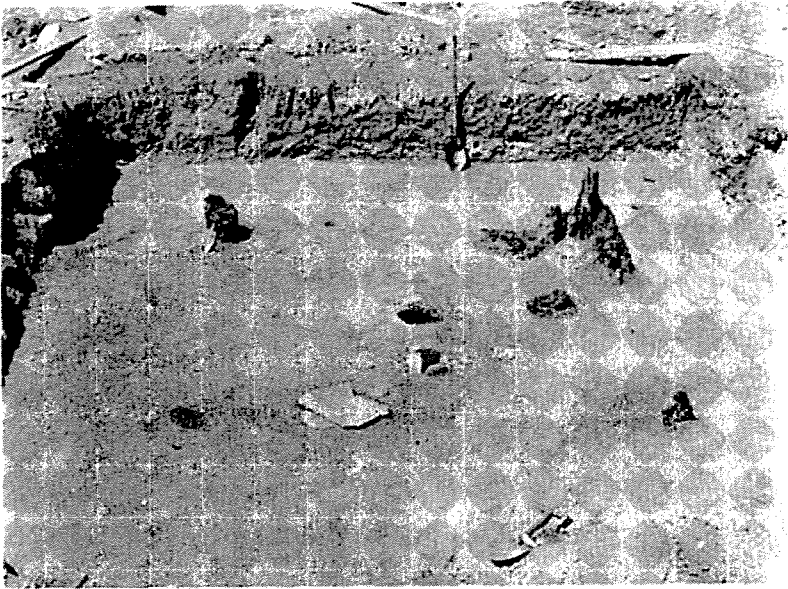
Roof construction is thought to be the same as the walls. Small poles of two to four inch diameter were used on rafters across the large supporting roof beams, spaced about sixteen to eighteen inches apart. This was topped by small poles laid close together and covered with brush or reeds. The whole was covered by a thick layer of clay. This provided a well insulated dwelling. One charred end of a large cross beam was found in the northwest corner of the pit house. It was cottonwood with a diameter of twenty inches. This beam showed evidence of being worked into a plank; it has a rather uniform thickness of three inches. Undoubtedly there was an air vent in the roof above the fire pit.

The fire pit of this house was roughly in the center of the room. It has a sixteen inch diameter, and is six inches deep at the center. This fire place has the shape of a gently

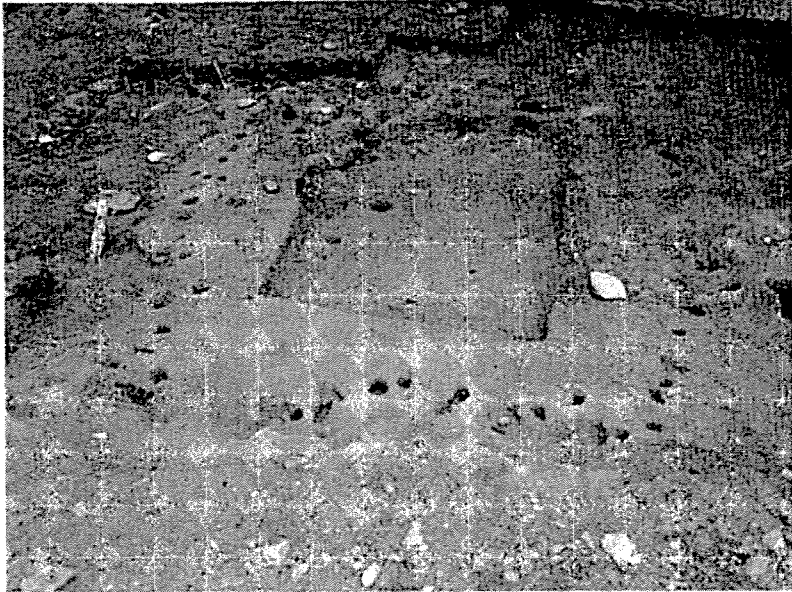
rounded bowl; and the interior is smoothly and heavily plastered.

Artifacts encountered in this pit house include pottery, bone objects, and stone implements. Numerous pottery sherds were found of the local types, such as El Paso ware, Plain Brown ware, Chupadero Black-on-White, Three Rivers Red-on-Terracotta, and Lincoln Black-on-Red. Two complete pottery vessels were recovered. One is a Chupadero Black-on-White jug which was sitting in the southeast corner (Plate 16, A). This jug is eight inches tall and seven and one-half inches in diameter. In direct association with the jug were six bone gaming pieces. The other pottery vessel is Lincoln Black-on-Red; however, it lacks the characteristic black design. This bowl is seven inches in diameter and two and five-eighths inches high. Three bone awls were found, two of which are split long bones, while the other is a deer ulna awl with the effigy of a mountain sheep carved on the handle (Plate 17, b). Three crude hammerstones and a fragmentary arrow shaft straightener are the stone implements associated with this house.

House 2 was occupied later than *House 1*, because it is higher in the stratigraphy of the site, and the east side overlaps the outline of the first house (Figure 4). Three occupational periods of this room are indicated by three floor levels. The earliest floor is about two and one-half feet below the present surface. There are eight inches of fill between this and the middle floor level. The latest floor level is separated from the middle floor by three inches of fill. Each of the floors is of hard packed clay. The house was built in a pit. On the south side an adobe wall had been built which was nineteen inches wide, and two feet high at the time of the first occupation. The wall remained the same height for the subsequent occupation, hence the pit became more shallow as the fill accumulated. The other walls of the pit seem irregular; however, it is difficult to discern the original height of the pit as the area has been disturbed by previous digging. The adobe wall on the south served as the partition between rooms two and three (Figure 4).



A



B

PLATE 11

A, room 15; B, post hole design in area between room 1 and room 15.

Four central posts were present at all three floor levels, as were secondary posts. Set in the south adobe wall are depressions where small poles had been set. Some of these post holes were four inches deep, while others were only two inches in depth. Presumably the usual construction of poles slanting from the ground to the cross beams and covered with brush and mud was followed. Charred vigas found on the floor indicate that the cross poles of the roof ran north and south.

The fireplace for the first, or earliest, occupation had a diameter of ten inches and was ten inches deep. The walls of the fire pit were straight and well-plastered. There was a layer of caked ashes in the bottom. The middle floor level used the same fire pit, building up the sides until the pit was eighteen inches deep, and the same diameter as the earlier one. Again the sides are smooth and plastered. The latest occupation sealed up the old fire pit and had a shallow depression ten inches in diameter and two inches deep, in which were found some ashes and charcoal. It was located above the previous fireplaces. All three of the fireplaces are located close to the center of the room.

House 3 is located directly south of *House 2* (Figure 4), and they are separated by the common adobe wall. Dimensions of this house are twelve and one-half feet by thirteen feet. The floor is three feet below the present surface of the ground. The house is set in a pit that was about twelve inches deep at the time of occupation. The room has been refloored once; there is only one inch between the two floors, which indicates that there was no time lapse between the two occupations. Both of the floors are smooth and made of hard clay.

Four centrally located post holes carried the weight of the roof. The southwest post hole is twenty inches deep and has a fifteen inch diameter. The southeast one is fifteen inches deep and eight inches in diameter; the northeast hole is seven inches deep and has a seven inch diameter; the north-

west post hole is fourteen inches deep and six inches in diameter. Fragments of cedar posts were found in the holes.

All of the secondary posts are located close to the walls (Figure 4). There is a concentration of large, deep post holes on the west side of the building. In both the southwest and the northwest corners were double posts. This could indicate that more of the weight of the walls and roof were carried on this side.

From the charred vigas and burned clay that had fallen into the room, it is presumed that the walls and roof were completed by placing poles across the large cross beams, covering these with smaller poles, and topping with mud or clay.

The fire pit has a twelve inch diameter at the surface, and a seven inch diameter at the bottom of the pit. In depth, it measures nine and one-half inches. The interior has been well plastered, and the bottom had a layer four inches thick of caked ashes.

House 4 is directly south of houses 2 and 3; however, it belongs to an earlier occupation than either. The floor is five feet below the present surface of the ground. This house has an irregular shape. The west wall is ten feet long; the east wall is thirteen feet ten inches long; the south wall is twelve feet four inches long; and the north wall is twelve feet nine inches long. The house was placed in a pit that had been dug into the gravel. The surface of the gravel was uneven, hence the depth of the pit varied from seventeen inches on the east side to twenty-three inches on the north side.

The floor of the pit was rough and was somewhat higher at the edges of the room, and having the greatest depression at the center of the room. The rough gravel bottom was covered by a thin layer of clay that has been worn away in many places. The walls of the pit had large stream rocks protruding. No effort had been made to effect a smooth wall; although some plaster had been irregularly applied.

Four central posts formed a rough square in the center of the room that measured approximately five feet nine inches. These post holes varied in depth from eighteen inches to twenty-three inches; and they varied in diameter from seven to nine inches. There are no secondary posts in this house. If any small posts were present, they were set on the ground level of the pit and have been obliterated by later occupations.

No definite fire pit was in this house. Instead, there was a large depressed area in the center of the room where the fire had been. This area is twenty-eight inches from north to south and nineteen inches from east to west. In this area the clay of the floor has been burned to a bright orange, and there are ashes and charcoal.

In the extreme northwest corner a burial was found. A hole had been dug through the floor to a depth of thirteen inches. The opening in the floor measured twenty-four inches north and south and eighteen inches east and west. The skeleton was a child of approximately five years. The body was in a tightly flexed position with the head oriented to the north. The floor had been sealed after the burial, which would indicate that the house had been abandoned after the burial.

House 5 was not followed to the limits of the walls because of previous digging. However, it was possible to ascertain the position of the four central posts, the fire area, and the depth of the pit on one side. This house is located south of House 1 and east of House 3 (Figure 4). This floor level is thirty inches below the present surface. According to stratigraphy, this house was occupied about the same time as the lower level of House 2.

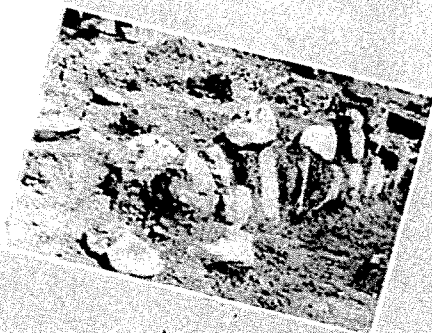
Outside dimensions of the room are not available. The central posts form a rectangle seven feet two inches from east to west, and the east side of the rectangle is six feet while the west side is four and one-half feet. These posts averaged six inches in diameter. Approximately in the cen-

ter is a bed of ashes. These ashes were caked in an area twenty-four by eighteen inches. This is the only fire place associated with this house. The floor was plastered and had been smooth and even. From the one wall that was found, it is presumed that this house was in a shallow pit, only three to four inches deep.

Artifacts associated with this house are a large unidentified bone implement (Plate 17, k), a flat metate fifteen inches long and nine inches wide, and a mano eight and one-fourth inches long.

House 6 is approximately square, and is eleven feet north and south and nine and one-half feet east and west. The floor level is just above the undisturbed gravel. The house was no doubt occupied at the same time as *House 5* and has similar characteristics.

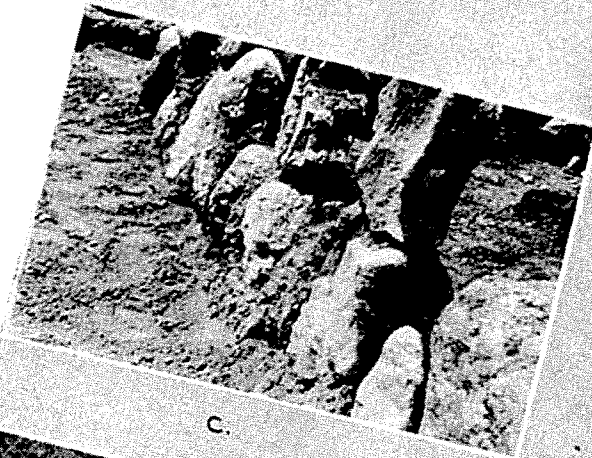
Houses 7 and 8 are structures with slab stone walls. These two rooms have rock walls on two sides. The walls are formed by large rocks, sometimes measuring eighteen by eight inches. These are stacked on edge in two or more courses, being only one rock in thickness. Two such walls were encountered, one running north and south, the other running east and west (Plate 12, a and c). The north-south wall is made of larger rocks, is higher and is in a better state of preservation. The other wall, which has been subjected to erosion at the southern edge of the mesa, was made of smaller, rounder stones. The walls were nearly perpendicular to each other, forming a pattern like a "T". The top of the "T" runs east-west on the south of the mesa, with the perpendicular piece running north from the south wall. Plaster is not present on any of the rocks in the walls. Two adjacent rooms were formed by these walls, the north-south wall being the common wall (Fig. 4). There are two levels of occupation in room 8 with four inches of fill between. Room 7 did not have a fire place. Each occupational level of room 8 had a fire place, with the upper one being about two feet to the northeast of the lower one. Both of the fire pits of room 8 have diameters of thirteen to fifteen inches and a



A.



B.



C.



D.



E.

PLATE 12

A. East wall of room 7; B. Firepits and segments of the two-floor levels in room 8; C. West wall of room 8; D. Segment of post of upper occupation; (Note the rock footing.) E. Segment of flagstone floor in a partially excavated room of upper occupation west of room 7.

depth of four to five inches (Plate 12, b). The walls of the fire pits are straight but unplastered.

South of the southern wall are small projections that could have been used for storage bins, but nothing was found in any of them. Just south of the wall of the east room was a shallow pit in the gravel that contained sherds of El Paso pottery, all fire-blackened.

The remaining walls of these houses were supported by posts. These two rooms were not placed in pits, but the packed clay of the floor was placed directly on the ground. Artifacts found in association with the stone walled houses are identical to those found in the other structures.

House 9 was oblong in shape, being nine feet north and south and thirteen feet six inches east and west. Its floor level was just above the undisturbed gravel deposit and was well made and easy to trace. On the south edge of the room is an adobe base wall twelve inches wide and fourteen inches wide (Fig. 4). The fire place is twelve inches in diameter and four inches deep, and is well plastered.

Houses 10, 11, and 12 are similar to 5 and 6 and belong to the same occupational level.

House 13 belongs to lower, or original occupational level with its floor being on the undisturbed formation, and being eighteen to twenty-four inches below the present surface. The room is approximately thirteen feet north and south and seventeen feet east and west. Six cedar posts were found in their original positions within the room. Four of them were center posts and two with the same spacing and alignment were adjacent to the west wall. There were no corresponding posts or holes near the east wall. The fire pit, approximately in the center of the room, was well-made and plastered with clay. An unusual amount of pottery sherds were found immediately on the floor. Two or three ollas were broken on the floor at the close of, or after, the room's last occupation.

House 14 differs from all the others described in this paper in that it belonged to the upper, or most recent, occupation. Its floor level was six inches below the present surface and is eighteen inches above the levels of Houses 5, 6, 16, and 13. The dimensions of the room are sixteen by ten feet. The floor is poorly made, indistinct, and hard to follow. The fire place, located off center, was rough and poorly made. A pit was dug in the southeast corner of the room, and fifteen inches below the floor level, another floor of excellent make was found. In all likelihood house 14 is superimposed on the fill above another house which belongs to the same period as houses 5, 6, 9, 10, 11, 12, and 13.

House 15 is similar in every respect to house 1, only slightly smaller in dimensions, being eighteen feet square. The original builders had excavated a pit two feet deep, quite a chore for them considering the hardness of the river-deposited gravel and boulder formation. A beautiful, smooth, hard floor had been laid on gravel bottom. Since the house was abandoned, from eighteen to twenty-four inches of fill has accumulated above the original ground level, or from three and one-half to four feet above the floor level.

Obviously the interior of the room burned out shortly after its abandonment. The charred bases of the four center posts are still in place. These extend above the floor level from four to eighteen inches and vary in diameter from nine to twelve inches (Plate 11, a). On the floor was a segment of roof beam about two feet long and fourteen inches in diameter. It had doubtless been the beam which connected the tops of the two west center posts. It had not been charred and was in badly disintegrated form. However, its dimensions were easy to measure.

In the center was a bowl shaped, beautifully plastered fire place with its top flush with the floor save for a slight elevation of the rim an inch high and two inches wide. One foot to the east of the round, central fire place was another, oblong, with each of the four sides formed by a flat stone

on edge. The inside dimensions were six by eleven inches. Both fire places were filled with ashes.

The west wall still retained the original plaster which had been covered with successive layers of greyish wash. In one place five thin layers of the wash were intact.

At floor level in the southwest corner was a niche eleven inches wide and ten inches high. As it extends back, to a depth of fourteen inches, it slopes downward to a depth of five inches. The bottom and sides were plastered. The niche contained a number of pot sherds, two pieces of yellow ochre, and one piece of dark red paint. This niche is similar to one found in the northwest corner of house 1. Of interest is a hole in the floor two inches in diameter and nine inches deep. It is located eighteen inches east of the southeast center post. (Plate 11, A).

Summary of observations on houses. There were two major periods of occupation, the lower, or older period, and the upper, or later period. An interval of unknown length intervened between the major occupations. The houses of the lower occupation followed a similar pattern with a central fire place, four center posts, leaning side walls for the parts above ground, and well-made, smooth, compact floors. Houses of the upper occupation were poorly made, varied considerably in shape and size, with floors indistinct and often difficult to trace, small posts, and without well-defined fire places. There is some evidence that some of the houses of the later period were rather flimsy, jacal-like structures. (See post hole pattern in Plate 11, b).

The number of houses of the second occupation, superimposed over those shown in Figure 4 (with the exception of house 14 which is an upper level room) probably outnumber the lower level rooms shown. The upper level rooms, with the exception of house 14, are plotted due to the fact that their floors and boundaries were so indistinct that they could not be mapped with certainty. Their existence was indicated by scores of posts and post holes whose bottoms

terminated in the fill above the floor levels of the lower rooms. The posts in the upper, looser fill often had rock footings. (Plate 12, d).

Pottery

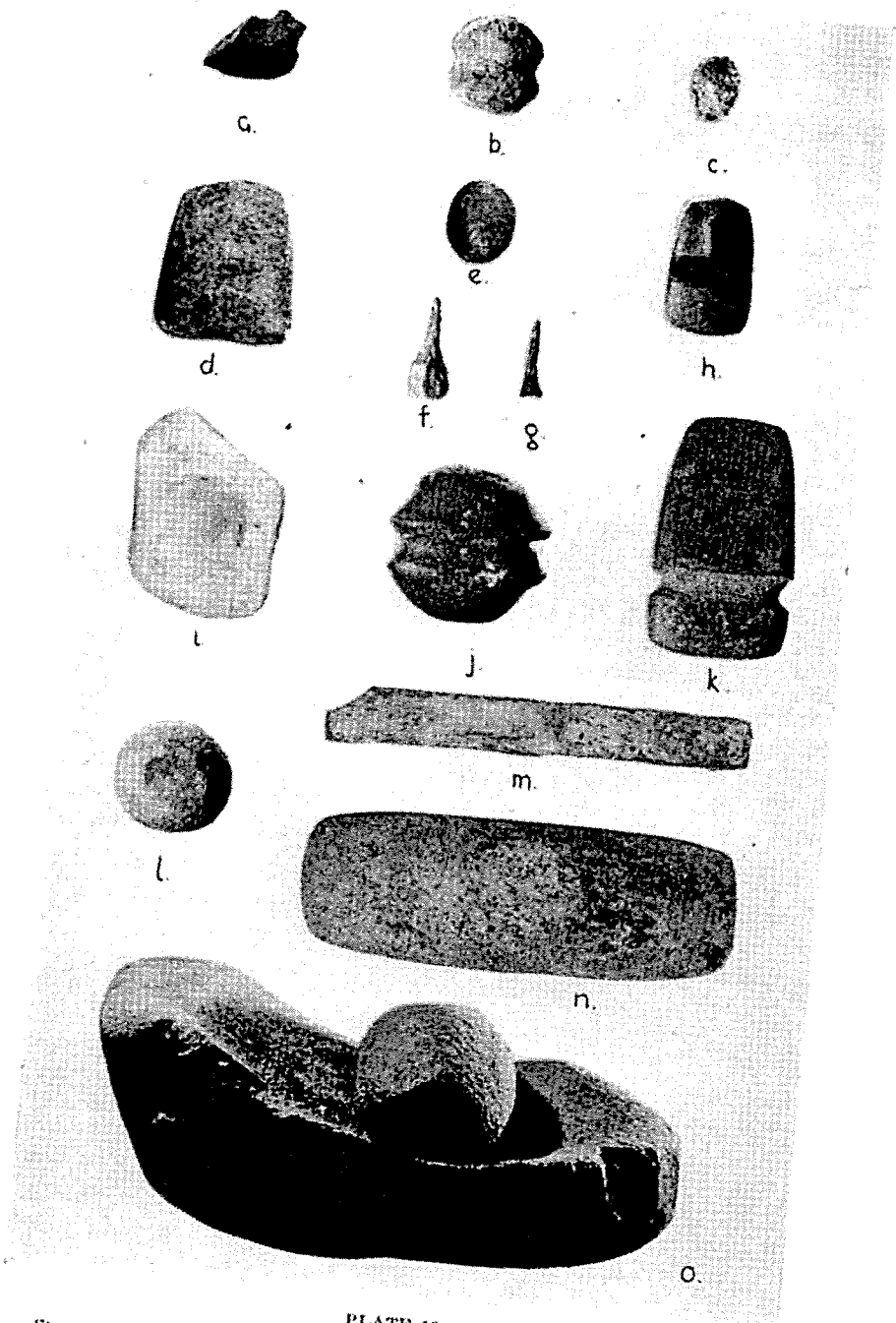
At the Bonnell Site, as elsewhere in Southeastern New Mexico, pottery provides the most useful and reliable basis for cultural classification and dating. Over 100,000 sherds have been collected from the site. Fifteen pottery types have been identified, which are as follows:⁷

- El Paso Polychrome
- Polished Brown
- Plain Brown
- Jornado Brown
- Three Rivers Red-on-Terracotta
- Lincoln Black-on-Red
- Chupadero Black-on-White
- Corrugated or Rubbed Coil Ware
- Mimbres Black-on-White, Bold-Faced
- Tularosa Black-on-White
- Gila Polychrome
- Playas Red Incised
- Ramos Polychrome
- Agua Fria Glaze-on-Red, or Rio Grande Glaze I
- Heshotauthla Glaze-on-Red

Eight types are considered to be resident to the site because of their large occurrence. These are El Paso Polychrome, Polished Brown, Plain Brown, Jornado Brown, Three Rivers Red-on-Terracotta, Lincoln Black-on-Red, Chupadero Black-on-White, and corrugated. Mimbres Black-on-White, Tularosa Black-on-White, Gila Polychrome, Playas Red Incised, Ramos Polychrome, Rio Grande Glaze I, and Heshotauthla Glaze are considered to be intrusives.

Brown ware is characteristic of the entire southern area of the Southwest. El Paso Polychrome, Polished Brown,

7. A type collection was identified by Dr. H. P. Mera, Erik Reed, and Stanley Stubbs in Santa Fe, August, 1950.



Stone artifacts of Bonnell Site.

PLATE 13

Plain Brown, and Jornado Brown are identified with the Jornado culture. Typological differences of the four brown wares are indefinite at the present time, consequently a thorough sherd analysis was not possible. Morphological differences used in distinguishing the four types in this paper are as follows. El Paso Polychrome has a paste that is gray to black with coarse sand tempering.⁸ The decoration is red and/or black on brown. Jar rims are thickened everted (Plate 15, b, d). Walls of the vessels are thin, averaging one-eighth inch in thickness. The most common form of El Paso pottery is the olla or jar (Plate 16, d).

Polished Brown ware has an even paste that is medium brown in color. The walls of the ollas are about one-fourth inch thick, which is decidedly thicker than El Paso Polychrome. The outside of the jar is a highly polished brown; the inside of the jar has been scraped smooth. Ollas are the only form of this ware present at Bonnell.

Plain Brown ware has a light brown paste that is fairly regular in texture. The vessels are crude and irregularly made. Usually there is no decoration, but incising and punctating occur. Walls vary in thickness, but in general they are about one-fourth inch thick. This ware is the most crude of the four brown ware types, and more individual variation occurs.

Jornado Brown ware has a black to brown paste of grainy texture. It is thicker than El Paso Polychrome, and is always in the olla form. Crudely made, it sometimes has a black or red design of no special form.

Approximately fifty per cent of the Bonnell pottery is brown ware. Plain Brown and Jornado Brown are the most numerous. It must be remembered that most of the brown ware was in the form of large ollas which would break into more sherds than the smaller jars and bowls of the other pottery types; hence it is possible that a sherd percentage

8. Jennings, 1940.

does not give an accurate idea of the actual number of vessels belonging to each pottery type.

Broad-lined Three Rivers Red-on-Terracotta comprises the next most numerous ceramic group. The only known form is the bowl (Plate 16, c). Rims are direct and flat; the paste is even and tempered with fine sand. Decoration consists of a broad line applied to the bowl interior (Plate 15, b, c). The time range begins before 1350 A. D. and ends *circa* 1450 A. D. Thin-lined decoration is present on only a few sherds.

Chupadero Black-on-White has a long time range, being in existence from *circa* A. D. 1050 to 1650. This ware has a gray paste with fine sand tempering. The characteristic design is alternating solid black and hatched areas (Plate 15, b, j and k). The interior is usually given a rough finish by brushing, which results in striated lines on the interior surface. The base is a disc type, so called because a disc was shaped apart from the rest of the vessel, to which the walls of the jar or bowl were added. The most common form of Chupadero Black-on-White at Bonnell is a jar with a flaring rim (Plate 16, c); bowls with straight rims are also found. On jars the handles are usually formed by two or three pieces of rolled clay placed side by side. One small ladle of Chupadero ware was found. This ware was in constant usage during the occupation of the site.

Corrugated or rubbed coil ware occurs throughout southern New Mexico. This ware at Bonnell ranges from sharp corrugation to a rubbed-over coil. In color, the range is dull red to gray and black (Plate 15, B, e).

The paste of Lincoln Black-on-Red is like that of Three Rivers Red-on-Terracotta, the main difference being in the decoration. Lincoln Black-on-Red has a deeper red background on the interior and black line decoration (Plate 15, B, b); however, sometimes, the bowls have the red slip on the interior, but are lacking the black line decoration.

The remainder of the pottery types represent distinct intrusives, for only a few sherds of each type were found. Although the intrusive wares are few in number, they give the best available indication of outside contacts. They also offer the best technique of dating the site through cross dating with areas where the chronology has been fully worked out.

Gila Polychrome occurs in both bowl and olla forms; it is the second most numerous intrusive. Bowls have black-on-white interiors, red exteriors, and flaring rims. Ollas have black-on-white designs on the exterior and are red to yellow on the interior. This ware, which comes from the Gila Valley of Arizona, generally from the region about Safford and west to Globe, has a time range of about A. D. 1350-1450 (Plate 15, B, m).

Mimbres Black on White is the most numerous type of intrusive pottery. It is the late Bold-Face type. There were Mimbres villages as far east as Ruidoso, and it is likely that sherds are from these nearby sites (Plate 15, B, f).

Tularosa Black-on-White has a harder paste than the Mimbres Black-on-White and the white is often crackled. The hatching design is parallel to the area blacked in, and the black often appears as brown (Plate 15 B, g).

Ramos Polychrome and Playas Red Incised are both from Chihuahua (Plate 15, B, h and i). These two wares are commonly associated with Gila Polychrome, Chupadero Black-on-White and St. Johns Polychrome, which would give it an approximate date of 1350-1450.

Heshotauthla Glaze is represented by six sherds from the same bowl. This ware is from Zuni, and slightly predates Agua Fria Glaze-on-Red. It has a redder slip than the Agua Fria Glaze-on-Red; in fact the slip is sometimes thick enough to crackle.

Agua Fria Glaze-on-Red, or Rio Grande Glaze I, is a member of the Rio Grande Glaze group, the development of

which is well-known and accurately dated by dendrochronology. This Glaze I starts about A. D. 1350 and lasts until 1450. The fifteen sherds found at Bonnell probably come from the southern portion of the glaze area, possibly the Jornada del Muerto. Since this pottery provides the most precise date available for the Bonnell Site, it would indicate that the occupation of the site includes this time period. The dates of other intrusives also fall generally into this same time range, and it seems that the closing occupancy was approximately A. D. 1450. This is substantiated by the absence of Glaze II which would have reached the area by this date.

Saint John's Polychrome is rare in this complex, but one practically complete bowl was found on the floor of room 13.

Unidentified sherds numbered approximately 1% of the whole amount. Among these are several sherds of a polished black ware. There is one unidentified black-on-red type.

Miscellaneous objects of pottery include three pipes of undecorated brown ware, which are tubular and average three inches in length. Three sherd discs could have been used as pendants. Some have perforations near the top as though for suspension and show wear around the holes, while others have holes in the center, or merely have a hole started but not completely drilled. Usually the pottery is a brown ware, but one black-on-red disc was found. One pottery pendant is in the form of a triangle with notches on each side; all of the edges are beveled (Plate 15, A, c).

Ground Stone Objects

Grinding and Pounding Implements. Three types of grinding stones occur at the Bonnell Site. They are a trough or scoop metate, which has been ground with a backward and forward motion, a flat metate that shows no sign of wear, and a basin type milling stone which has been ground with an elliptical or rotary motion. Fourteen grinding stones were recovered.

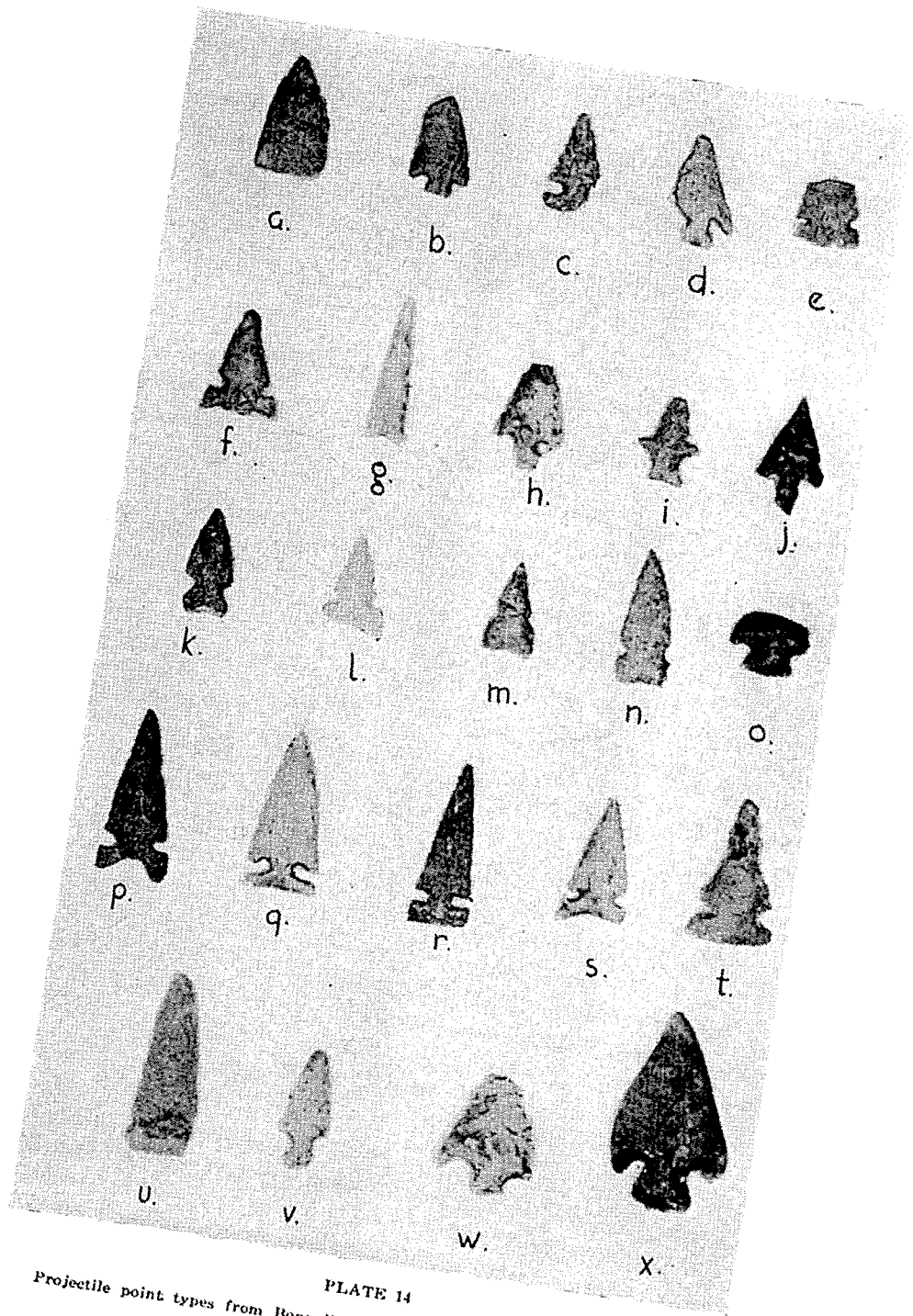


PLATE 14

Projectile point types from Bonnell Site.

At the proximal end of each trough metate is a flat heel about four inches in width (Plate 13, o). The distal end is thinner than the proximal end and is open. This type of metate averages eighteen inches in length and thirteen inches in width. The actual basin is about fourteen by eleven inches.

Basin milling stones average nineteen by sixteen inches. Only one has the "heel" which occurs on the trough metates. These all show grinding with an elliptical motion and have a central basin about four inches in depth. One of these basin milling stones has been worked on the sides and bottom to a uniform thickness, while the others are very uneven, varying in thickness from four to seven inches.

The flat metate is exceedingly well made. It measures twenty-four inches in length, fifteen inches in width, and is two inches thick at the grinding section. It is of a finer grain than the other grinding stones, which are made of coarse igneous rock. It also has a four inch "heel", which is elevated one-half inch above the level grinding surface, and there is no depression from grinding. On the reverse side of the metate is the imprint of a large cloven hoof. The imprint is four and one-half inches long.

Seventy-seven manos were recovered in the excavation, plus fifty-five surface finds that were available for analysis. Manos include the two handed cylindrical type, a one-handed oval type, as well as some very large heavy cylindrical specimens. The two handed cylindrical mano has a size range of six to nine inches in length and two to four inches in depth. These made up eighty-two per cent of the total manos. This type of mano was probably used with trough metates, the mano covering the entire grinding surface (Plate 13, o). There is a great deal of variation in the size of the oval hand stones. They range from three to six inches in diameter and from one and one-half to four inches in depth, and made up ten per cent of the total number of manos. The oval mano was probably used with a rotary milling stone, covering only a part of the grinding surface.

Only one flat mano was recovered. It is eleven inches in length and varies from one-half to three-fourths inch in thickness (Plate 13, n). This mano is well ground and has copper oxide stains on one surface.

Three large heavy manos were found. They range in length from thirteen and one-half inches to sixteen inches and are five to six inches in width. These manos are exceedingly heavy, and of undetermined use.

Igneous rock was used to make all of the manos. Possible sources of the material are igneous pebbles in the stream bed or out-croppings of igneous dykes that appear at intervals up and down the Ruidoso Valley.

One fragmentary pestle was recovered from the upper occupation. It is four and one-half inches long; the grinding surface measures three and one-half by two and three-fourths inches. No mortars were found in the excavation, but several are reported to be located in the large rocks in the valley.

Axes. Nine full-grooved axes were recovered. Seven are made from igneous rock and show signs of usage on the cutting edge. They vary in size and in workmanship. The smallest axe is four and three-fourths inches in length and shows good workmanship. The largest axe is crudely made; it is six and one-eighth inches long and four and one-fourth inches wide and two and one-fourth inches thick. It has been roughly pecked into shape, but the form is irregular.

One axe has been made from a mano, and merely had the groove added. The best made axe is of a fine-grained rock that is green in color (Plate 13, k). The blade shows no sign of use and the axe is well-shaped.

Arrow-shaft tools. The seven arrow-shaft tools from this site are of a uniform type. Each has been made from a small well-shaped mano and has a single groove running transversely across the upper surface (Plate 13, h). The lower surface of the shaft tools is flat and well-ground. The speci-

mens average four and one-fourth inches in length, three inches in width, and two inches in thickness. The grooves are uniformly made, being one-half inch in width and one-fourth inch in depth.

Most of the arrow-shaft straighteners previously described in the literature are much more elaborate. The site which has yielded arrow tools most similar to those at Bonnell is the Bradfield Site in the Lower Tularosa Basin, where most of the tools have one or two transverse grooves.

Hammerstones. No accurate count of the hammerstones was kept; however, sixteen were noted. They are fashioned from battered nodules of igneous rock and are of various sizes and shapes, showing heavy usage on the various prominences (Plate 13, 1).

Paint Palettes. Fourteen palettes were recovered, and these occur in three distinguishable forms. One form is a flat, unshaped stone slab that has adhering particles of red and yellow ochre. This type averages six and one-half inches in length. Another form is a shaped stone, with a central depression two and one-half inches in diameter and one-half inch in depth at the center (Plate 13, i). Three palettes show this depression. The other form of palette, of which only one specimen was found, is a piece of broken El Paso pottery that had been used to mix yellow ochre.

Stone Ornaments. One stone pendant was recovered. It is one and one-half inches in length and one and one-fourth inches in width. It has an engraved human face in inverted position and a hole for suspension at the top (Plate 15, A, a).

A turquoise pendant is three-fourths inch long and one-half inch in width (Plate 15, A, d). It is light blue turquoise with golden matrix, such as is found at Oro Grande, which is in the lower Tularosa Basin eighty miles southwest of Bonnell. Four discoidal turquoise beads, as well as two small masses of unworked turquoise, were also recovered.

One stone bead is made of a pink stone; it is three-fourths inch in length, and is in the shape of a comma. A hole for

suspension is in the larger end. Two discoidal beads of purple fluorite were found; they measure only one-fourth inch in diameter. One small unworked mass of the material was also present. These beads were associated with other discoidal shell beads, and a *Conus* tinkler in House 8.

Miscellaneous Objects of Stone. Three unidentified stone objects are made of a stone that is not native to the mesa, and thus were obviously imported. Each of the three specimens shows crude workmanship. They are in the shape of an elongated rectangle with a cross-section measuring about one and one-half inches square. One of these stones is eleven and one-half inches in length (Plate 13, m), while the other two are about four inches in length. Similar objects have been found in the Mimbres sites, but they are usually made. It has been suggested that they are ceremonial staffs.⁹

One grooved ball-like object was encountered (Plate 13, b). It is two and one-half inches long and two inches in diameter. Around the center is a groove about three-fourths inch wide and one-third inch deep. Its use is undetermined, although it could have been used in a handicraft, such as weaving, to weight a ball of yarn.

Fifteen granite pebbles were found. They vary from three-fourths to two inches in diameter (Plate 13, e). Those which show use could have been used in polishing pottery, while others may have been gathered because of the varied and attractive colors of the pebbles.

Chipped Stone

Scrapers. Twenty-four scrapers were present. Approximately two-thirds of these scrapers are side scrapers (Plate 13, a), while the others are end scrapers (Plate 13, c). The largest scraper has a width of three and one-half inches, while the smaller retouched flake scrapers measure one to one-half inches. One scraper has a sharp graver point at one end.

9. Conversation with Mera, Santa Fe, 1950.

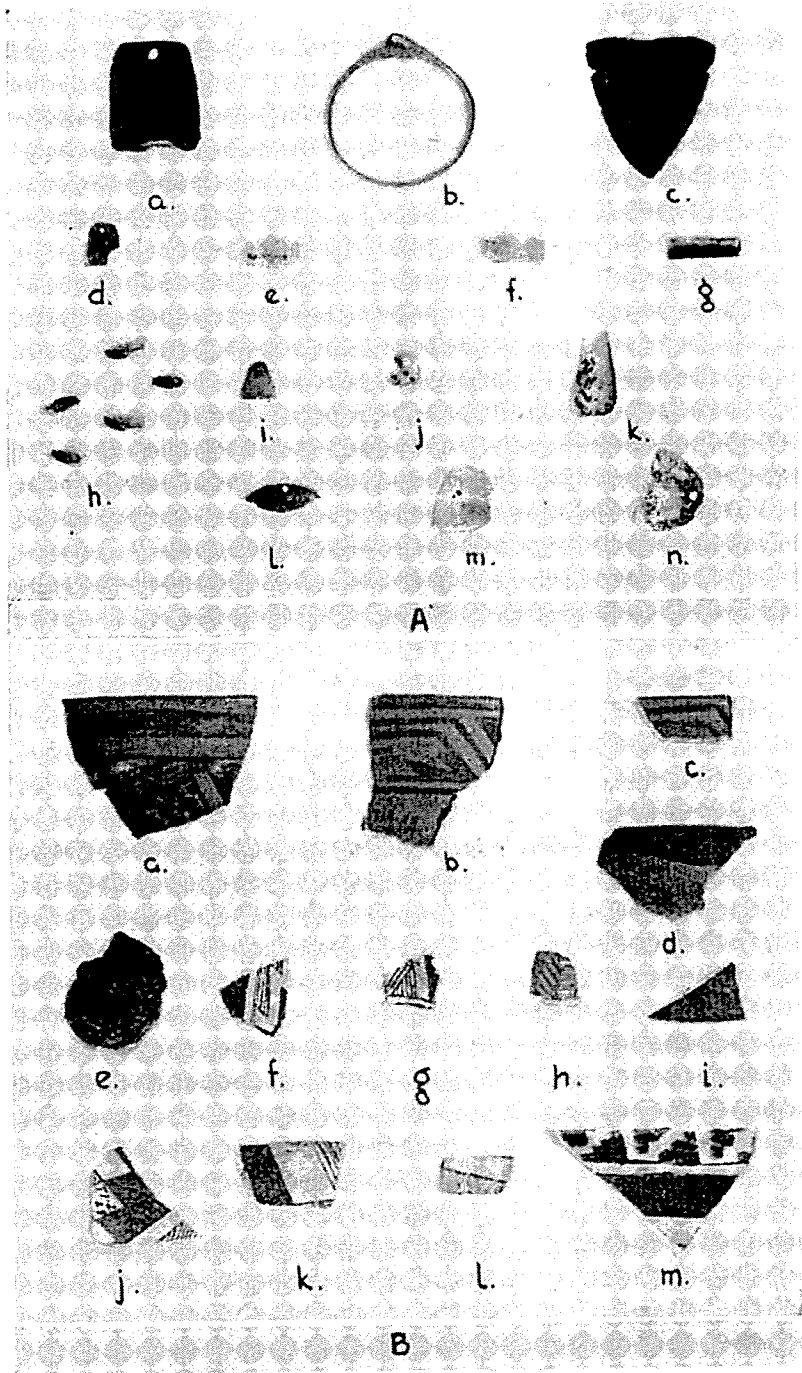


PLATE 15

A. Ornaments of shell, bone, turquoise, and pottery from Bonnell Site; B, Pottery types of Bonnell Site.

Gravers. Four gravers were recovered. All are small flakes, averaging one and one-fourth inch in length, with a sharp projection on one side.

Drills. Five stone drills were found (Plate 13, f and g). The largest is two and one-half inches long.

Projectile Points. Ninety-five projectile points were recovered at Bonnell (Plate 14). Materials used in making the points are white opal, chert, chalcedony, flint, Alibates flint from the Canadian River of Texas, red jasper, and obsidian. Most of the points are made from flint and chert. White opal, jasper, and obsidian are found in only one or two points each. They may be classified on a basis of form as follows.

<i>Form</i>	<i>No. of Points</i>	<i>Key to Plate 14</i>
Triangular	4.....	a
Long triangular point		
with indented base	4.....	g
Side-notched	55.....	f, k, l, m, n, p
With concave base	20.....	q, s
With convex base	21.....	c, t
With straight base	13.....	r, u
And base-notched	1.....	e
Corner-notched	21.....	b, d, h, i, j, o, v, w, x
Broken	24.....	

The triangular point is one-half inch wide at the base and one inch in length. It is made of flint (Plate 14, a). The four long, narrow triangular points with indented bases vary in length from three-fourths inch to one and one-half inches. All exhibit fine chipping. White opal and obsidian are the materials used in these points (Plate 14, g).

Side-notched points with concave bases measure from three-fourths to one and five-eighths inches in length and are three-eighths to five-eighths inches wide at the base. Side-notched points with convex bases vary in length from one inch to one and one-half inches and are one-half to three-fourths inch wide at the base. All of these are made of flint

and chert. The side-notched points with straight bases usually exhibit fine chipping. In length, they vary from one and one-fourth to one and three-fourths inches. When the three varieties of side-notched points are grouped together, they form the most numerous group of points found at the site.

Only one basal fragment of a side and base-notched point was found. The base is one-half inch wide; the length cannot be determined (Plate 14, e).

Corner-notched points vary a great deal in size, shape and workmanship (Plate 14, b, d, h, i, j, o, v, w, x). The smallest point of this form is seven-eighths inch long and nine-sixteenths inch wide at the base (Plate 14, b); while the largest is one and three-fourths inch long and one inch in width (Plate 14, x). One Perdiz point was found (Plate 14, j); this type is from the Big Bend of Texas.¹⁰ The asymmetrical point (Plate 14, b) is common near Dimmit, Texas, but is unreported elsewhere.¹¹

Objects of Bone

Bone Awls. Fifty-two bone awls were recovered from the Bonnell site (Plate 17, b, c, and d). These include splinter awls, split bone awls, and awls made from deer ulnae. They vary according to size and the amount of work expended on each. The largest awl is six and three-fourths inches long, (Plate 17, c), while the average length is about four inches. Several of them show an unusual amount of shaping and polishing. For example, the awl in Plate 17, d is very slender, having a diameter of one-fourth inch, is highly polished, and both ends are shaped to a point. One fragment of an awl has three light yellow bands running transversely around the tip.

One split-bone awl is of particular interest. The proximal end of this awl is carved to represent a human head with a

mountain sheep head-dress (Plate 17, b). It is five inches long and one and one-half inches wide at the broadest point, and three-eighths inch thick at the top. The eyes are not fashioned alike. On one side, the eye is diamond-shaped, while on the other side it is roughly circular. Green stains appear on both sides of the awl, and could have been caused by copper oxide or some chemical action in the soil. In south-eastern New Mexico this is the only object that has been reported which shows a combination of human head and mountain sheep crown. However, the mountain sheep motif is known in the Penasco valley on a bodkin-shaped object¹² in the Tularosa Basin on stone figurines,¹³ and it is also reported in the Chupadero country to the north.¹⁴ This awl was found on the floor of House 1, which is the largest and deepest pit house.

Needles. One bone needle was recovered. It is two and one-half inches long, has a spherical head at one end, and the opposite end is sharpened to a fine point.

Punches. Three antler punches were found. They each show a great deal of use (Plate 17, j).

Gaming Sticks. Thirty-one gaming sticks were recovered. There are two sizes of elongated oval sticks; one is about one and one-half inches long (Plate 17, l), while the other is three-fourths inch long (Plate 17, g). Both are usually one-fourth inch wide. Three round gaming sticks have a diameter of one-half inch. Each has a depression in the center of one side that is about one-sixteenth inch in diameter (Plate 17, f).

Agricultural implements. There are three hoes made from bison scapulae. These vary from seven to nine inches in length (Plate 17, l). Bone hoes have not been reported from the immediate area, but stone hoes are found in the Tularosa Basin at the Alamogordo Sites.¹⁵ The scapular bone hoe is

12. Jennings, 1940, p. 9.

13. Lehmer, 1948, p. 69.

14. Personal conversation with Mera, 1950.

15. Lehmer, 1948, p. 66.

common on the Southern Plains. One implement which is seven inches long, and is also made of bison scapula, shows longitudinal marks along one edge, as if it had been used with a sawing motion (Plate 17, k).

Miscellaneous objects of Bone. Two tubular bone beads were found which are three-fourths inch long and one-fourth inch in diameter. They show signs of polishing (Plate 17, a, g). A turkey leg bone whistle is three inches long with an opening midway on one side (Plate 17, i). One spatulate smoothing object was recovered (Plate 17, e). It is made from a split long bone and shows a great deal of usage.

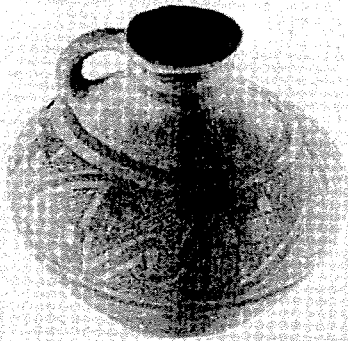
One unidentified object was made of a hollow long bone (Plate 17, a). It is six inches long and three-fourths inch in diameter. The bone has two longitudinal slits on one side. Encircling lines are engraved at both ends and at the center. To my knowledge, a similar object has not been reported previously. It could hardly have functioned as a flute. Other uses have been suggested, such as a hair ornament or some type of weaving implement. This object was found in the center of a group of rocks in association with a bone smoother (Plate 17, e) and a clay pipe.

Objects of Shell

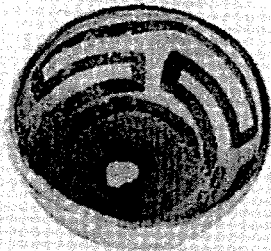
Shell was used entirely for making ornaments. A number of different shells were used. Mussel shells from the local streams are utilized most, but specimens of *Glycemeris*, *Conus*, and *Olivella* are also used.

Olivella shells are strung as beads (Plate 15, B, h). Of the two hundred and twenty-seven *Olivella* beads found, two hundred and twenty-three were associated with one burial; this burial was a child who had a burial offering of a five strand necklace of these beads as well as a "killed" Chupadero Black-on-White bowl.

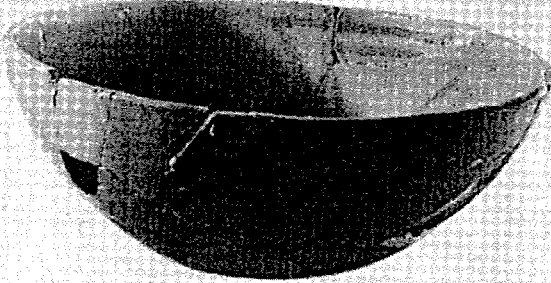
Mussel shell was used for twenty-one ornaments of varied shapes (Plate 15 B, c, d, i, j, k, l, m, and n). Some of these are well worked with the rough exterior removed to give a fin-



a.



b.



c.



d.

PLATE 16

Olla and bowl types, Bonnell Site.

ished appearance, while others are rough and relatively unshaped. One of these shell ornaments is roughly rectangular; it is one inch long and one-third inch wide. It is similar in size and shape to the bone gaming sticks, and could have been used for the same purpose (Plate 15 B, d).

Two roughly triangular objects are made of a shell that is three thirty-seconds of an inch thick. One is one and one-fourth inches long (Plate 15 B, i), and the other is three-fourths inch in length (Plate 15 B, k). Neither have a hole for suspension.

In six instances, shell ornaments are engraved (Plate 15, B, c, j, m, n). Four of these are in animal form, two representing fish (Plate 15, B, c), and one an animal such as a prairie dog or a squirrel, and the other some type of fowl (Plate 15, B, j). Two of these ornaments have holes drilled in them so that they might be suspended as pendants.

Only one bracelet was found, and it is of the usual *Glycymeris* variety (Plate 15 A, b). It was made by removing the central part of the shell and grinding the remaining ring and the hinge smooth. By-products of the manufacturing process are absent, except for the local mussel shell, which encourages the belief that at least part of the work was done elsewhere.

A *Conus* shell tinkler was present. It is three-fourths inch in length and one-half inch wide at the base. It has a small hole drilled near the top for suspension.

Twenty discoidal beads were encountered, and the type of shell used to make them cannot be determined. They are small, having a diameter of one-eighth to one-fourth inch.

Food

Evidences of food at the Bonnell Site are meager, but there is enough data to furnish an outline of the diet. Charred maize was found, although not in large quantities. Because of the sedentary nature of the culture represented, maize was probably an important food. The maize has rather

slender cobs with small kernels; the row number is low, usually six or eight. From the total excavation only about a quart and a half of charred maize was recovered. Most of this was small and badly broken. Only one place at Bonnell had any concentration of charred cobs, and here there were ten cobs on a burned section of a floor. The remainder of the corn cobs were scattered throughout the excavation.

No beans or squash were found, although they were probably in use, because they are generally associated with the maize complex in the Southwest.

Certain wild plants were probably gathered and used. Seeds of the pitahaya were found. The pitahaya is a cactus (*Lemaireocereus thurberi*) with an edible fruit. Charred walnut shells were also present.

Animal bones are plentiful. Most of the animal bones were broken and some were split. The following animals were identified: bison, deer, wolf, coyote, squirrel, jack-rabbit, and turkey¹⁶

Food was supplied by both hunting and agriculture. Since agricultural remains are scarce, it seems that hunting was more important; however, there are too few projectile points to permit the supposition that these people had a hunting culture. It must be kept in mind that no refuse heap was located, and hence a great deal of evidence is not available.

Burials

At the Bonnell Site burials are placed between houses or under floors in graves only deep enough to accommodate the body. Skeletons are in a flexed position on the side or back with no particular orientation of the head in any direction. Grave offerings are rare, although they are occasionally present in the form of *Olivella* beads or ceramic burial bowls.

16. A sample collection of animal bones was identified by Eugene C. Mear of the Texas Memorial Museum, University of Texas.

Fifteen individuals were encountered in the excavation, of which only three were adults. The others vary in age from infancy to adolescence. Most of the skeletons are well preserved, the bones being articulated and in the position in which they were buried. Burials 4 and 14 were located under floors. Burials No. 1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 12, and 13 were between the houses.

Burial 1. This grave contained two individuals, both of whom are children (Plate 18, c). One child is under six, while the other is approximately twelve. Both of the skeletons had apparently been in a flexed position; the exact position could not be determined because of the disarticulated nature of the bones. The alignment of the grave is north and south, and the grave measured forty inches in length and twenty-five inches in width. A skull was located at each end of the grave, and the bones of the bodies were overlapped. Both skulls contained several body bones. In the northern skull were sixteen vertebrae, several ribs, and a scapula. This skull is also of interest because it has large parietal foramina (Plate 18, a). These foramina are located about one inch above the lambdoid suture, and measure about one-fourth inch in diameter. This burial was located west of House 7.

Burial 2. This grave contained two children, one of whom was about six years of age and the other only a few months old (Plate 18, b). The burial had a north-south alignment, and measured thirty-five inches in length and eighteen inches in width. Both bodies lay on the back, with legs flexed and arms extended, and the heads oriented to the north. There were no grave offerings with either child. The vertebral columns of the two individuals were in a straight line, and there was a distance of seven inches between the skeletons. The burial was placed northeast of House 10.

Burial 3. This was an incomplete burial of a child about six years of age (Plate 18, d). The position of the body at the time of burial could not be discerned, since the bones

were not all present and were disarticulated. The alignment of the grave was east and west, with the head to the west.

Burial 4. This is a single burial of a child placed on the back with knees flexed. The alignment of the grave was east and west, and it measured sixteen inches in length and ten inches in width. The head was to the east. Grave offerings included a small Chupadero Black-on-White bowl that was placed over the face, and a strand of *Olivella* beads that had been placed around the neck and over the chest of the individual. The Chupadero Black-on-White bowl is five and one-half inches in diameter and rather crudely made. It had been "killed" by knocking a small piece from the center of the bottom of the vessel. The *Olivella* beads had four or five strands. This burial was located under a house that is not plotted because of the incomplete excavation. The floor had been cut through, indicating that the burial was made at the time of occupation.

Burial 5. This single burial contained a child between four and six years of age. The grave was aligned east and west, with the head to the east. The skeleton lay on its right side with the legs flexed. The bones of the body had been badly crushed, particularly the ribs. Burial 5 was located just east of House 8, as was Burial 6.

Burial 6. This child was placed in a grave with an east-west alignment. The body was almost fully flexed on the left side. Orientation of the head was to the east. The skull and rib cage had been crushed. This burial was located nine inches to the north of Burial 5, and interment had been from the same occupational level.

Burial 7. A foetus was located in a small grave with an east-west alignment. The grave pit measured only seven inches in length and three and one-half inches in width. The bones were so small as to be difficult to identify, and the position of the body was not clearly discernable, although it appeared to have been flexed.

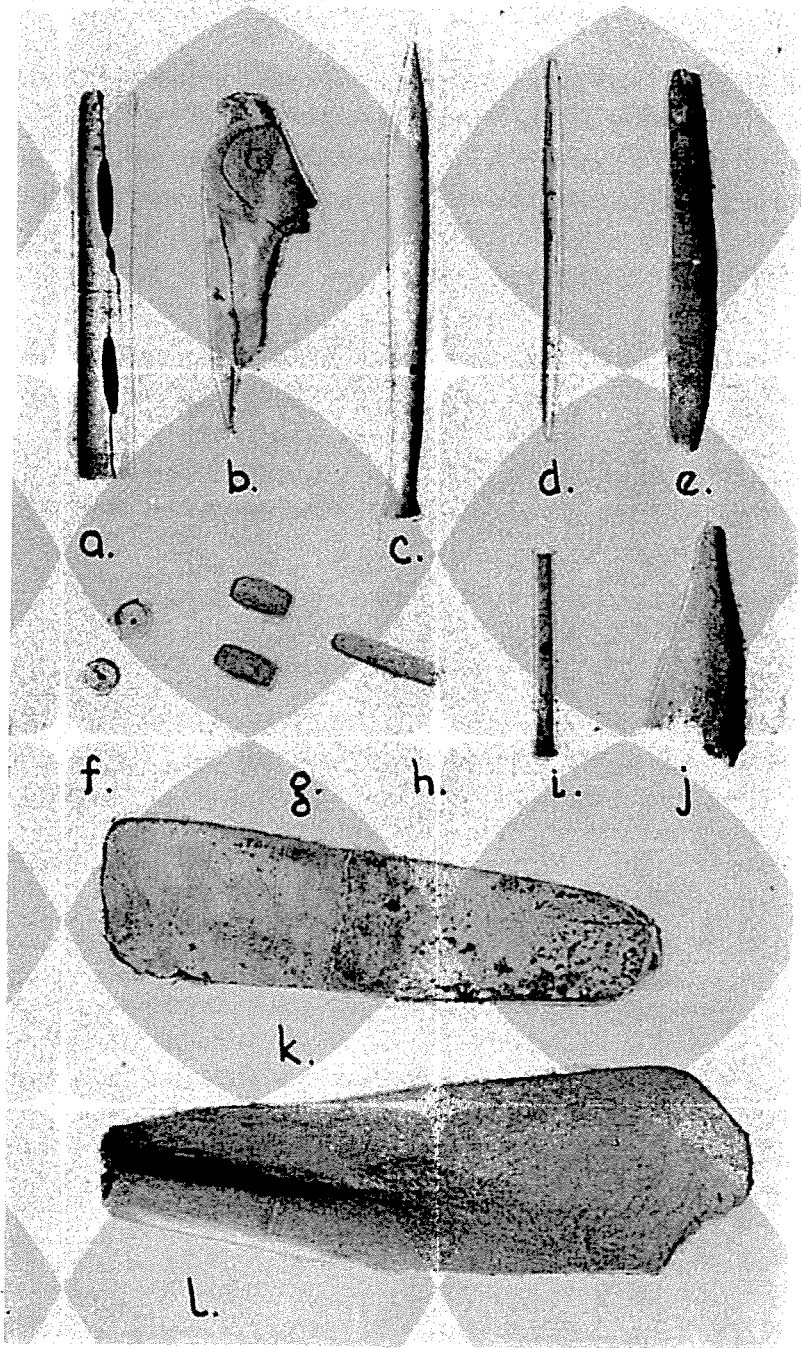


PLATE 17

Bone artifacts, Bonnell Site.

Burial 8. This was the burial of a child. Grave alignment was east and west, with the head of the individual oriented to the west. It contained one burial offering, a large Three Rivers Red-on-Terracotta bowl, which had a diameter of ten inches, and which had been placed over the face of the child. Most of the body bones were missing, and those present were in a poor state of preservation.

Burial 9. Burned fragments of an infant skeleton were found scattered throughout an area which measured thirty-six inches from north to south and sixteen inches from east to west. The bones were broken and none of the skull was recovered. Small discoidal beads were found scattered in the surrounding soil. This is the only cremation found at Bonnell.

Burial 10. An adult male was interred in this grave, which had a north-south alignment. (Plate 18, e). The body was placed on the back with legs flexed over the chest and arms folded across the chest under the legs. Occipital deformation is evident on the skull. Pathological bony growths are present on the skull, but no other bones of the body exhibit this pathology. A large projection of bone is present on the lower right parietal. A similar growth, although smaller, is on the left parietal. The inferior external occipital ridge shows an abnormal projection. There are small growths in the facial region, especially one on the nasal bone.

The skull is asymmetrical, the right side being larger. There are two Wormian bones in the lambdoid suture, which were presumably caused by the deformation. The sagittal suture had become obliterated in one small area; however, the suture is very marked for the rest of its length. The teeth are all present and contain no cavities. They show a great deal of wear, especially on the incisors which are shovel-shaped. All of the teeth have been worn down to an even surface. Judging from the skull and teeth, the individual was probably thirty years of age at death.

Burial 11. This grave, which contained an individual of

advanced age, was oriented north and south, with the skull to the north. Only the skull and some of the long bones were present, and they were in a poor state of preservation.

Burial 12. The skeleton of a young child was found in this burial. Body bones were scattered over a grave approximately three feet and fourteen inches wide. Orientation of the grave was north-south, with the head to the north. The body had been placed on the back, and was probably flexed; however, the body bones were so scattered that the actual burial position was undiscernable. Associated with the body was a worked bone splinter three inches in length, a charred corn cob with eight rows, and pottery sherds of Chupadero Black-on-White and Heshotauthla Glaze.

Burial 13. A young adult female had been buried in a flexed sitting position, in which the arms were crossed over the pelvis and the knees drawn up against the chest. The body faced east. The skull was not found; however, it is probable that the skull had been uncovered by erosion and was picked up by passing pot hunters. The scapulae were located only three inches below the present surface of the ground. A broken Chupadero Black-on-White bowl was found in the fill around the shoulders of this female, indicating that she may have had a burial offering over her head.

Burial 14. A child approximately five years of age had been placed under the corner of the floor of House 4. The grave was roughly two feet square; and it had been dug into the native gravel that underlies the floor of this house. Position of the body was on the back in a highly flexed position. The body was aligned north and south with the head to the south. There are no grave offerings associated with this burial.

Burial 15. This was a child about five years old found six inches below the surface just east of room 9.

Conclusions

The Bonnell site was evacuated between 1350 and 1450. This is shown by the presence of Rio Grande Glaze I and the absence of Rio Grande Glaze II, which would have reached the area by 1450. The opening date of the site cannot be definitely established at the present. A fairly long occupation is indicated by the depth of the fill, the superimposition of houses, and by the fact that to date, none of the datable trade pottery has been recovered from the earliest houses. A beginning date of *circa* 1200 is suggested.

The culture of the Bonnell inhabitants was sedentary, with the economy depending on both agriculture and hunting. Possibly there was some emphasis on hunting. Pit houses at the site show a tendency to become shallower toward the end of the occupation. The earliest pit houses were between fourteen and twenty-two inches in depth, while the later ones were progressively shallower, until the most recent houses were built on the surface or in a depression only three inches deep.

The Bonnell Site belongs to the Jornada Branch of the Mogollon¹⁷. Geographically, the site is located on the northern periphery of the Jornada. In time, it falls into the San Andres Phase of the Northern Area. Due to a lack of published material for sites in the Northern Area of the Jornada, the material trait list is indefinite. The Bonnell Site has the cultural complex that would be expected from a general knowledge of the archaeology of the area; this site will contribute to a more detailed definition of the material culture of this phase.

This site is very close to the line where Pueblo and Mogollon influences meet. Some traits present at the Bonnell Site having a southern or Mogollon origin are the pit houses, brown ware pottery, and burial customs. Traits with a Pueblo origin are the Chupadero Black-on-White pottery full-grooved axes and the rock walls. While the Bonnell

17. The definition of the area and the phases associated with Jornada are defined by Lehmer, 1948.

site shows this mixture of traits, it is predominantly of southern origin. However, other sites within a fifty mile radius that fall within the same time range have a much stronger Pueblo influence¹⁸. When enough of these sites have been excavated, there will be an excellent basis for a study of the effect of the contact of the two cultures.

External contacts are indicated by the intrusive items. Trade pottery comes from northern Chihuahua, the Gila area of southern Arizona, the Mimbres and Tularosa areas, and from the Rio Grande pueblos. Alibates flint is from the Canadian River of Texas; and the bison implements possibly have a Texas Panhandle or South Plains origin. Contact with the Texas Big Bend is indicated by the Perdiz projectile point. Turquoise is present from Oro Grande to the Southwest. *Olivella* beads are from the coast. Trait similarities and mutual intrusives would further suggest contacts with these contemporaneous cultures.

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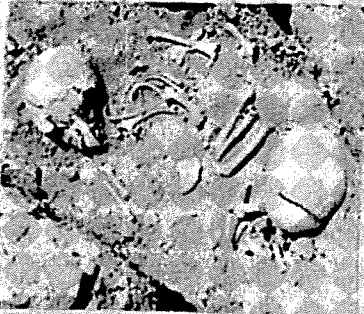
18. For example, Fall Ranch at Capitan, and Bloom Mound at Roswell.



A.



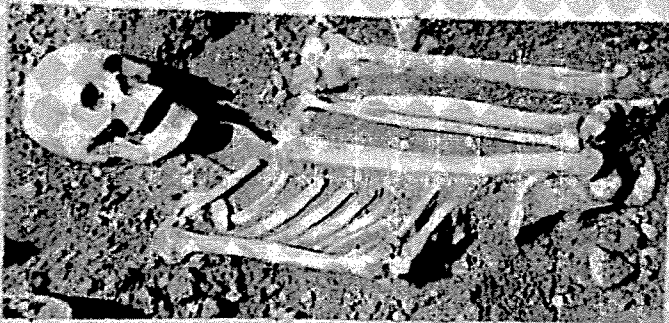
B.



C.



D.



E.

PLATE 18

Burials, Bonnell Site.

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SANDALS OF FEATHER CAVE

WM. B. ROOSA

Feather Cave is a large limestone cave six miles east of Capitan, in Lincoln County, New Mexico. It is on the shoulder of a hill north of the Rio Bonito 500 yards from U. S. Highway 380.

The cave faces to the south, with the long axis running north and south. The entrance, once much larger, has partially filled up with spall rock from the ceiling and debris from outside so that it now slopes down sharply into the cave proper. The cave measures 240 feet by 61 feet in its greatest dimensions. It has a high ceiling which has been blackened by early fires and stained by the action of groundwater. The rear of the cave is strewn with large rough boulders from the ceiling. The central portion is fairly level and the fill is relatively rock free.

Excavations were started late in the summer of 1950, and resumed in the summer of 1951. The 1950 excavation consisted of an east-west trench across the cave at the widest point. The 1951 excavation was a trench running north and south for 90 feet, with an east-west trench meeting it at the south end to form a reversed capital "L". The 1950 and 1951 east-west trenches converged at the south end of the north-south trench.

The excavations were conducted under the auspices of The Field School of the University of New Mexico, and were directed by Dr. Paul Reiter. Nine students participated in the 1950 session, while twenty-one were present in 1951.

While the cave has not yet been fully excavated, it is felt that a preliminary report on sandals is of value, especially since it is possible that new types were found.

The sandals are of a close weave wicker work, and with one possible exception are made of yucca. They fall into the two general classes: Four Warp of which there are 8 complete specimens, 20 semi-complete, and 16 fragmentary; and Two Warp with 10 complete, 30 semi-complete, and 25

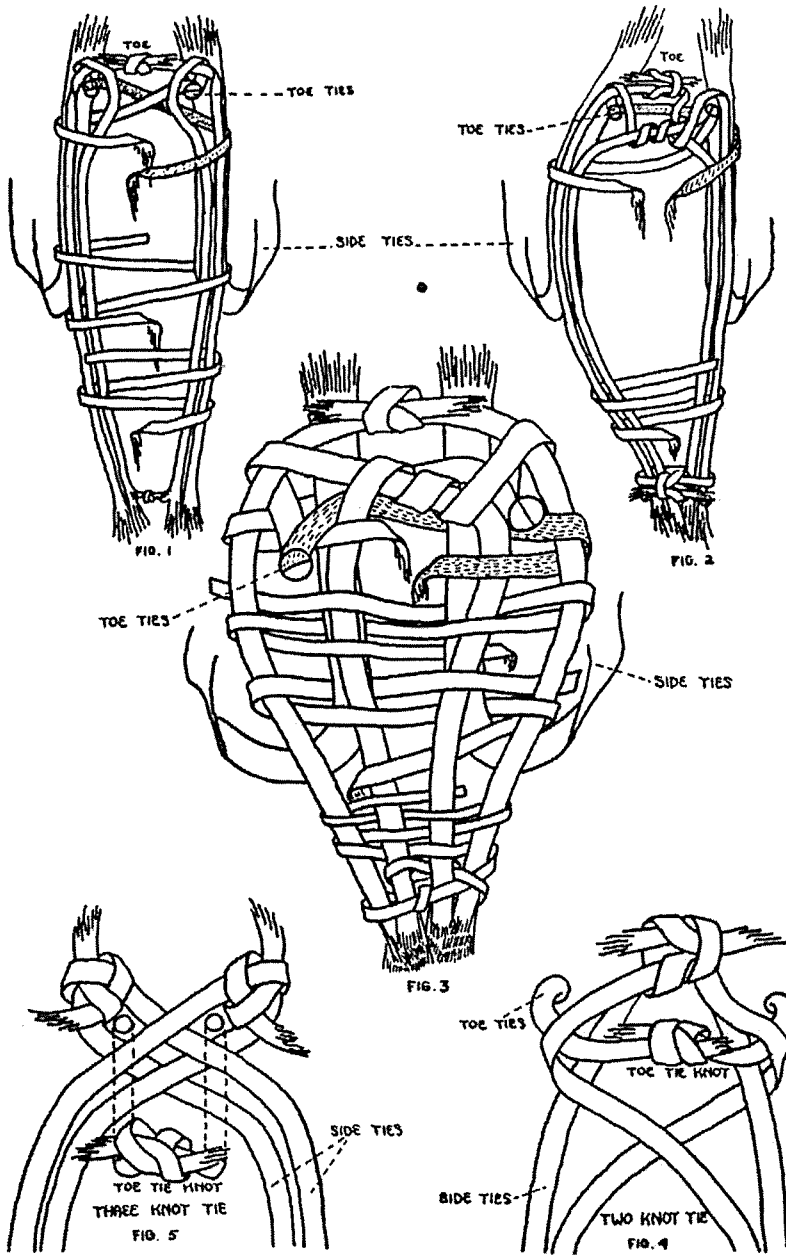


FIGURE 6

Sandal types, Feather Cave.

fragmentary specimens. In addition there are 5 amorphous specimens not readily assignable to either category..

Type 1: Two Warp Toe Sandal—38 complete or semi-complete, 25 fragmentary.

Narrow whole leaves of yucca form the warp, weft, and ties of this type. The specimens analyzed (No. 581, No. 582) have nine leaves in each warp element. This number varies from eight to ten, but the basic pattern is the same. (See Fig. 6, 1). The upper four leaves with wide ends at the heel run full length, while the five lower ones, with wide ends at the toe, leave the body of the sandal to form the side tie straps. The wide ends of the warp leaves extend beyond the heel and toe and are shredded forming heel and toe buffers.

Two pairs of upper warp leaves, one from each element, are joined in a knot across the toe. The remaining pair from each side is looped around the first pair, leaving the short ends extending up to form part of the front ties. Weft elements of two-three leaves each are introduced through the loops in the warp, with the short ends forming the rest of the front ties. The five lower warp leaves are added to each side and are secured by looping the wefts, one at a time, under and over the opposing warp bundle. The wide ends of the weft leaves are shredded and brought out on the bottom of the sandal, forming a pad on the underside.

The regular weft elements of four to six leaves each are added one at a time. They differ from the first two in that the small ends are not anchored in the warp, but remain free on the upper surface of the sandal. Each weft element starts and ends on the opposite side from the one preceding it. They are not interwoven, however, the wide butt ends cross each other on the sole, each one being tucked up under the preceding one.¹

1. Since toe construction serves as a means of classification, the author has started the descriptions at the toe. However, it seems quite likely that the weft was started from the bottom, and that both two and four warp types were started at the heel and finished at the toe.

Heel treatment varies. In eleven of the fourteen specimens with nearly intact heels, strands from the opposing warp elements are joined in a square knot, two are tightly woven with no knot, and one is finished with a square knot in the last weft.

The ties of the seventeen specimens with nearly complete sets follow the general pattern of a toe loop and side straps, none of sandals has any form of heel straps or ties. On all specimens the elements of the toe loop (four or five leaves each) are terminated in a large square knot. Toe loops are centered and are for the second and third toes. Each side tie separates into two straps which loop around the toe loop, terminating in one or two large square knots. (See Fig 6, 4 and 5). Counting the toe loop knot, three sandals have two large knots in the ties; three more have two knots (actually one and a half knots, since the side straps do not form a complete knot) bound together with the loose ends of both knots; ten sandals have three separate knots, while one has three knots bound together. Side ties consist of from four to six leaves each, nine sandals having five, eight with six, and three with four.

Structurally the specimens of this type are nearly identical, however, they vary somewhat as to size and shape.

Sandal No. 775—Plate 19A, a. This is a large sandal, 8.7" long, 1.8" wide at the toe, 2.8" at side straps, and 1.8" at the heel. It is symmetrically tapered about the long axis. The heel is finished by joining warp strands in a square knot. There are four leaves in each side and toe tie element and two large knots in the ties.

Sandal No. 194—Plate 19A, 6. This sandal is smaller, 6.6" long, 1.6" wide at toe, 2.5" at side straps, and 1.1" at heel. There are four leaves in each side and toe tie element, and two knots in the ties. The taper is symmetrical about the long axis, and it appears to be for the right foot. There is no knot at the heel.

Sandal No. 783—Plate 19B, a. From its general appearance and the cake of mud on the sole it is apparent that this sandal

was worn in wet weather. These sandals tend to lose form and disintegrate when wet, which would account for its unusual shape. It is 6.3" long, and 4.2" wide at widest point. There are five leaves in each side and toe tie element, and two knots bound together in the ties.

Sandal No. 748—Plate 19B, b. This sandal is small, 5.1" long, 1.7" wide at toe, 2.5" at side straps, and 1" at heel. Taper is symmetrical about the long axis. Most of the ties are missing. A two element twisted cord of cotton or milkweed fiber (probably the latter) has been fastened to the stub of one of the front ties. This sandal is further distinguished by virtue of its having been chopped in two by the author's shovel.

Sandal No. 437—Plate 19C, b. This is a large sandal with little taper, 7.1" long, 2.8" wide at toe, 3.5" at side straps, and 2.9" at the heel. It has five leaves in each side and toe tie element and three knots in the ties. The sandal is relatively wider than those previously mentioned. It may not be a complete sandal since the heel ends of the warp elements appear to have been broken off. Strands from the warp elements are joined in a heel knot. These sandals are weak in the heel, since all show signs of wear there, and 17 are nearly complete except for the heel. It is quite possible that the original heel of this sandal broke off and that the heel knot is a "field repair." If it is complete, it represents a legitimate subtype.

Sandals of this type are more or less symmetrical about the long axis. A few are markedly asymmetrical and may have been intended as lefts and rights. All specimens show signs of wear, especially at the heels. In a few, some of the weft leaves are shredded. Since not all of the weft leaves are shredded in any sandal, this may be the result of wear and aging, rather than a deliberate process.

All of the specimens fall in the size range of sandals 194, and 775. The term "Toe Sandal" is used because of the nature of the ties. However, it is apparent that some of the larger ones are at least three-quarter, if not full length.

Type 2: Asymmetrical Two Warp Toe Sandal—Plate 19C, a.

This type is represented by one specimen, No. 527. It is the largest sandal in the collection, 9.5" long, 2.5" wide at toe, 3.5" at side straps, and 1.5" at heel. It is markedly asymmetrical about the long axis, and appears to be for the left foot. It differs structurally from type 1, in the toe construction. (See Fig. 6, 2). There are seven leaves in each side tie, and four in each toe tie element. The ties are joined in two knots. The heel is finished with a knotted weft leaf. It was found at a depth of 12 inches.

Type 3: Two Warp Toe Sandal—Not Illustrated.

This type is represented by one specimen, No. 278, found at 8 inches. It is incomplete, and shows no evidence of ties. There is no pad on the sole and no toe or heel buffer. It is large, 7.2" long, 3" at toe, and 2" wide at heel; and appears to be made of very wide leafed yucca or grass. The specimen is too fragile to permit dissection.

Type 4: Four Warp Fishtail Toe Sandal—26 specimens complete or semi-complete, 16 fragmentary.

This type of sandal has a great deal in common structurally with types 1, and 2. All three types have: 1. Eight full-length warp leaves, four of which form part of the front ties; 2. Eight to ten warp leaves which form the side tie straps; 3. Two weft elements which form part of the front ties; 4. A pad on the sole formed by wide ends of weft; 5. Heel and toe buffers formed by wide ends of warp leaves; and 6. They share the same types of ties and knots.

Lefts and Rights are not identifiable in type 4. Each warp element consists of two leaves with wide ends at the heel. The outer warp elements are joined in a square knot at the toe. The inner warp elements cross over the toe (entwined about each other) so that each goes to the opposite side, then over and under the outer warp and up to form part of the toe tie. (See Fig. 6, 3.)

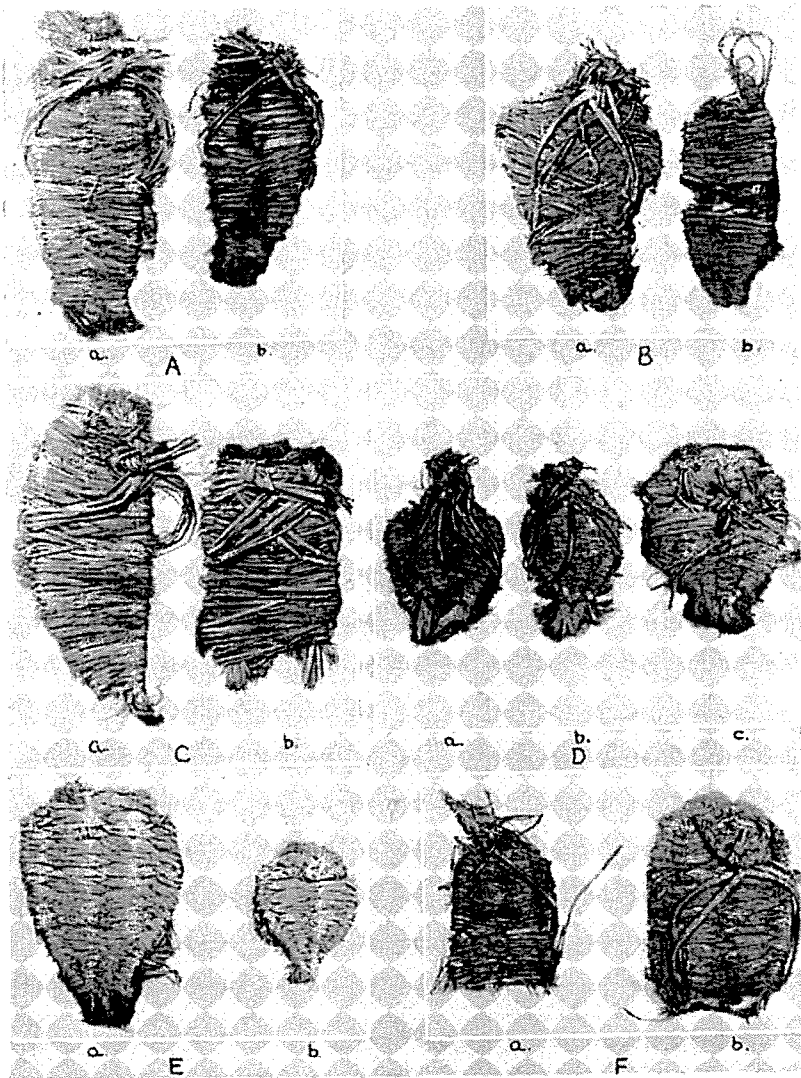


PLATE 19

Sandal types, Feather Cave.

Warp elements of four or five leaves each are added under the inner warp elements. The first two wefts (two leaves each) form part of the toe ties, and anchor the bottom warp elements in much the same way as in types 1 and 2.

In most cases ties are identical with the two warp sandals. (Fig. 6, 4 and 5.) Ties consist of a toe loop and side straps. The toe loop is well centered and is for the second and third toes. Of the nine sandals with more or less complete sets, four have the two knot tie, two have three knots, two have two knots bound together, while one (No. 444) has two knots bound together and a third free knot.

In most cases the side straps enter the body of the sandal on the bottom between the middle and outer warp elements. Including fragmentary specimens, ten sandals have braided ties. The braid is a flat four element braid or sennet.

Heel treatment varies slightly, especially in the degree to which the warp ends cross over each other. (See Plate 19, D and E.) Warp elements are not tied together at the heel as in some of the two warp sandals, however, the last weft leaf is woven tightly around the warp elements (See Fig. 6, 3.)

Sandal No. 154—Plate 19D, c. This is a fairly large specimen, 5.5" long, 2.7" wide across origin point of toe ties, 3.6" maximum, 2.7" at side straps, and 1.2" at the heel. It deviates from the norm in that the side straps enter the body on the upper surface rather than the sole. The ties terminate in two knots.

Sandals No. 732—Plate 19D, a and b. These two small sandals were found together and may be a pair. One is 4.4" long, 2" wide at toe, 2.6" maximum, and 1" at heel; while the other measures 4.2" long, 2.4" wide at toe, 3.2" maximum, and 1.4" at the heel. Ties are identical, both having two knots bound together.

Sandal No. 438—Not Illustrated. This specimen measures 5.5" long, is 3.2" at maximum width, and 1.1" at the heel. The toe of this one varies from the norm in that only

the outside right warp follows the pattern and terminates in the front knot. The right middle warp goes over and under the outside warp and comes up to form part of the right half of the toe loop. The left side of the toe follows the toe construction of Cosgrove's type 1c² in that the left inside warp terminates in the front knot, while the outside warp becomes part of the left half of the toe tie loop. The ties employ three knots.

Sandals No. 441 and 445. These are pictured in Plate 19E to show the range of size in the type. There are several fragmentary specimens which if complete would be larger than No. 441, however it is the largest nearly complete sandal of this type. It is 6.9" long, while the small one is 3.8" long.

Sandal No. 524—Plate 19F, b. The heel is missing from this one. It measures 6.1" long, 2.9" wide at toe, 3.9" maximum, and 3.3" at the ties. It is distinguished by having braided ties, and the fact that the right side tie enters the body of the sandal on the sole, while the left enters on the upper surface between the inside and outside warps. Since the specimen is incomplete, we hesitate to assign it to a different class or subclass. Sandals of this general type were found by Cosgrove³ and Howard⁴, and in Isleta Cave, a Basketmaker III Site 11 miles east of Isleta, New Mexico, by Reiter. Cosgrove's specimens are similar in outline, but not in structure.

Type 5: Four Warp "Half Sole" Toe Sandal—2 specimens.

Sandal No. 195—Plate 19F, a. This specimen is 4.4" long, 2.7" in maximum width, and 2.6" wide at the heel. Toe construction follows closely that of type 4. The essential differences in the two types are in the heel treatment, and the ties. Weft strands are prevented from sliding off at the heel by a square knot joining strands from the inner warp elements. The side ties of this type are not part of the warp

2. Cosgrove, 1947, Figures 87, 88.

3. Cosgrove, 1947, Figures 87, 88, Types 1a, and 1b.

4. Howard, 1930, Plate XXXIV, 2.

elements, but rather are separate leaves which are looped around the outer warp elements. The ties consist of a toe loop and side straps, and terminate in two knots which are bound together.

Sandal No. 151—Not Illustrated. This is quite similar to No. 195, however it is incomplete, lacking the toe. The heel differs in having three small square knots uniting strands from all four of the warp elements instead of one knot. This sandal was found at 14", while No. 195 was at 24".

A very similar sandal is illustrated by Howard⁵, and one was found recently by a student in a cave near Hot Springs, New Mexico. Cosgrove equates Howard's sandal to his type 1b. However, the toe construction of our specimen does not agree with Cosgrove's drawing. Since Howard does not analyze his sandal, it is impossible to say that our specimen is identical.

The sandals were found at depths of 1" to 51½ inches in loose, dry fill, disturbed in places by rodent holes. Of the 100 specimens of types 1 and 4 assignable to a specific level, 70% were at or above the 18 inch level, while 84% were at or above the 24 inch level. Roughly 50% of the sandals were at or above the 12 inch level.

The one specimen of type 2 was at 12 inches, while that of type 3 was at 8 inches. The two specimens of type 5 were found at 14 inches and 24 inches. It is possible that types 2, 3 and 5 represent later developments than types 1 and 4 both of which were found as deep as 51 inches.

Comparison of types 1 and 4 shows 68.3% of type 1 at or above 18 inches, as opposed to 75% of type 4 at the same level. In type 1, 80% are at or above 24 inches, while 90% of type 4 are at the same level. Distribution of the two types is fairly even, with type 1 having a slightly higher percentage in the lower levels.

There is little evidence on which to base a sequence of types. In type 4 sandals, those with braided ties occur only

5. Howard, 1930, Plate XXXIV, 1.

in the first 18 inches. This might indicate that braided ties are a recent development in this type of sandal.

Two and four warp yucca leaf sandals with sole pads formed from the wide ends of the leaves are fairly common in the Southwest; ranging from northeastern Arizona to the Big Bend Area of Texas. Tos sandals have been found as far north as Jemez Cave⁶, however, they are most common in the Big Bend and Hueco areas of Texas and New Mexico.⁷

A two warp toe sandal common to this area has been designated "Fish-tail" by Roberts,⁸ Smith,⁹ and others. Many of the sandals of this type are roughly obovate with a round toe and a "Fish-tail" heel. Jackson pictures a specimen from Culbertson County, Texas which is more rectangular in shape, and closely resembles our types 1 and 2.

Cosgrove found several types of fish-tail sandals in the Hueco Mountain Area. His type 4a is rectangular in outline, while type 4b has a more obovate shape. Both types have warp elements which leave the body of the sandal to become side straps—a feature shared by our types 1, 2, and 4. Our types 1 and 2 most closely resemble Cosgrove's type 4a in shape and structure, however, they also show a close structural relationship to type 4b, but lack the obovate shape. In outward form our types 1 and 2 also resemble his types 2 and 3. These differ from ours in toe construction and have ties which are separate elements.

The obovate two warp "Fish-tail" sandals are very similar in shape and construction to our "Type 4, Four Warp Fish-tail Toe Sandals." Our type 4 shows much greater similarity in shape and structure to Cosgrove's type 1c. As has been noted, toe structure of the two types is different while heel treatment is similar, but not identical. All of our specimens (of types 1, 2 and 4) are unique in having weft elements which form part of the toe loop. While this may occur in

6. Alexander and Reiter, 1935, p. 59.

7. Sayles, 1935, Table 8.

8. Roberts, 1929, Plate 2.

9. Smith, 1933, Type 1a, Plate 13, No. 30.

10. Jackson, 1937, Plate 31, No. 2.

the specimens of Robert, Smith, Cosgrove and others, it is not mentioned or shown.

CONCLUSIONS

Sandals of types 1, 2 and 4 are of a general type common to the Big Bend and Hueco areas. They show most marked resemblances to sandals found in the Hueco Mountain district and along the Rio Grande north of El Paso by Cosgrove and assigned by him to the Hueco Basket-maker culture. Type 5 is similar to ones found by Howard in Guadalupe Mountains, and assigned to a Basket-maker culture. Type 3, if it is a valid type, has not been analyzed to permit valid comparisons.

From the sandals, the proximity of the sites, and other associated artifacts found in the cave, it appears that Feather Cave represents a site of the Hueco or Hueco Basket-maker culture. Lehmer has defined the Hueco as the earliest phase of the Jornada branch of the Mogollon.¹¹

The problem of whether we call the culture "Hueco Basket-maker" or "Hueco Phase of the Jornada Branch of the Mogollon" appears largely to be one of definition of terms. If we restrict the term Basket-maker to a culture on a certain technological level in the San Juan area, we are wrong to call them Basket-makers; the same of course applies to like use of the term Mogollon. If on the other hand we use a broad definition for the terms Basket-maker and Mogollon we may be quite justified in applying either term to this area without necessarily implying close relationships to other areas.

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POTTERY OF THE RIO BONITO AREA OF LINCOLN COUNTY, NEW MEXICO

ARTHUR JELINEK

As a more thorough archaeological picture is constructed in the Southwest, the remaining gaps become increasingly apparent. One of the areas about which knowledge is most scant is that with which this paper is concerned. An attempt will be made herein to place the culture of the area in context (with regard to relative chronology and association with contemporary developments) by means of ceramic types, both native and trade, found in the area.

The material was collected in connection with the University of New Mexico Field School during the 1950 and 1951 seasons from sites along the upper reaches of the Rio Bonito in the vicinity of Fort Stanton, New Mexico. Several sites in adjacent territory are also represented in an attempt to widen the view of developments in the area.

The eight sites in the Bonito valley, from east to west (see map), hereafter referred to by number are:

- (1) Lincoln Rock Shelter—a small rock shelter near Lincoln.
- (2) Double Crossing Ruin—a pueblo-type ruin with wall bases in evidence, between the Fort Stanton cutoff and Lincoln.
- (3) Stanton Ruin—a ruin of the same type as (2) near U. S. 380 on the Fort Stanton Reservation, east of the cutoff.
- (4) Feather Cave—a large cave on the shoulder of the hill directly across the valley from (3).
- (5) Upper Bonito Site I—a site with possible wall remains on the Stanton Reservation, three miles west of the hospital.
- (6) Three Post Site—a site apparently of pithouse type,

being cut by an arroyo near three large posts west of (5).

- (7) Upper Bonito Site II—a site with no structural evidence, 6 miles west of the Fort Stanton Hospital.
- (8) Upper Bonito Site III—a small site with one ceramic type in evidence, two miles west of (7).

The majority of the sites lie between 150 and 200 yards from the river, 1, 2, 4, and 6 on the north side, and 3, 5, 7, and 8 on the south.

Included sites not in the Bonito Valley are:

- (9) Petroglyph Site—a pueblo-type site with wall bases clearly in evidence, about four miles north of Bernardo Gap.
- (10) Mesa Ranger Station Site—a site without evident structural remains west of the station, arroyos are cutting the site on two sides.
- (11) Fred Pfingston Site—a large site west of (10) with possible remains of wall structures in the western portion and definite pithouse remains in the east, it probably includes two separate settlements, each on its own hill.

Sites 9 and 11 are much larger than any of the Bonito developments while 10 conforms more to their average size.

Miscellaneous material was collected from sites on the Morris and Padilla ranches between the Bonito and the base of the Capitan Mountains.

The sites are all in the Sacramento Highlands east of Carrizozo and would be included in the "Highlands" category in the survey by Stallings¹. It is a hill country of grass alternating in less favorable locales with juniper and, in a well watered spot, with clumps of larger trees and lush undergrowth, indicating the fertile potentials of the area.

1. Stallings, 1982.

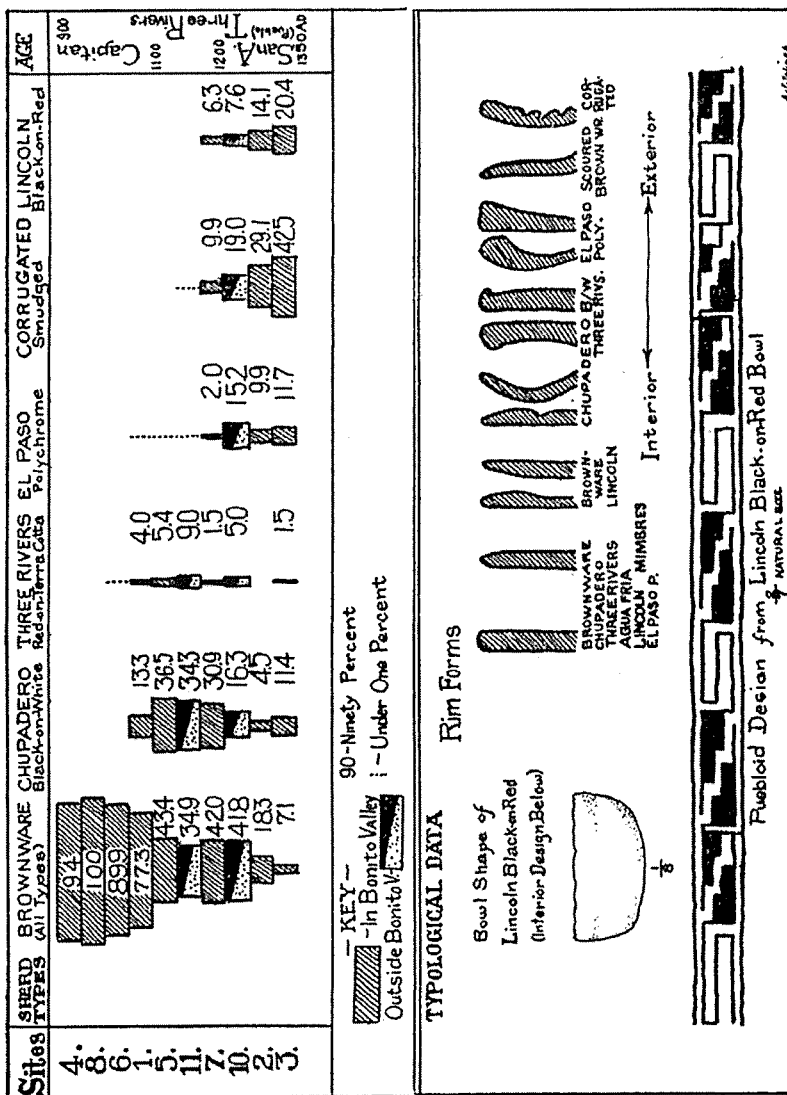


FIGURE 8

Pottery Percentages from Rio Bonito Sites.

The first comprehensive report on the complex in which this area is included was by Stallings in 1932; previous to that time reports² had been published on separate wares and types found in single sites with little attempt at correlation. Roberts in 1929 described a "very sandy dark red ware with decoration in dull black", extending from the El Paso district north and west and dating, on the basis of Mimbres evidence, from the Great Pueblo period. In 1931³ this was named "El Paso Polychrome". The same year the predominant black-on-white ware of the region was designated "Chupadero Black-on-White"⁴ and the black-on-red as "Lincoln Black-on-Red"⁵. Stallings' report listed two types of native ware, Chupadero Black-on-White and the El Paso-type brownwares. Lincoln Black-on-Red and Three Rivers Red-on-Terracotta were classified as variants of Northern Rio Grande wares, both the wide and narrow line varieties of the latter and glaze variants of the former were mentioned. His conclusions were that this was a Pueblo ceramic district, designated "El Paso", with native brown and black-on-white wares, influenced by Mimbres and Casas Grandes developments, and occupied from early Pueblo III to early Pueblo IV times, after which the population withdrew to the north.

Sayles⁶ refers to dates of 1310-1330 and 1345 for El Paso Polychrome and associates it with Chupadero Black-on-White, Lincoln Black-on-Red, Three Rivers Red-on-Terracotta, Mimbres, Chihuahua, St. Johns, and Gila Polychrome in the El Paso phase. In the Jumaño phase to the southeast of the El Paso he lists a basic red-on-brown complex including buff, grey, and brownish wares, plain and decorated with broad and narrow red lines, occurring in both bowl and jar forms. The paste is coarse, tempered with sand and gravel, and the surface frequently floated.

2. Alves, 1931, 1932, p. 42. Mera, 1931. Mera and Stallings, 1931. Roberts, 1929. Stallings, 1931.

3. Stallings, 1931.

4. Mera, 1931.

5. Mera and Stallings, 1931.

6. Sayles, 1935, pp. 72-73, 78-79, Table 7.

Mera⁷ lists the brownware as originating in the Mogollon area, with eastern variants possessing thicker walls than the Alma types, light colored angular temper, and in some cases a red interior slip. In work on Jackson's⁸ ceramic material from caves in Culbertson County, Texas, Mera found Chupadero Black-on-White underlain by El Paso wares, the lowest sherd being of El Paso type paste with a red interior slip. He states that these wares are all "roughly contemporaneous" (50-100 years), and gives the closing date for black-on-red in that area as 1350. In a later publication⁹ he reports Chupadero, El Paso, Three Rivers Red-on-Terracotta, and Rio Grande Glaze Polychrome east of the Pecos in southeastern New Mexico. In the Saline-Medano district to the north of the area with which we are concerned he finds¹⁰ San Marcial Black-on-White, Mogollon Red-on-Brown, Socorro Black-on-White, and Mimbres Black-on-White as intrusive wares, with El Paso Polychrome, Chupadero Black-on-White (from Socorro Black-on-White), and a corrugated brownware as the native developments. The native brownware is said to possess a peculiar temper and much of it is indistinguishable from El Paso Polychrome paste. The corrugated ware is thought to be the result of Pueblo influence on the basic brownware. In his last publication on the area¹¹ Mera points out the existence of Jornada Brownware, a coarsened derivative of Alma Plain in the southern part of his "brownware district" (as opposed to Saline-Medano in the north). He gives a plausible derivation of Three Rivers Red-on-Terracotta from San Francisco Red. He lists the earliest dated sherds in the area as three specimens of Mogollon Red-on-Brown from three separate sites. He also states that all intrusives in the north were of Pueblo derivation although black-on-white wares from this source were absent. The latest of these intrusives was Agua Fria Glaze-

7. Mera, 1943.

8. A. T. Jackson, 1937, pp. 152-154.

9. Mera, 1938.

10. Scholes and Mera, 1940, pp. 291-299.

11. Mera, 1943.

on-Red, which was introduced shortly before the abandonment of the area.

Toulouse¹² states that the brownware found in early levels at Pueblo Pardo in association with Chupadero Black-on-White and a redware similar to San Francisco Red is almost indistinguishable from Alma Plain.

Krieger¹³ reports Chupadero, El Paso, and Lincoln Black-on-Red occurring with Glaze I and Glaze III in one Llano Estacado site and Chupadero and El Paso Brown with Glaze II, Glaze III, and Potsuwii Incised at the Antelope Creek Site.

Later references have been made to the high percentages of El Paso Polychrome (90%) in a site adjacent to the city of El Paso¹⁴ and to the occurrence of all types mentioned by Sayles, plus corrugated, scoured brown, and Little Colorado black-on-white wares in the area east of El Paso^{14A}.

Jennings, in 1940¹⁵, stated his belief that the brownware of this area is part of a Mogollon development. This was crystalized a few years later by Lehmer¹⁶, who designated it as the Jornada Branch of that culture and divided the territory into a northern and southern area, each of which passed through three phases as follows:

<i>North</i>	<i>South</i>
1400	
1300 San Andres	El Paso
1200	
1100 Three Rivers	Dona Ana
1000 Capitan	Mesilla
900	

Hueco

The Capitan phase includes the earliest pottery types in

12. Toulouse, 1944, p. 73.

13. Krieger, 1946.

14. Moora, 1947, pp. 104-109.

14A. Smith, 1936, pp. 104-109.

15. Jennings, 1940.

16. Lehmer, 1948.

the area with which we are concerned, they are, polished Jornada Brown, Broadline Red-on-Terracotta, and in rare instances, Mimbres Boldface. The Three Rivers Phase includes Jornada Brown, El Paso Polychrome, Three Rivers Red-on-Terracotta, Mimbres Black-on-White, Mimbres Corrugated, Chupadero Black-on-White, and some St. Johns Polychrome. The San Andres Phase is characterized by El Paso Polychrome and Three Rivers Red-on-Terracotta accompanied by Lincoln Black-on-Red, Chupadero, Gila Polychrome, Ramos Polychrome, Playas Incised, Agua Fria Glaze-on-Red, Arenal Glaze Polychrome, St. Johns Polychrome, Heshotauthla Glaze Polychrome, and smudged corrugated.

With this data we find that a generalized picture of the southeastern New Mexico area includes a basic brownware, sometimes similar to Alma Plain, accompanied in degrees by Chupadero Black-on-White, El Paso Polychrome variants, and a group of painted redwares, which in some cases appear similar to the northern Rio Grande types. Chupadero is apparently a derivative of the northern black-on-white tradition. Most of the material appears to coincide in time with late Pueblo III and early Pueblo IV developments to the north. Using this as a background we approach the specialized developments of the Rio Bonito area.

Virtually all material recovered was from surface collections, the few stratigraphic samples obtained being either too small or too homogenous to be of value in correlation.

Sites 4, 6, and 8 (see chart) contain an overwhelming percentage of brownware, large amounts of which have been polished. The sherds are divisible into El Paso Brown and a coarse variety of Jornada Brown, with the latter occurring in the highest percentages. Alma Plain and Alma Scoured are also in evidence. Parts of two small vessels of coarse polished redware were found at site 6. The crudeness of form and rough finish over which a polishing stone had been rubbed would suggest an individual experiment, had not parts of two vessels of the same obvious type been

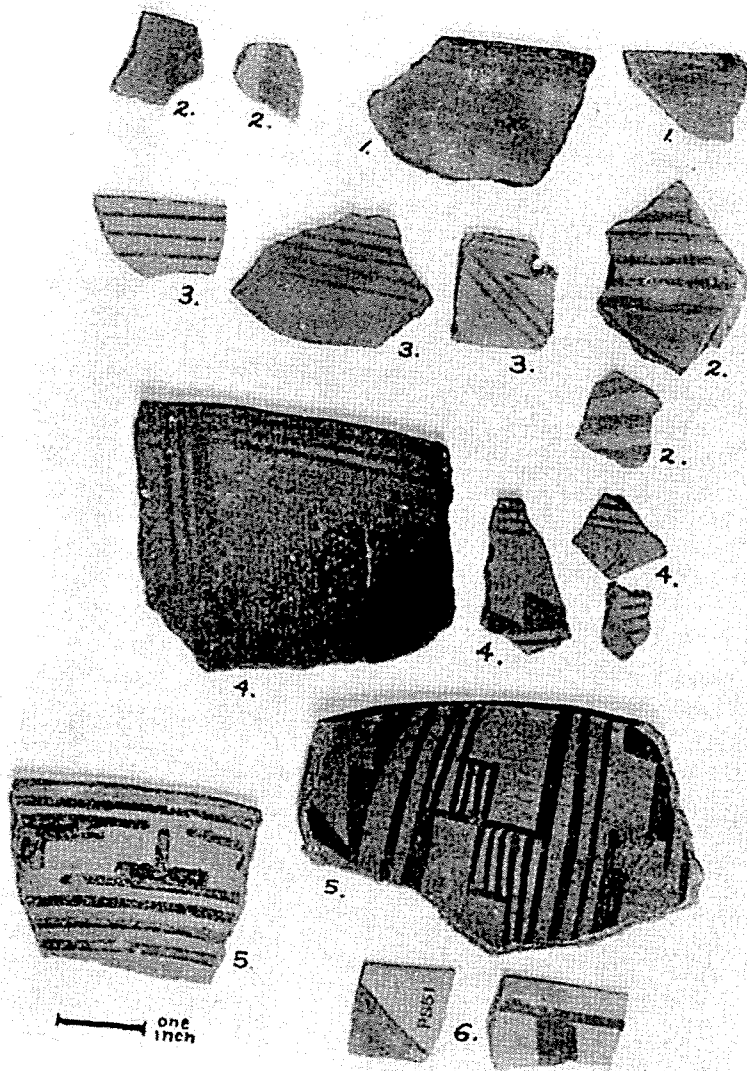


PLATE 20

The Redware Sequence. 1, Red wash on polished brownware (Specimen on left is bowl rim with wash on inside, overlapping around the edge); 2, types of Broad-line Red-on-Terra Cotta; 3, Three Rivers Red-on-Terra Cotta (Fine-line); 4, Lincoln Black-on-Red with Three Rivers type decoration; 5, Later types of Lincoln Black-on-Red; 6, Bonito variety of Agua Fria Glaze-on-Red (Left—exterior, right—interior).

found. Nothing similar was encountered on any of the other sites. Decorated wares from these sites are confined to one sherd of the fine-line type of Three Rivers Red-on-Terracotta with an unsmoothed exterior (in contrast to the normal smoothed) found at site 6.

Site 1 seems to represent a transitional stage, since while containing a large majority of brownware with Jornada Brown dominant, it also yielded Chupadero Black-on-White, Broadline Red-on-Terracotta, and El Paso Polychrome.

Sites 5, 7, and 11 are dominated jointly by Chupadero Black-on-White and brownware which occur in more or less equal quantities, together forming about 70% of the sherds from each site. Three Rivers Red-on-Terracotta is present at all three, the highest percentage occurring at site 11 which is closest to the type site. El Paso Polychrome is also present at all three sites, though in two of them it does not attain one per cent. Corrugated ware (the smudged corrugated of Lehmer) is found only in site 7, suggesting a time relationship. Lincoln Black-on-Red also occurs only in site seven.

Site 10 falls out of the range of the above in that the percentage of Chupadero Black-on-White is about 15% less than their average, while that of El Paso Polychrome rises from less than one per cent to over 15% of the total content. The percentage of corrugated ware is also markedly higher, while that of Lincoln Black-on-Red is less noticeably so. The ratios of brownware and Three Rivers Red-on-Terracotta remain about the same.

The remaining sites, 2 and 3, can be classified in one group characterized by the dominance of corrugated ware over the relatively minor occurrence of both plain brownware and Chupadero Black-on-White, the two of which, when combined, in neither case equal over 25% of the total. Three Rivers Red-on-Terracotta is all but absent. Lincoln Black-on-Red shows a substantially higher percentage than it does in any of the other groups as does El Paso Poly-

chrome (except at site 10 where the higher percentage may be due to the relative proximity to the source of the El Paso wares).

We therefore have three main categories of sites and two transitory examples which can, with increasing difficulty as they become more recent, be fitted into Lehmer's northern Jornada classification; the first with the Capitan, the second with the Three Rivers, and the third with the San Andres. The contradictions and discrepancies with this system are given below.

In the Capitan Phase of the Upper Bonito we have only brownware, a few sherds of which show a red wash. None of the Mimbres types or Broadline Red-on-Terracotta are in evidence at these sites at the present, although several sherds of the latter were found in site 1 (apparently next in chronological order) accompanied by variants of Chupadero Black-on-White and the El Paso wares, which would tend to place it in the next phase.

In the sites tentatively assigned to the Three Rivers Phase, with the exception of the above, we find all of the requisites present except Mimbres Corrugated. Broadline Red-on-Terracotta is coexistent with Three Rivers Red-on-Terracotta (fine-line). Lincoln Black-on-Red and the local smudged corrugated wares make a sudden appearance in the latest site of the period. The design elements of the early Lincoln Black-on-Red assign it definitely to a Three Rivers inspired origin (see Plate 20). Brownware has begun its decline, El Paso influence (*i.e.* recent influence from the south) has not been felt to any extent and Chupadero Black-on-White, emanating from a northern source, is at its peak.

The transition between the Three Rivers and San Andres Phases represented by site 10 shows Chupadero declining in favor of what must have been a strong wave of influence from the south bringing El Paso Polychrome. The local wares which had manifested themselves at the last of the

Three Rivers Phase continued to improve their status through the transition and the following San Andres Phase.

This final development, contrary to Lehmer, finds Three Rivers Red-on-Terra Cotta missing from the Bonito Area. Also in disagreement is the dominance of corrugated ware rather than El Paso Polychrome, which, although present in increased percentages was by no means dominant; in fact, it may have been intrusive in this area rather than a native ware.

The abandonment, in the late 14th century, occurred when corrugated and Lincoln Black-on-Red wares were at their peak, the latter giving way to an early glaze ware (Agua Fria Glaze-on-Red), a ware similar in many ways to the later forms of Lincoln. As already mentioned, Chupadero Black-on-White and the plain brownwares were very much on a decline and Three Rivers Red-on-Terracotta had disappeared (the appearance of a few sherds at site 3 is due to the extended occupation of this site, evidenced also by the percentage of Chupadero and specific trade material). The general impression given by collections from these last sites is one of Pueblo culture.

Trade material is present in most sites to the extent found in those reported on by Lehmer. The most useful are the red-on-terracotta types and the early glaze wares. The former have been dealt with to some extent in the foregoing material, a brief summary of their development follows. A brownware with a red wash, presumably that which Mera postulated as ancestral to the series, has a spotty distribution among the sites, occurring in all three phases. Sherds of this type from the later sites appear considerably worn which may indicate an extended or interrupted occupation of the site, placing the sherds in an earlier phase than that by which the site is characterized. The broadline variety of red-on-terracotta is present to a larger extent in the sites of the Three Rivers Phase than in the San Andres, where it occurs sporadically, indicating a somewhat later development of this ware in the Bonito Area than in those to the

south. In the earlier sites it is difficult to distinguish between examples of this and Mogollon Red-on-Brown ware. A distinctive type of Broadline Red-on-Terracotta occurs at site 5 in the form of both bowls and ollas, with a heavily roughened exterior and interior respectively. It is also characterized by a black core with large, angular crystalline inclusions, all of which brings to mind the red-on-terracotta wares mentioned by Sayles¹⁷ in connection with the Jumano Phase of the lower Rio Grande. Only a few sherds were found at the one site of its occurrence. The co-existence of Broadline and Three Rivers (fine-line) Red-on-Terracotta is demonstrated at sites 3, 5, 6, and 7. All forms of red-on-terracotta were apparently replaced by Lincoln Black-on-Red in the San Andres Phase. Further work in the area will clarify Mera's red wash, broad-line, fine-line, black-on-red, glaze (see Plate 20) sequence.

The Rio Grande Glaze I red ware (Agua Fria Glaze-on-Red) is present locally in fair amounts (1-2%) in the San Andres Phase and, with the more plentiful local ware, Lincoln Black-on-Red, is as excellent a guide to this phase as Three Rivers Red-on-Terracotta (fine-line) is to the Three Rivers Phase. The glaze ware is distinguished from Lincoln Black-on-Red, which it resembles superficially, by a grey core, a finer paste, and a sharper fracture. Rims are both square and round. From the external similarity it is probable that this was replacing the Lincoln ware at the time of the abandonment of the area. Other glaze wares, mostly from the Little Colorado occur sporadically as far back as site 7, where the Lincoln Black-on-Red and smudged corrugated wares first appeared. This may be another case of extended occupation.

Mimbres Black-on-White wares occur only in Three Rivers Phase sites, and have their heaviest distribution, as does Three Rivers Red-on-Terracotta, in the westernmost sites, which are also those with the easiest access to the trade from the Mimbres area.

17. Sayles, 1935.

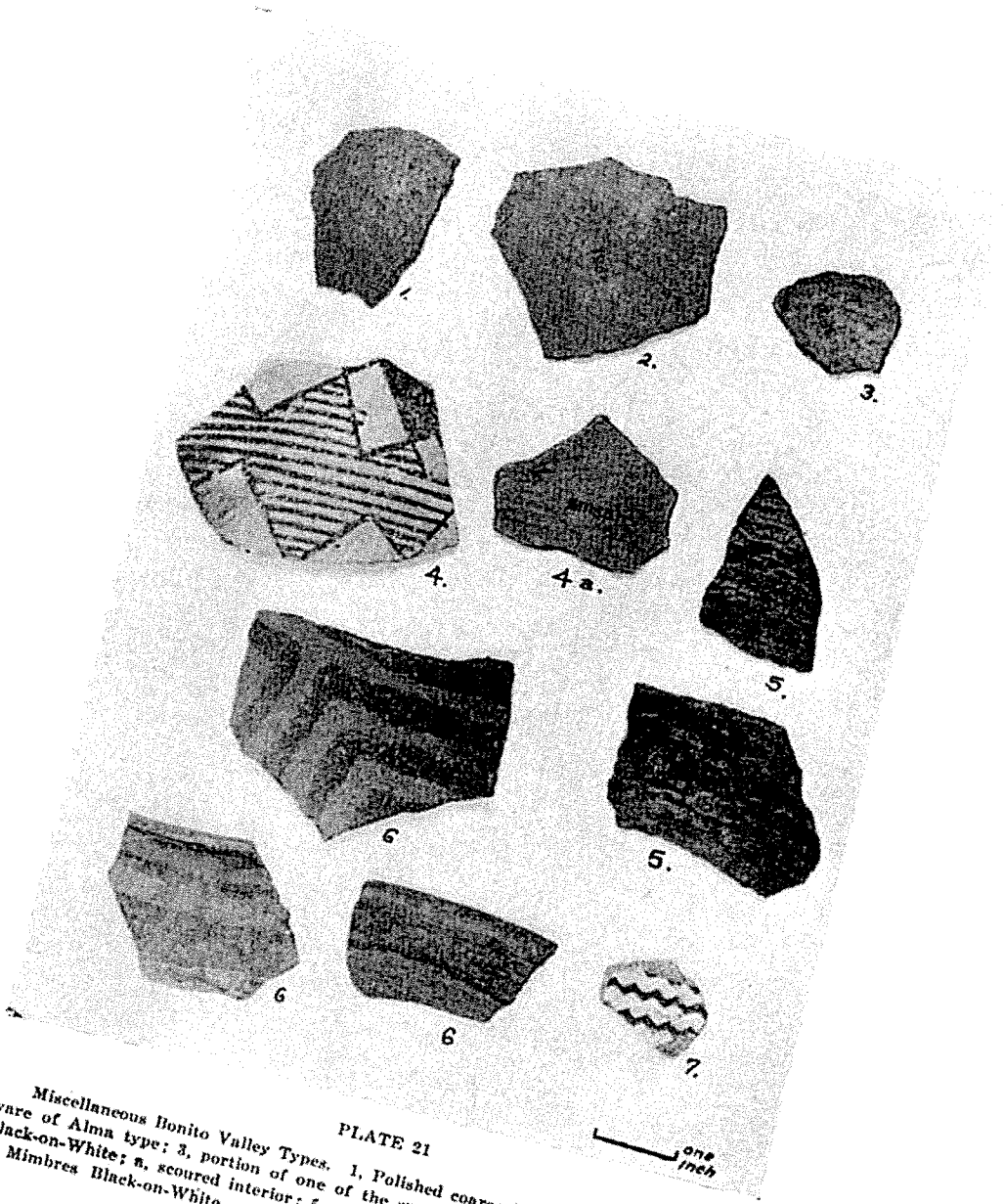


PLATE 21
 Miscellaneous Bonito Valley Types. 1, Polished coarse Jornada Brown; 2, Brown-ware of Alma type; 3, portion of one of the small bowls from site 6; 4, Chupadero Black-on-White; a, scoured interior; 5, Smudged Corrugated; 6, El Paso Polychrome; 7, Mimbres Black-on-White.

The accompanying chart contains a summation of the material presented above.

A few additional peculiarities with regard to the black-on-white ware of the area deserve mention. One of interest is that glaze on Chupadero (apparently accidental) occurs in all sites on which Chupadero Black-on-White is found and in no definite ratio. The earliest occurrent is at site 1 and the latest at site 3. It is most plentiful at site 9, although probably early San Andres was not included in the general summary because of its radically high percentage (for the Bonito area) of Chupadero Black-on-White. This is presumably due to its comparative proximity to the center of development of that type. Another development concerning this ware is the early appearance of a number of black-on-white types differing from each other in one or more ways (finish, rim form, etc.) and yet similar in at least one respect to the homogeneous Chupadero of later sites. This would contradict Mera's origin of Chupadero, although nothing definite can be stated without work of a stratigraphic nature.

Conclusions

As may be deduced from the high percentages of Chupadero to the north and El Paso Polychrome to the south, closer than 30 miles each way, the culture of the Bonito Valley was on a borderline, its foundations in the south and west and its progress toward the culture of the north.

The briefest summation of the ceramic history would point out a brownware origin stemming from the south and west with increasing influence from the north which finally enveloped all of the earlier traits and left it, at the time of its abandonment, a full-fledged Pueblo ceramic development. The situation is best demonstrated by the sequence of red wash-on-brown, to Broadline Red-on-Terracotta, to Three Rivers Red-on-Terracotta, to Lincoln Black-on-Red with a fine-line decorative scheme which degenerated into

the panel below the rim decoration of the Pueblo black-on-red wares, and finally gave way in part to the earliest Pueblo glaze-on-red ware. This last type apparently arrived in the Bonito Valley at a date somewhat later than that of its appearance in the north as evidenced by the tree ring date of 1310 to 1360 for both Agua Fria and El Paso Polychrome in Gallo Canyon.¹⁸

This development, while continuous, can be separated into three distinct phases to which the names Capitan, Three Rivers, and San Andres postulated by Lehmer can be applied with varying degrees of certainty. Somewhere between the Three Rivers and the San Andres Phase the culture of the Upper Bonito crossed the line from an aberrant form which could be associated with Mogollon to a stage which, ceramically, is indisputably Pueblo. Therefore it is suggested that the northern boundary of the Jornada be made more flexible, passing through the Bonito area in the Three Rivers Phase, and to the south of the Bonito Valley in the San Andres Phase, leaving the valley in Pueblo territory during the final development.

Lesser developments will help in establishing the identity of the people concerned. The first of these is the influx of Mimbres ware from about 1100 to 1200, an indication that some of the population of the Mimbres area abandoned at that time joined the eastern Jornada branch. There is evidence of this at Site 11 where two separate settlements are apparent, one area containing high percentages of Mimbres ware and another much larger area containing almost exclusively native wares of the same period. Other evidence of this sort is the sudden influx of large amounts of El Paso Polychrome in the "San Andres" Phase, whereas only traces of it had been present up to that time. In the south large percentages are present in the Three Rivers Phase. This indicates that in the last stage of northern development the southern settlements were already being abandoned in favor

18. Lehmer, 1948.

of the north. Cultural influence from this direction had been steadily weakening for a long period of time as evidenced by the continually increasing absorption and adoption of northern traits. It is probable that the Apache entered the Southeast New Mexico area, which was their stronghold at the time of the Spanish arrival, through these weaker southern villages, driving some of them to the north, and following up in that direction, eventually eliminated the Bonito Valley settlements. This final abandonment can be said to have been completed by 1350, the Gallo Canyon dates to the north being considered contemporaneous with the abandonment which took place shortly after both Agua Fria Glaze-on-Red and El Paso Polychrome began arriving in the area in substantial amounts.

There is evidence that the population may have scattered to the north (Abo and other pueblos of the Saline-Medano district) and west, sherds of Lincoln Black-on-Red, El Paso Polychrome, and Chupadero having been found on the Texas side of the Llano Estacado accompanied by Rio Grande Glazes I and III.

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University of New Mexico,
Albuquerque,
January, 1952.

ARCHEOLOGICAL EXCAVATIONS AT THE BELTON RESERVOIR, CORYELL COUNTY, TEXAS*

E. O. MILLER AND EDWARD B. JELKS

Introduction

The Belton Dam, presently under construction by the United State Army Corps of Engineers, is located on the Leon River 3½ miles due north of Belton, Texas. The reservoir impounded by the dam will extend 17½ miles up the Leon and 12 miles up Cowhouse Creek, the principal tributary. It will function in flood control, and will supplement the water supplies of Temple, Belton, Killeen, and Ft. Hood.

A preliminary archeological reconnaissance of the Belton Reservoir area was made by Robert L. Stephenson in July, 1949. He located 38 archeological sites which will be affected by the reservoir. Twelve additional sites were discovered subsequently by E. O. Miller.

Working intermittently from January 18 to March 2, 1951, E. H. Moorman and E. O. Miller completed minor excavations at the Grimes-Houy shelter (41-39D4-17) and the Urbankte Site (41-39D4-15). Later, in November and December, 1951, Miller spent six weeks at the Belton Reservoir working on the Grimes-Houy burnt rock midden (41-39D4-19), the Johnson Hole Site (41-39D4-20), and the Horse Creek burnt rock midden (41-39D4-21). Both Stephenson's survey and the subsequent excavations were part of the Inter-Agency Archeological Salvage Program of the Smithsonian Institution, the National Park Service, the U. S. Army Corps of Engineers, and the Bureau of Reclamation. This program, designed to salvage archeological material endangered by dam construction, has been supervised by the River Basin Surveys—a unit of the Smithsonian Institution—under the direction of Dr. Frank H. H. Roberts, Jr.

*Permission for the publication of this paper has been kindly granted by the Secretary of the Smithsonian Institution.

After the activities of the River Basin Surveys at Belton had been terminated, additional excavations at some of the same sites were undertaken by Mr. D. B. Hill, an amateur archeologist of Moody, Texas. The material he recovered was included in the tabulations and analyses of this study. Mr. Hill's cooperation in lending his specimens for analysis and photographing is gratefully acknowledged.

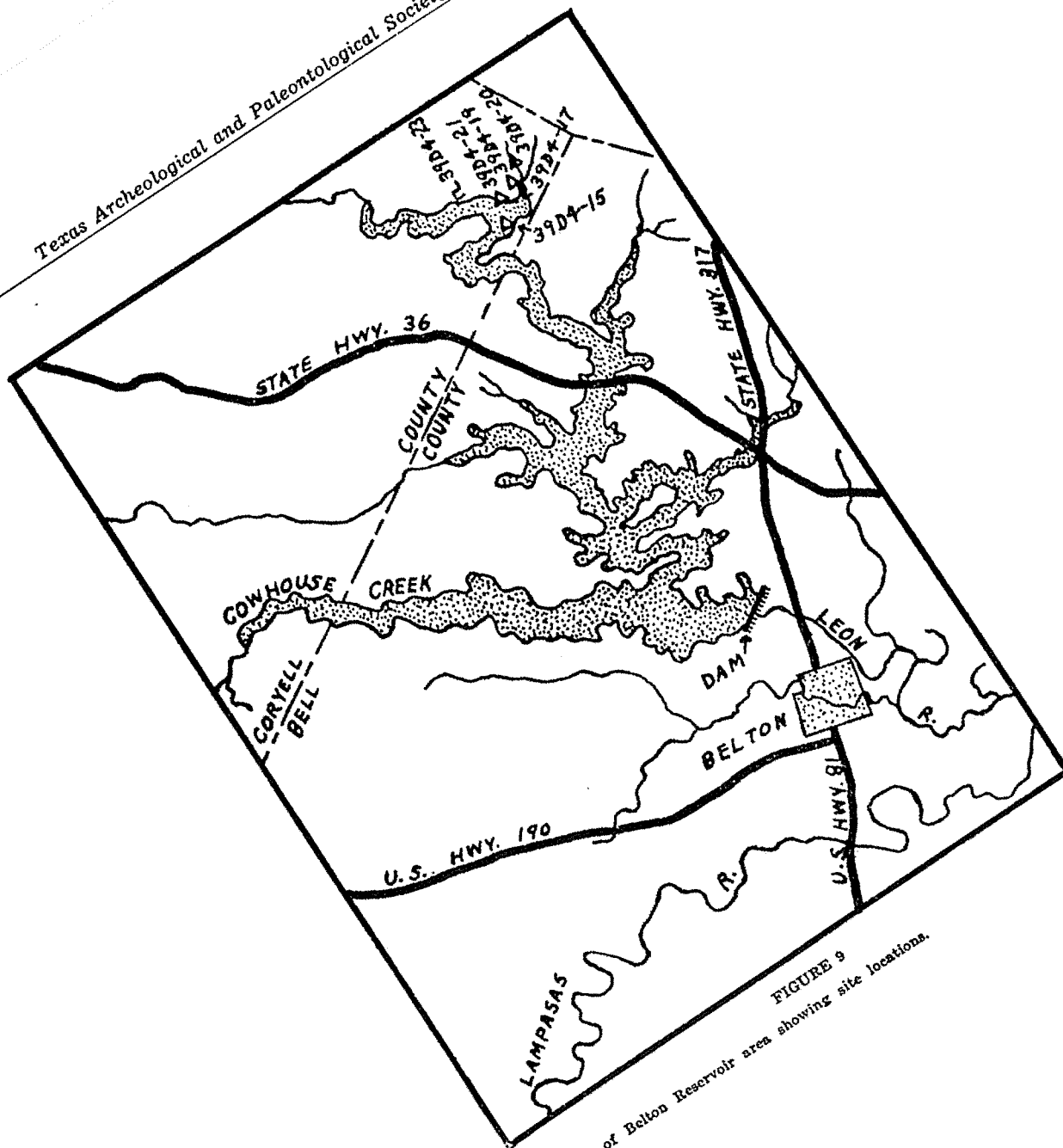
Special acknowledgment is due Alex D. Krieger, University of Texas archeologist, who examined all the artifacts, identified the Caddoan pottery types, and pointed out similarities between some of the lithic artifacts and their counterparts in the Caddoan area.

Analysis of the Artifacts

Three fundamental steps were employed in analyzing the material from Belton. First, the artifacts from each site were separated into classes on a basis of supposed functional design: *i.e.* they were classified as knives, awls, arrow points, dart points, etc. Then, wherever possible, each class was further sub-divided into types. Many specimens fell into previously recognized typological categories; others required new definition. The newly-defined types are presented here as tentative groupings and will probably require revision as additional data are gathered through future research. The third step in the analysis consisted of plotting the distribution of the various classes and types, and seeking to recognize affiliations between groups through associations, one with another, within the sites.

In order to separate the artifacts into classes, it was necessary to draw certain arbitrary lines of definition, especially for the chipped stone implements: these are explained here to minimize confusion on the part of the reader.

Broad-bladed, stemmed implements—unless the stem was set at an inappropriate angle—were considered to be projectile points. Included also in the projectile point class were triangular-shaped blades of such size and shape as to suggest their use on projectiles. Those implements with one smooth,



Map of Belton Reservoir area showing site locations.

FIGURE 9

unworked face were classified as scrapers, except for a few specimens whose form compelled their inclusion with the projectile points or drills. Thin, sharp-edged blades flaked on both faces were classified as knives, while the thicker, cruder blades with edges unsuitable for cutting purposes were simply designated blades. Implements with very narrow, pointed blades were put into the drill category, and those with short, sharp, beak-shaped projections were called graves.

The term *blade* refers to any relatively flat implement worked on both faces; it is also used to designate the body (as distinguished from the stem) of a projectile point, or the long, sharp-edged projection of a drill. The *stem* of a projectile point, drill, or knife is the projecting "tab" by which the implement was presumably hafted. The *base* of any implement is the bottom-most edge. The word *base* is also used to indicate the broad, non-blade portion of a drill.

Stone Artifacts

Projectile Points

Differentiation between arrow and dart points on a basis of size and technique of manufacture is now a generally accepted practice among North American archeologists. This dichotomy was followed in analyzing the Belton material, the light, thin, finely flaked specimens being designated arrow points while the heavier, thick, crudely chipped ones were classified as dart points. Although an occasional point of intermediate size and design might have been either a heavy arrow point or a light dart point, most of them fell naturally and conveniently into one of the two categories. Descriptions of the projectile point types follow:¹

Ellis Stemmed. (Plate 22, 1). This type, previously described by Krieger (Newell and Krieger, pp. 166-7), is a

1. Type names preceded by an asterisk were first recognized by J. Charles Kelley, University of Southern Illinois archeologist, but most of them have not been previously described in print. Kelley's type names are used here.

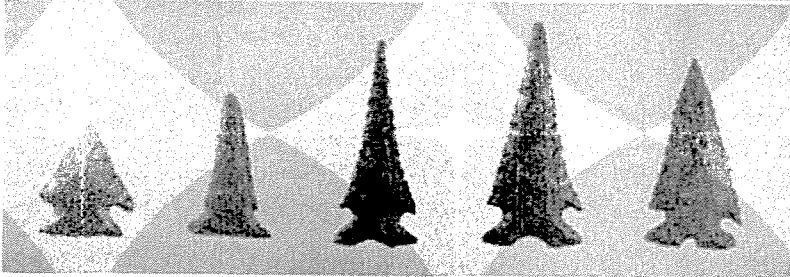
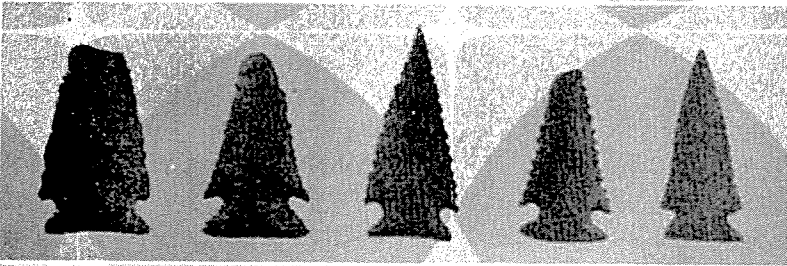
relatively small dart point characterized by an expanding stem and strong shoulders. *Ellis* occurs over most of the eastern portion of the United States in Archaic and Woodland sites as well as in many later complexes. A minor type at Belton, it was found both in Edwards Plateau Aspect and in Central Texas Aspect components.

Ensor Stemmed. (Plate 22, 2). This is the writers' name for a provisional dart point type of distinctive design occurring in large numbers in most sites in the Belton area. The most prominent characteristic is a strongly expanding stem with a straight or convex base, the lateral extensions of the stem usually being approximately in line with the blade edges. *Ensor* resembles *Ellis Stemmed*, but differs from it in these respects: the expansion of the stem is sufficient to bring the stem corners flush with the blade edges, a small notch is frequently present in the middle of the base, markedly concave blade edges are common, the blade edges are sometimes serrated, and *Ensor* is generally longer, thinner and of more slender proportions than *Ellis*. While *Ensor* and *Ellis* possibly are variations of a single type, in the writers' opinion each has enough individuality to warrant a separate designation. After having examined a number of private collections from Central Texas, the writers believe that *Ensor Stemmed*, together with type *Darl Stemmed*, described below, are affiliated with both the Edwards Plateau and Central Texas Aspects.

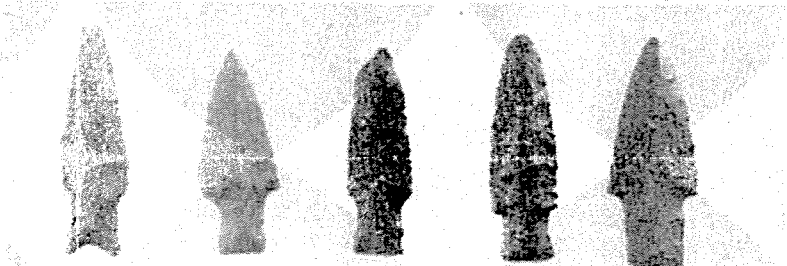
Yarbrough Stemmed. (Plate 22, 3). Twenty-four points from five sites were classified as *Yarbrough Stemmed* (Newell and Krieger, p. 168), a relatively slender, medium-sized dart point, with slight shoulders and a parallel-sided stem. Bases range from concave to convex and the stems are frequently smoothed along the edges. This is a dominant dart point type at the Yarbrough Site, Van Zandt County, Texas, and is part of the late pre-pottery complex there. It is also present at the Davis Site, type site of the Alto Focus, in Cherokee County. Its principal affiliations appear to lie



1



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PLATE 22

Stone dart points. 1, Ellis Stemmed; 2, Ensor Stemmed; 3, Yarbrough Stemmed. All approximately $\frac{1}{2}$ size.

with the late pre-pottery cultures of east Texas, with continuation as a minor type into the pottery horizon.

Gary Stemmed. (Plate 23, 2). *Gary* (Newell and Krieger, p. 166) is a barbless, shouldered dart point with a characteristic contracting stem. It is widely distributed over the Southeastern area at both pre-pottery and pottery levels. The two Belton specimens were found at the Johnson Hole Site.

Darl Stemmed. (Plate 23, 1). This small, slender dart point with a beveled blade is present in large numbers in the Central Texas Aspect and Edwards Plateau Aspect components in the Belton area. A few examples were found at the Yarbrough Site during excavations there by the University of Texas, and were classified by Krieger (personal communication) as a variant of the type *Yarbrough Stemmed*. *Darl* is similar to *Yarbrough* in general outline, having slight shoulders and a parallel-sided stem, but differs from *Yarbrough* in its beveled blade, complete absence of stem-edge smoothing, and in the semi-serrated effect—resulting from fine pressure flaking along the edges of the blade—of most specimens. The present writers believe that this style of point represents a significant departure from the *Yarbrough* motif, consequently they have considered it a separate type. As with the type *Ensor Stemmed*, however, *Darl Stemmed* is introduced as a provisional type. Its final disposition must await broader distributional and associational studies than have been made to date.

**Pedernales Indented Base.* (Plate 23, 3-5). This point is the principal diagnostic element of the Round Rock Focus (Kelley, 1947b; Campbell). Fifteen specimens were recovered at Belton, eleven of them from the burnt rock midden at the Johnson Hole Site. *Pedernales* is a large dart point with a characteristic bifurcated stem and a triangular blade. There is considerable variation in general proportion and outline between individual specimens.

**Nolan Beveled Stem.* One dart point of this type was found at Belton, in the Ament shelter. *Nolan* is the principal

projectile point type of the Clear Fork Focus as defined by Kelley (Kelley, 1947a), but also occurs in Round Rock Focus components. It can be easily identified by its square—or sometimes slightly expanding—stem which is beveled to the right, its straight base, and slight rounded shoulders.

**Castroville Convex Base*. (Plate 23, 6-7). This point occurs frequently in components of the Edwards Plateau Aspect and is considered by Kelley (Kelley, 1947b, p. 124) to be a diagnostic element of the Round Rock Focus. The stem is fairly broad and usually expanding, and the base ranges through varying degrees of convexity. The shoulders are well developed, and pronounced barbs are frequent. The blade is broad with convex edges. Five specimens of *Castroville* were found at Belton, in three sites.

**Bulverde Barbed*. (Plate 23, 8). Three possible *Bulverde* dart points were found at Belton. All were in the Johnson Hole burnt rock midden. This type is distinguished by a straight base, square or slightly contracting stem, pronounced barbed shoulders, and a short, squat, triangular blade. It is consistently found in Edwards Plateau Aspect components in Central Texas, but its focal affiliations are as yet undetermined.

**Martindale Fishtail*. (Plate 23, 9). The one specimen of this type was recovered at the Johnson Hole burnt rock midden. *Martindale* is a thick, broad-bladed point which occurs in components of the Edwards Plateau Aspect. The term *Fishtail* was derived from its most distinctive feature, the curving lateral stem projections which extend to either side. The exact cultural affiliations are unknown.

Arrow Points

**Scallorn Stemmed*. (Plate 24, 1). This is one of the principal arrow point types of the Austin Focus (Krieger, 1946, p. 166). An expanding stem, sharp barbs, and occasional serrated blade edges are typical features. A number of the arrow points at Belton possessed the essential form of type *Scallorn Stemmed* but, at the same time, had erratic features

that would have prevented their inclusion within the type limits as originally defined by Kelley. For purposes of the present analysis, the limits of variation were extended to embrace a greater diversity of form than was originally included in the type description. It is probable that future research will break down this extended "type" into several groups.

**Perdiz Pointed Stem*. (Plate 24, 2). This is one of the most numerous arrow point types at Belton. It is widely distributed in Texas, and is especially well represented in the Toyah, Austin, Rockport, and Frankston Foci (Kelley, 1947b; Newell and Krieger, pp. 191-2). Light, thin, and finely flaked, its most distinctive feature is a long, sharply pointed stem. Long, sharp barbs are also characteristic.

**Cliffton Contracting Stem*.² (Plate 24, 3). This is a crudely made arrow point with a very small contracting stem and broad, unbarbed shoulders. A flint flake of proper shape was simply roughed into the desired form with little or no attention devoted to detail or accurate delineation. Many specimens retain one smooth, unchipped face and, in cases where a curved flake was used, a marked degree of curvature frequently survives in the completed point. *Cliffton* is found in the Harrell Site, type site of the Henrietta Focus, in Young County, and in most components of the Austin Focus (Krieger, 1946, p. 115).

**Foyle Flake*. (Plate 25, 1). This arrow point lies typologically between *Cliffton Contracting Stem* and *Perdiz Pointed Stem*. Like *Cliffton*, it is made from a small flake, with one face usually left smooth and unchipped, but it differs from *Cliffton* in having a larger, sharply-pointed stem and in the fine chipping and clean lines of most specimens. It is sufficiently close in type to *Cliffton* and *Perdiz* to suggest affiliation with both, and it is probable that future distributional studies will result in some reshuffling among the three

2. *Cliffton* was misspelled *Clinton* in Kelley, 1947b. Both names refer to the same type arrow point.

types. *Foyle*, while far from rare, was not found in abundance at Belton.

Alba Barbed. (Plate 25, 2). This is a small arrow point with a bulb-shaped stem and concave blade edges which sweep out to broad barbs. Occasionally the stem edges are parallel. According to Krieger (Newell and Krieger, pp. 161-2) *Alba* is widespread in foci of the Gibson Aspect in the Caddoan area, but does not continue into the later Fulton Aspect. Seven specimens were found at Belton, four at the Johnson Hole Site and three at the Ament shelter.

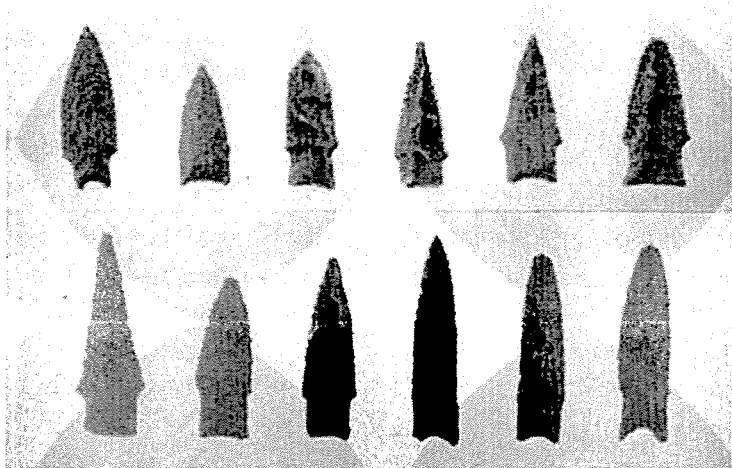
Drills

The drills can be easily separated into two distinctive categories: large and small. The large ones (Plate 23, 10-11) are chipped on both faces and are oval in cross-section; their bases are almost invariably worked into some shape, usually discoidal, square, or stemmed in the manner of dart points. The stems are usually identical to those of local dart point types. In contrast, the bases of the small drills (Plate 25, 4) are irregular-shaped flakes, completely unworked, and the blades frequently have one smooth, unchipped face. The large drills seem to be associated entirely with the Edwards Plateau Aspect cultures, while the small, more delicate ones are later and associated with arrow points.

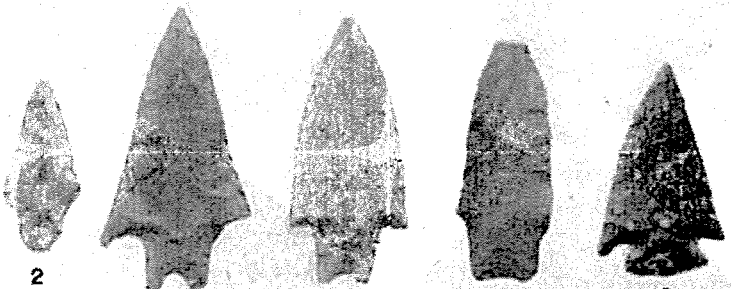
Knives

It is unfortunate that a detailed study of flint knife types in Central Texas has never been made. Several forms occur in sufficient number to suggest that definite types do exist, but their identification as such is beyond the scope of this paper. A large-scale study involving thousands of specimens would be necessary to determine the distinctive characteristics of the separate types and their distributions. Until such a study has been completed, most of the knives in the Belton area can be described only in general terms.

The knives are, for the most part, either triangular or leaf-shaped and have sharp tips. Bases of the triangular



1



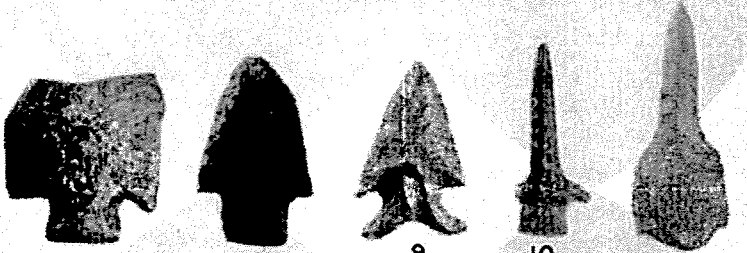
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PLATE 23

Stone dart points and drills. 1, Darl Stemmed; 2, Gary Stemmed; 3-5, Pedernales Indented Base; 6-7, Castroville Convex Base; 8, Bulverde Barbed (?); 9, Martindate Fishtail; 10-11, Large drills with worked bases. All approximately $\frac{1}{2}$ size.

forms range from straight to deeply concave. In addition to these, a few four-edged, beveled knives like those associated with the late Plains cultures and several specimens similar to the *Copena* type are present. Some of the thin, sharp implements classified as scrapers would make efficient knives and were probably used for cutting purposes.

Copena knives. A number of knives (Plate 26) were found which bear a striking similarity to those of the *Copena* Focus in Alabama, Mississippi, and Tennessee (Webb and Dejarnette, pp. 301-6) and will henceforward be referred to as *Copena* knives. This type also occurs in appreciable numbers in components of the Alto, Spiro, and Gahagan Foci (Newell and Krieger, pp. 173-4).

Scrapers

Scrapers can be classified as snub-nosed, side, and trimmed flake. The snub-nosed ones are of medium size and are evidently associated almost exclusively with the Central Texas Aspect. The other styles are more nondescript and their affiliations are undetermined. Side scrapers of varying forms apparently were shared by both Edwards Plateau and Central Texas Aspects, and irregularly shaped flint flakes, retouched unifacially along one or more edges, occur in all components.

Grinding Stones

Manos are present in components of both the Edwards Plateau and Central Texas Aspects. The deliberately-shaped ones usually have parallel sides and rounded ends, and both faces show evidence of use. Others, made from large, unshaped, water-worn quartzite nodules show wear on only one face.

Limestone and sandstone grinding slabs with round or oval depressions were used with the manos. No true metates (*i. e.* grinding slabs used with back-and-forth motion) were found.

A small piece of sandstone with several grooves set at random angles was picked up on the surface at the Urbankte Site. It was probably an abrading stone or hone used to sharpen the tips of bone implements.

Pigments

There were small pieces of ochre at all sites. Red ochre was most common, although a few fragments of yellow ochre were also found. One piece of red ochre, from the Johnson Hole burnt rock midden, has a cross-hatched design incised on one facet, and a number of other pieces from various sites have worn surfaces where the pigment was scraped off.

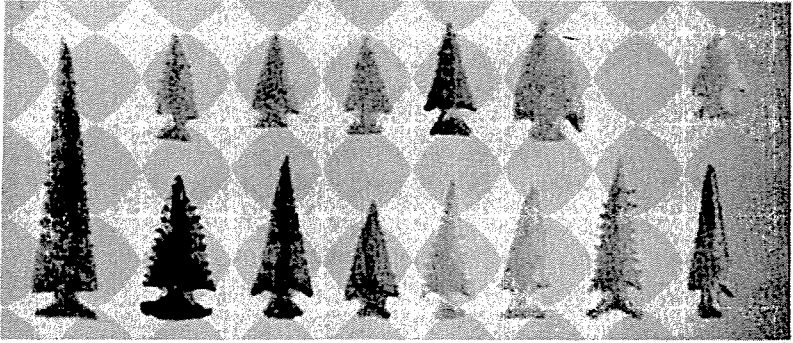
Artifacts of Bone

Pointed Bone Implements

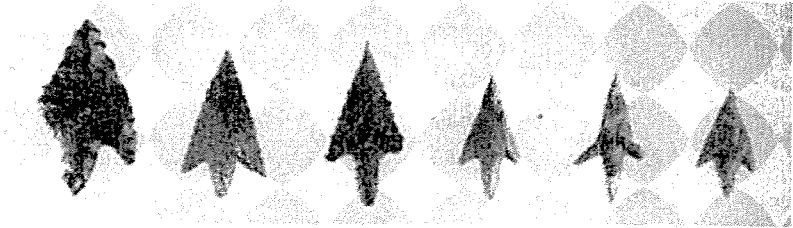
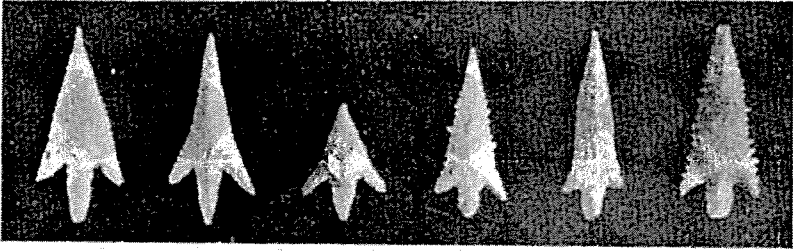
These were found associated with all components and can be separated into two general styles. One style (Plate 27, 1) was made from a splinter, sharply pointed at one end, with a smoothed, blunt base. Also included in the splinter group are a few specimens with rough, unworked bases (Plate 27, 1). The second, and most numerous, style (Plate 27, 2) retains all or part of the articular surface of a joint on the basal end. No particular differences in the provenience of the two styles was observed. These implements, generally supposed to be awls, pins, needles or weaving tools, were all polished to some extent, especially toward the distal end.

Flaking Tools (Plate 27, 5 and 9).

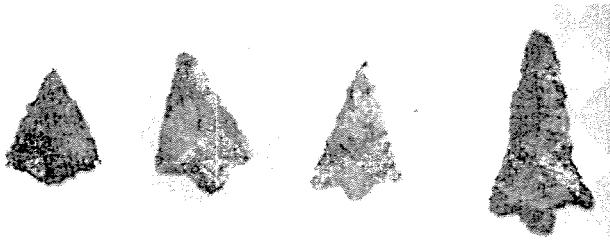
These were made from the proximal end of a deer ulna, with the unworked articular surface and olecranon left as a convenient handle. The ulna was severed one to three inches below the "handle" and the tip was smoothed into a rounded or beveled shape. No other flaking implements were found, with the possible exception of several fragments of deer antler (Plate 27, 8) which may have been parts of flakers.



1



2



3

PLATE 24

1, Scallorn Stemmed; 2, Perdix Pointed Stem; 3, Clifton Contracting Stem. All approximately $\frac{1}{2}$ size.

Tablet-Shaped Objects

Two flat, rectangular-shaped bone objects of unknown use were found, one at the Ament shelter (Plate 27, 3), the other at the Grimes-Houy shelter (Plate 27, 4). Both were collected by Mr. Hill and both were associated with burials. Approximately $\frac{1}{8}$ inch thick, they are polished on the outer surfaces and around the edges. The inner surfaces, smoothed slightly, still retain a veneer of the spongy, cellular structure found inside mammal bones. The size and shape of these objects suggest that they were made from flat or long bones of some large mammal, possibly bison.

Ceramics

Pottery was present at the Urbankte Site, the Grimes-Houy shelter, the Johnson Hole Site, the Grimes-Houy burnt rock midden, and the Ament shelter. Included are engraved, incised, brushed, punctated, and plain sherds, all tempered either with bone or clay-grit. No shell-tempered sherds were found. Many of the plain body sherds probably belong to vessels with decorated rims, but a few are plain rim sherds which suggests entirely plain vessels.

Unfortunately, most of the sherds are too small for positive identification as to type. Several of them, however, are unmistakably *Holly Fine Engraved* (Plate 29, 1-6), a diagnostic type of the Alto Focus (Newell and Krieger, pp. 81-90). A pottery pipe from the Ament shelter (Plate 29, 8) is assigned by Krieger to the Fulton Aspect—probably the Frankston, Titus, or Texarkana Focus. The pottery as a whole appears to be typical of the Caddoan area and undoubtedly represents both the Gibson and Fulton Aspects. The relative scarcity of pottery in these sites and the similarity to Caddoan area styles argue against its indigenous manufacture. It is more probable that all the sherds are fragments of trade vessels brought in from the east.

Analysis of the Sites

In the following analysis only those artifact types considered diagnostic of previously-defined cultures are dis-

cussed in detail. The Central Texas foci thus far defined have been identified and delineated principally on a basis of projectile point types, consequently they are the only criteria available for diagnostic interpretation. This situation is unfortunate, for distinctive types could very probably be recognized in other artifact classes if they should be subjected to thorough analysis; until such analyses have been made, however, it is necessary to rely chiefly on projectile point types for interpretation.

Space and time limitations would not permit detailed descriptions of all the artifacts, and since no comprehensive studies have been made for scrapers, blades, drills, awls, flaking tools and so on for Central Texas in general, they have been largely eliminated from this analysis. A tabulation of all artifacts from each site has been included, with the intra-site provenience of the specimens recorded wherever possible, and anyone who is interested in correlating the various diagnostic types with the other artifacts from the same components can do so by examining these tables.

The cultural affiliations of the artifact types under consideration are as follows:

Edwards Plateau Aspect

Round Rock Focus

Pedernales Indented Base

Castroville Convex Base (?)

Nolan Beveled Stem (?)

Clear Fork Focus

Nolan Beveled Stem

No established focal affiliation

Bulverde Barbed

Martindale Fishtail

Ensor Stemmed (?)

Darl Stemmed (?)

Central Texas Aspect

Austin Focus

Scallorn Stemmed

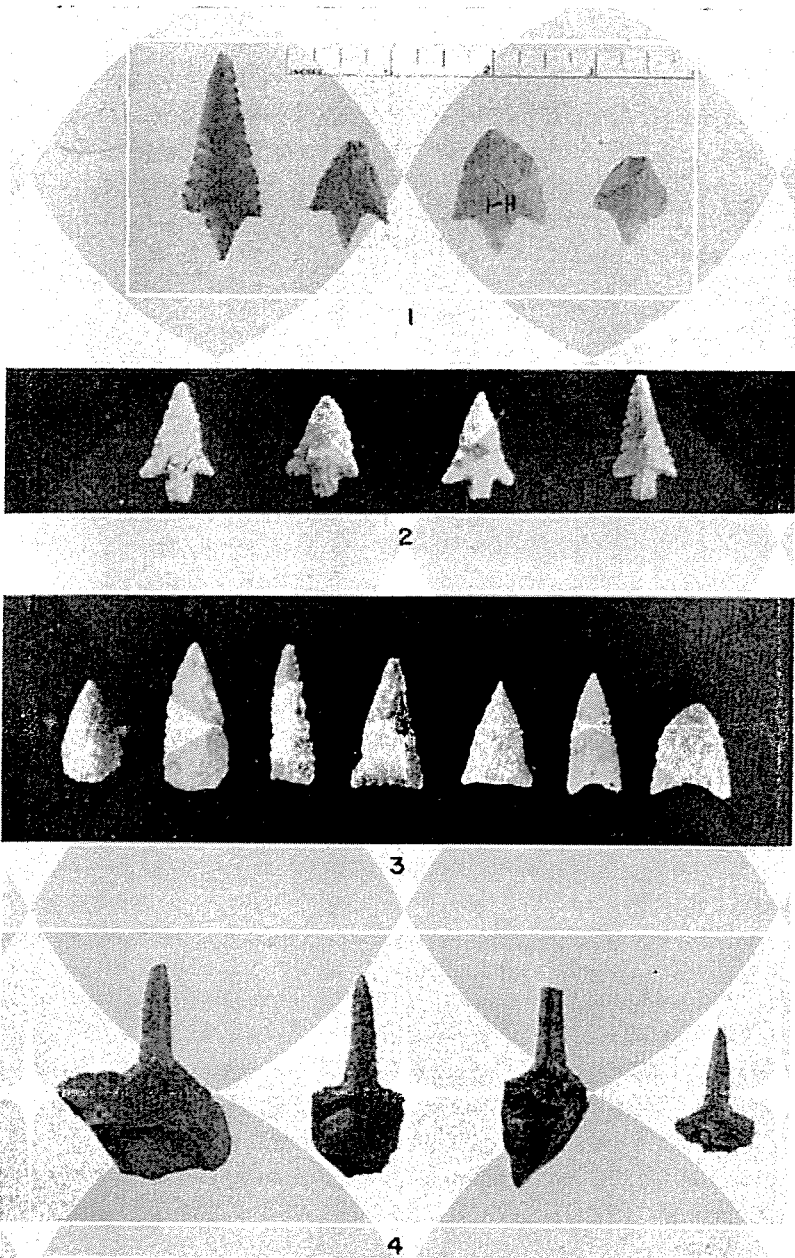


PLATE 25

Stone arrow points and drills. 1, Foyle Flake; 2, Alba Barbed; 3, triangular arrow points found in Austin Focus components; 4, small drills with unworked bases. All approximately $\frac{1}{2}$ size.

Perdiz Pointed Stem
Clifton Contracting Stem
Foyle Flake
Ensor Stemmed
Darl Stemmed

Toyah Focus

Perdiz Pointed Stem (?)
East Texas Archaic
Yarbrough Stemmed
Ellis Stemmed
Gary Stemmed

Gibson Aspect

Alto Focus

Yarbrough Stemmed
Wells Contracting Stem
Morrill Stemmed
Ellis Stemmed
Gary Stemmed
Alba Barbed
Copena
Holly Fine Engraved

Urbankte Site (41-39D4-15)

The Urbankte Site is located on the left bank of the Leon River immediately above its confluence with Horse Creek, about a mile below Mother Neff Park. It is in the south-eastern corner of Coryell County on the property of W. A. Urkankte, and covers an area of 3 to 4 acres.

In December, 1950, Moorman and Miller excavated two test pits there, each five feet square, and made twelve tests with an auger. It was determined that the cultural zone lies at the surface, extending no deeper than 15 inches in any place,³ indicating an occupation of fairly short duration.

3. On a recent visit to the Urbankte Site, Miller discovered at the extreme south-eastern edge of the site a midden approximately 30 inches in thickness. Although excavation of this midden might yield data that would alter somewhat the conclusions reached in the present analysis, it is doubtful that any significant revision would be necessary.

Except for potsherds—which are unusually numerous for a Central Texas site—and two types of stone artifacts, the artifact assemblage is typically Austin Focus.

Scallorn Stemmed, *Cliffton Contracting Stem*, *Foyle Flake*, and *Perdiz Pointed Stem* are the dominant arrow point types; dart point types include *Darl Stemmed*, *Ensor Stemmed*, and *Ellis Stemmed*. Four knives are probably of the *Copena* type.

A number of potsherds were recovered, all seemingly trade material from the Caddoan area to the east. Tempering agents are bone and clay-grit, and decorative techniques include brushing, incising, and engraving. Most of the sherds are too fragmentary for positive typological identification, but the ceramic assemblage as a whole is unquestionably Caddoan. Three sherds are identified as *Holly Fine Engraved* of the Alto Focus, Gibson Aspect.

Summary. Because of the shallowness of the cultural zone and the typological uniformity of the artifacts, the Urbankte Site is considered to be a “pure” component of the Austin Focus (Table 1). The presence of Caddoan pottery, *Copena* type knives, and *Ellis Stemmed* dart points in evident association with the Austin Focus material is construed as indicative of trade relationships between east and central Texas Indians, and the presence of potsherds of the type *Holly Fine Engraved* suggests partial contemporaneity of the Austin and Alto Foci.

Grimes-Houy Shelter (41-39D4-17)

This rockshelter is situated some 600 yards east of the junction of Horse Creek and the Leon River. It is about 60 feet long, with a depth of 6 to 12 feet and a ceiling height of from 6 to 8 feet above the present surface. It lies near the head of a box canyon with walls 20 to 30 feet in height.

Moorman and Miller spent several days excavating in the Grimes-Houy shelter in January, 1951. A grid system of five-foot squares was established and four of the squares were

excavated to bedrock at an average depth of 24 inches. The provenience of the specimens was recorded by square and depth below the surface. At odd times during the late spring and early summer of 1951, Mr. D. B. Hill excavated further in the shelter.

The principal occupation appears to have been by the Austin Focus. *Scallorn Stemmed* and *Perdiz Pointed Stem* are most numerous of the arrow point types, and both *Foyle Flake* and *Clifton Contracting Stem* are also present. Dart point types include *Ensor Stemmed*, *Darl Stemmed*, *Ellis Stemmed*, *Yarbrough Stemmed*, *Pedernales Indented Base*, and *Castroville Convex Base*. The two latter types are considered diagnostic elements of the Round Rock focus and all examples of both occurred relatively deep in the site (Table 2). Their presence here may indicate survival of Edwards Plateau Aspect artifact types into the Austin Focus since Austin Focus material occurs at the same levels. *Ensor Stemmed* and *Darl Stemmed* are thought to be local manifestations of the Austin Focus. Three four-edged, beveled knives of the type commonly associated with cultures of the Plains area were also found.

Artifacts pointing toward contact with the Caddoan area consist of *Ellis Stemmed* and *Yarbrough Stemmed* dart points, *Copena* type knives, and fragments of a single pottery vessel. The vessel is very similar to one from the Clements Site in Cass County which was found in association with European trade material. The fragments were found by Mr. Hill within a very restricted space and the vessel they represent was probably grave furniture included with one of the burials. Since the exact provenience was not recorded, however, it is impossible to assign it to the proper one.

No natural stratigraphy was discernable and any typological stratigraphy that may have existed was evidently disturbed by the numerous graves which were, in most cases, dug to bedrock. However, the arrow points as a

group were mostly in the higher levels while the dart points were generally somewhat deeper.

Twelve burials comprising a total of 17 skeletons were found, all between the back wall and a heavy rock fall running longitudinally through the center of the shelter. There were eight single, three double, and one triple interments. All the skeletons were flexed except for one infant which was extended on the back. One burial contained a flat, rectangular bone tablet (Plate 27, 4) which may have been used as a wrist guard for protection against the slap of the bowstring, and a plain, polished pendant of mussel shell (Plate 28, 2). No other burial furniture, with the possible exception of the pottery vessel mentioned above, was found.

Summary. The Grimes-Houy shelter yielded a quantity of artifacts identified with the Austin Focus. Three artifacts attributed to the Round Rock Focus were found in the lower levels, and the presence of four-edged, beveled knives suggests contact with Plains cultures. *Copena* type knives, dart points of the types *Ellis Stemmed* and *Yarbrough Stemmed*, and sherds from one pottery vessel point to a relationship with the peoples of east Texas.

Grimes-Houy Burnt Rock Midden (41-39D4-19)

This midden, located on top of the canyon wall in which the Grimes-Houy shelter is situated and about 200 feet northwest of the shelter, is oval in shape with a length of approximately 50 feet and a breadth of 30 feet. Six three-foot test squares were excavated in the midden by Miller in November, 1951. So far as the site was tested, the maximum depth of the cultural debris is about two feet. No natural stratigraphy was apparent.

The artifacts indicate occupation by both the Edwards Plateau Aspect and the Austin Focus. Dart points predominate over arrow points, with types *Darl Stemmed*, *Ensor Stemmed*, *Ellis Stemmed*, and *Yarbrough Stemmed* being represented. Arrow point types include *Scallorn Stemmed*,

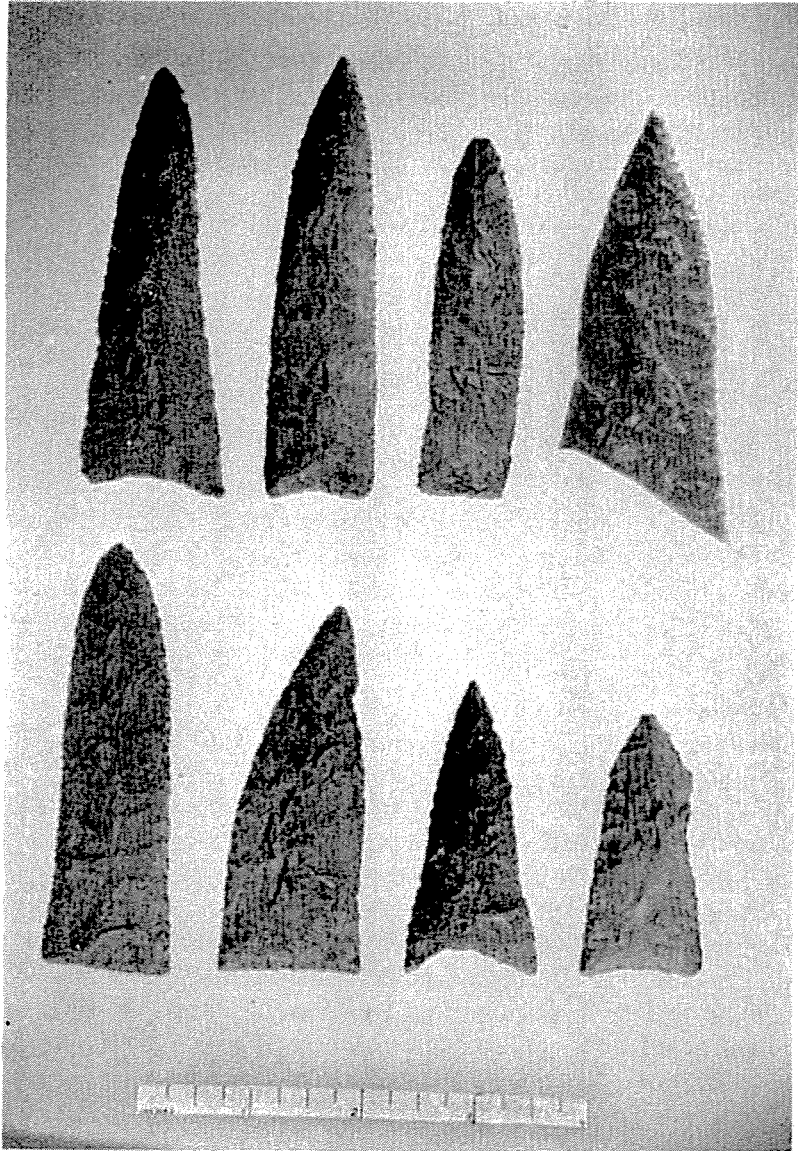


PLATE 26

Stone knives similar to "Copena" blades. All approximately $\frac{1}{2}$ size.

Perdiz Pointed Stem, and *Cliffton Contracting Stem*. One *Copena* type knife was found, and a number of potsherds were recovered. The sherds, which were found exclusively in the top twelve inches, all appear to be of Caddoan styles. Five sherds from one vessel were identified as type *Holly Fine Engraved*, and at least two more vessels were represented by a series of brushed and plain sherds.

Summary. The frequency of dart points suggests occupation by the Edwards Plateau Aspect. A few diagnostic arrow point types indicate a later occupation by the Austin Focus. Trade with the Alto Focus is represented by a vessel of *Holly Fine Engraved*, the fragments of which came from the upper one-half of the midden. Other indications of contacts with cultures to the east include one *Copena* knife and dart points of the types *Ellis Stemmed* and *Yarbrough Stemmed*.

Johnson Hole Site (41-39D4-20)

This site (Fig. 10) lies along both banks of Stockton Branch near a large "pothole" known locally as Johnson Hole—a popular swimming place. Two archeological components are present: a dissected burnt rock midden in the vertical east bank of the branch and a shallow midden, on the west bank, between the branch and a vertical limestone bluff. The burnt rock midden evidently accumulated at a time when the stream channel ran alongside the bluff, and was subsequently dissected when the channel migrated laterally to the east. After the channel had shifted, the area between its new position and the bluff was built up with alluvium, and it is in the upper portion of this alluvial fill that the later component is found.

Test E, a 10 by 15 foot rectangular excavated to a depth of five feet, was dug in the burnt rock midden by Miller in November, 1951. Most of the artifacts recovered are of types affiliated with the Round Rock Focus and include dart point types *Pedernales Indented Base*, *Castroville Convex Base*, *Bulverde Barbed*, and *Martindale Fishtail*. Also present were a few *Ellis Stemmed* dart points and several others:

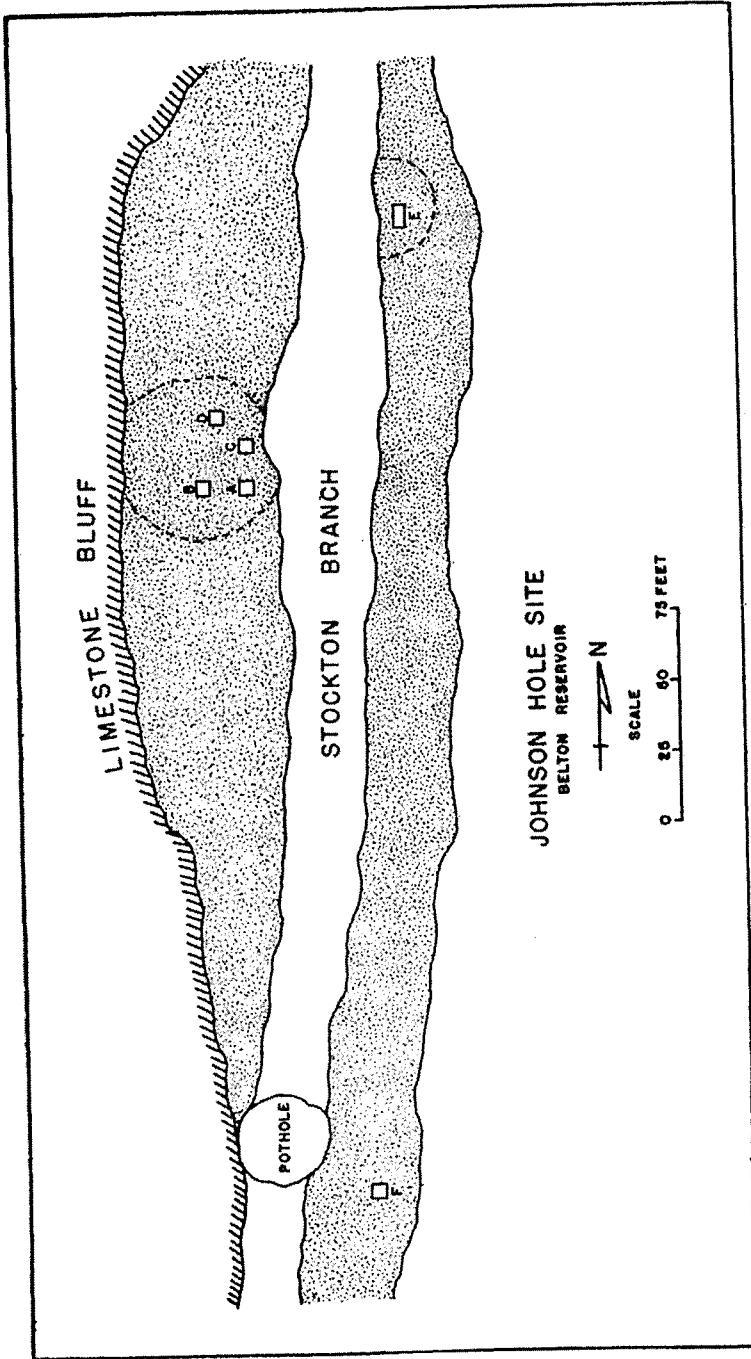


FIGURE 10

Plan of the Johnson Hole Site showing the location of test pits.

that may be variants of types *Wells Stemmed* and/or *Morrill Stemmed* (Newell and Krieger, pp. 167-8). One *Ensor Stemmed* point was found in the upper portion of the midden.

On the west bank, Miller excavated squares A, B, C, and D, each five feet square. Deposits attributed to the Austin Focus extend 12 to 18 inches below the present surface. Mr. Hill later excavated in the same general area. Diagnostic artifacts from this component include arrow point types *Scallorn Stemmed*, *Clifton Contracting Stem*, and *Alba Barbed*; dart point types *Darl Stemmed*, *Ensor Stemmed*, *Yarbrough Stemmed*, and *Ellis Stemmed*; one sherd of the type *Holly Fine Engraved*; and two *Copena* knives.

Test F was excavated by Miller on the east bank above the pothole, about 350 feet upstream from Test E. It revealed no trace of the burnt rock midden encountered in Test E. The cultural material extended to a depth of about 20 inches below the surface and included arrow point types *Scallorn Stemmed* and *Perdiz Pointed Stem*, and dart point types *Ensor Stemmed*, *Yarbrough Stemmed*, and *Ellis Stemmed*. These types, together with the shallowness of the deposit, suggest a correlation between this area and the later component below the pothole.

Summary. Two components are present at the Johnson Hole Site: a burnt rock midden of the Round Rock Focus and a later occupation by the Austin Focus. Associated with the Austin Focus material was a diagnostic trait of the Alto Focus: pottery type *Holly Fine Engraved*. Also in association with the same material were *Alba Barbed* arrow points, *Copena* knives, and dart point types *Yarbrough Stemmed*, *Ellis Stemmed*, *Ensor Stemmed*, and *Darl Stemmed*. *Ellis Stemmed* and possible variants of *Wells Stemmed* and/or *Morrill Stemmed* were associated with the Round Rock Focus component, and one specimen of type *Ensor Stemmed* came from a relatively high position in the same midden. *Horse Creek Site* (41-39D4-21)

This burnt rock midden is about 100 yards west of the Grimes-Houy shelter on the right bank of Horse Creek. The

creek has cut into the midden so that it is exposed in vertical cross-section. Resting on a bed of yellow clay and gravel, the cultural material is visible from 12 inches below the surface to a depth of 66 inches.

In November, 1951, starting at the vertical face, Miller excavated a trench five feet wide back into the midden for a distance of ten feet. The artifacts, which were sparsely scattered through the midden debris, are unquestionably of Edwards Plateau Aspect affiliation. One dart point of the type *Pedernales Indented Base* was found near the bottom of the cultural zone, and one specimen of *Darl Stemmed* came from near the top (Table 5). The middle portion yielded one *Ensor Stemmed*, one *Yarbrough Stemmed*, and two *Castroville Convex Base* points. The other artifacts, from throughout the entire depth of the midden, were of Edwards Plateau Aspect forms and styles. No natural stratigraphy was discernible.

Summary. The Horse Creek Site is a burnt rock midden component of the Edwards Plateau Aspect. One *Pedernales Indented Base* dart point was found near the bottom of the midden, suggesting occupancy by the Round Rock Focus. *Ament Shelter* (41-39D4-23)

The Ament rockshelter was not excavated by the River Basin Surveys since it is not within the reservoir area of the Belton Dam. It is included here, however, because of significant parallels between it and the other sites. It was discovered and excavated by Mr. Hill. Because of previous looting only a small undisturbed area remained, and it was there that Mr. Hill dug.

The indigenous artifacts are typically Austin Focus except for one *Nolan Beveled Stem* dart point (Clear Fork and Round Rock Foci) and one *Pedernales Indented Base* (Round Rock Focus). Of especial interest was a flexed burial, enclosed in a cist of flat stones placed vertically on edge, which contained the following burial offerings: five *Perdiz Pointed Stem* arrow points, five or six *Scallorn Stemmed* arrow

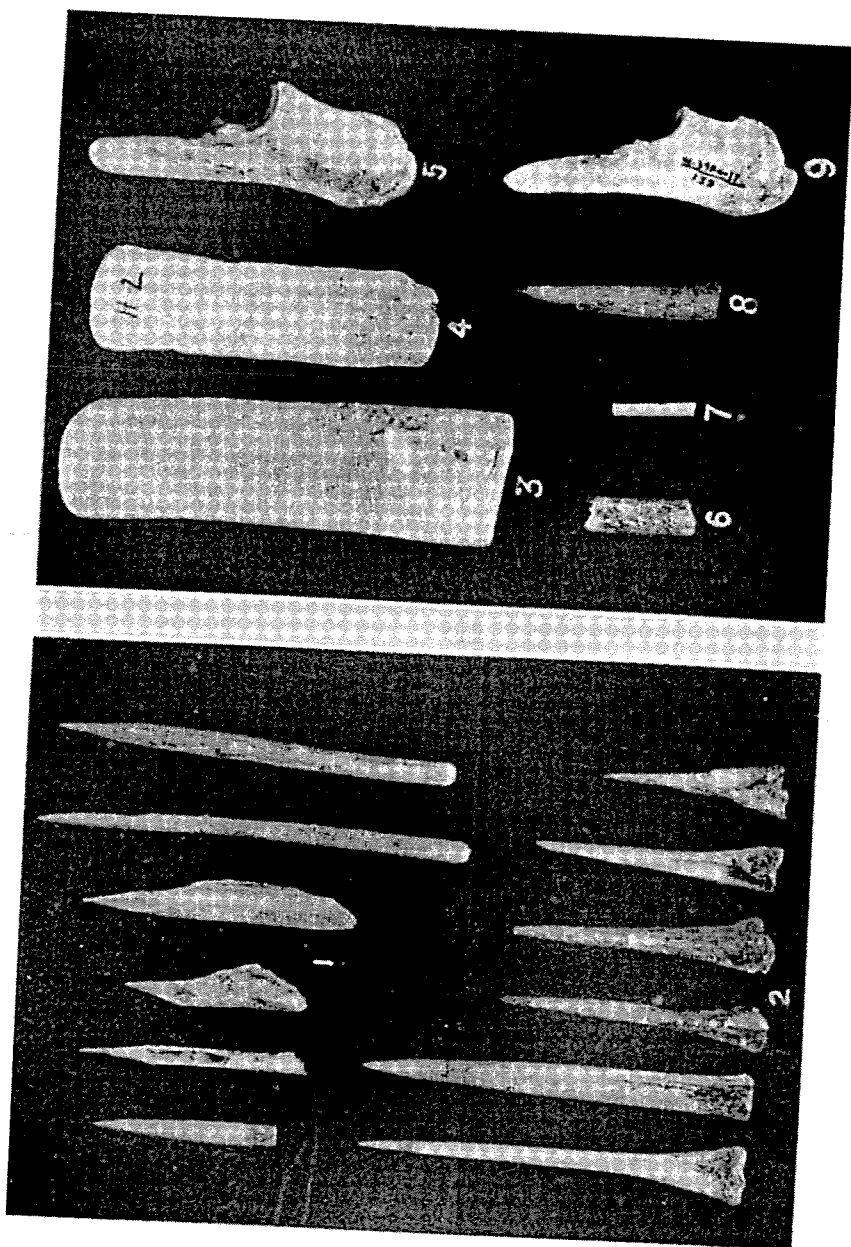


PLATE 27

Artifacts of bone and antler. 1. splinter awls; 2. awls with joint at base; 3-4. bone tablets; 5 & 9, deer ulna flaking tools; 6-7, bone beads; 8, polished antler tip. All approximately 1-3 size.

points, a flat bone "tablet" (Plate 27, 3), and a mussel shell ornament with notched edges (Plate 28, 4).

Arrow point types from the Ament shelter include *Scal-lorn Stemmed*, *Perdiz Pointed Stem*, *Cliffton Contracting Stem* and *Alba Barbed*; dart point types are *Ensor Stemmed*, *Darl Stemmed*, *Ellis Stemmed*, *Yarbrough Stemmed*, *Peder-nales Indented Base*, and *Nolan Beveled Stem*. Two *Copena* type knives, three obsidian flakes, eleven potsherds (probably from two vessels), and the bowl of a pottery pipe also came from the shelter. The latter has been identified by Krieger as a *Fulton Aspect* form.

Summary. Occupation at the Ament shelter is essentially *Austin Focus*, with traces of the *Round Rock*—or possibly *Clear Fork*—*Focus*. A pottery pipe fragment indicates probable trade between the *Austin Focus* and northeast Texas in *Fulton Aspect* times. *Alba Barbed* arrow points, *Copena* knives, and *Ellis Stemmed* and *Yarbrough Stemmed* dart points also link the site with cultures to the east. Contact with the Southwest is suggested by the presence of three obsidian flakes.

Synthesis and Conclusions

Indigenous occupation at the Belton sites can be identified with the *Edwards Plateau* and *Central Texas Aspects*. The *Edwards Plateau Aspect* is characterized by a lithic complex of relatively large dart points, knives, blades, scrapers, drills, and other classes of artifacts in a variety of forms. Several specimens considered diagnostic of the *Round Rock Focus* were found, all in lower occupational levels.

The areal distribution patterns of the two dart point types *Ensor Stemmed* and *Darl Stemmed*, so far as they are known at present, indicate a comparatively localized development. Since both were found in the *Horse Creek* site, a component of the *Edwards Plateau Aspect* with no *Austin Focus* material, they probably came into existence before the end of the aspect.

The Central Texas Aspect components are all considered to represent the Austin Focus. The writers' conception of this focus is somewhat different from that of previous investigators and requires some explanation here.

Krieger (1946, pp. 165-168) and Kelley (1947a and 1947b) originally defined the Austin Focus as a protohistoric and early historic culture, probably to be connected with the Tonkawa tribes. The principal diagnostic element was the arrow point type *Scallorn Stemmed*. Other traits were snub-nosed scrapers, four-edged beveled knives, crude side scrapers, notched bison ribs, *Oliva*-shell beads, triangular conch-shell pendants, flexed burials in crude, stone-lined pits, small, delicate flint drills, and (on some sites) European trade material. Many of these traits are typical of the sites at Belton. The Toyah Focus, another unit of the Central Texas Aspect, was differentiated from the Austin Focus by Kelley principally on the basis of an arrow point type, *Perdiz Pointed Stem*. Kelley (1947b, p. 122) also considered *Cliffton Contracting Stem* an element of the Toyah Focus, although this does not seem likely since, except in rare instances, it occurs only in Austin Focus components.

The Toyah Focus was identified with the Jumano Indians, and the widespread distribution of type *Perdiz Pointed Stem* was attributed to extensive trade activities by that group. Thus the large numbers of *Perdiz* points occurring in the Frankston Focus (East Texas), the Rockport Focus (Texas Gulf Coast), the Bravo Valley Aspect (West Texas), and the Austin Focus (Central Texas) were all thought by Kelley to have been traded in by the Jumanos (Toyah Focus). However, *Perdiz* is such a consistent trait of these foci that its presence in their components must be considered integral, whether manufactured on the spot or acquired through trade. Except for this arrow point type, there is nothing to suggest the presence of two different foci in the Belton components of the Central Texas aspect, and since *Scallorn*, *Perdiz*, and *Cliffton* are consistently associated with one another in these sites it does not seem completely

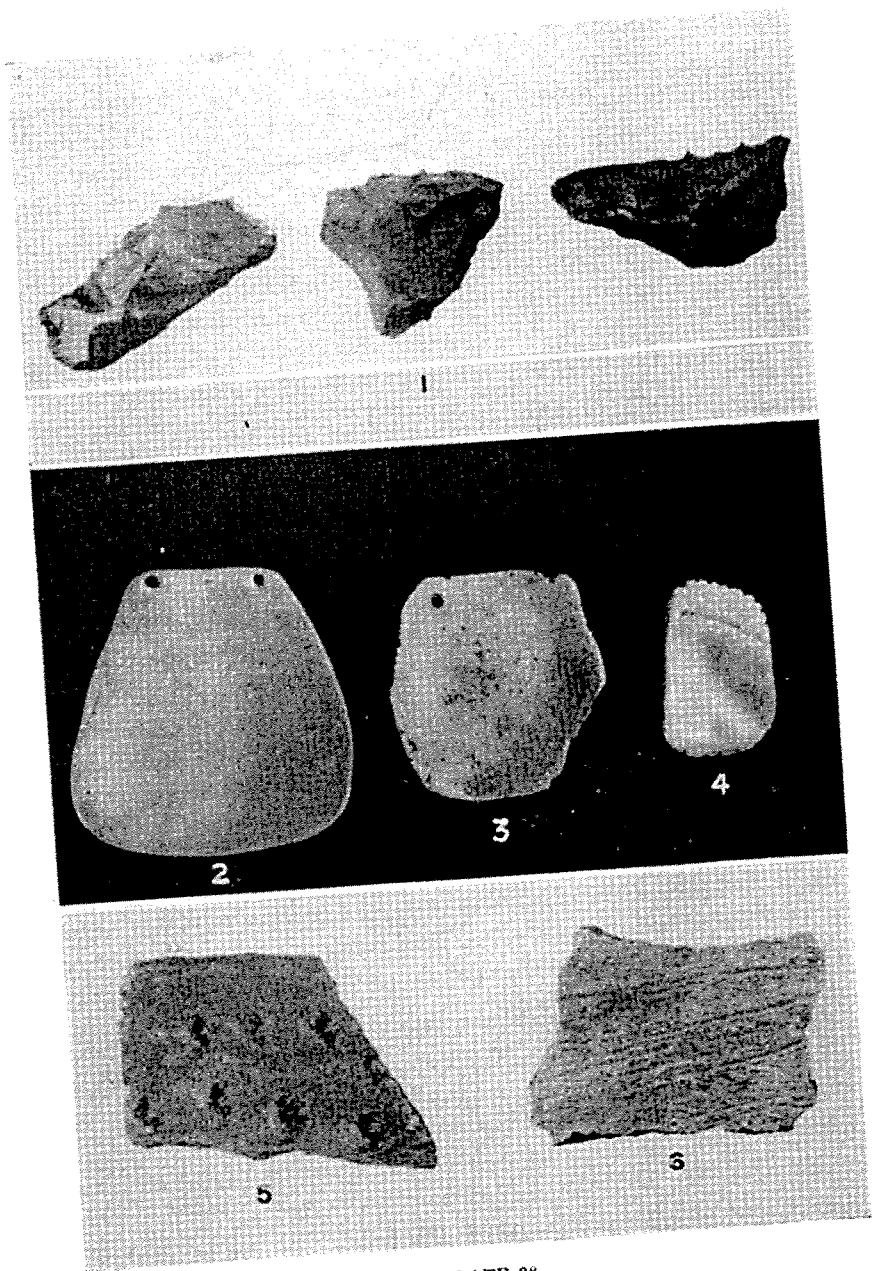


PLATE 28

Various artifacts. 1. gravers; 2-3, conch shell pendants; 4, mussel shell ornament; 5, punctated potsherd, Grimes-Houy shelter; 6, brushed potsherd, Grimes-Houy burnt rock midden. All approximately $\frac{1}{2}$ size.

feasible to separate them on a focal basis. In analyzing the Belton sites, then, *Scallorn*, *Perdiz*, and *Clifton*, together with the associated complex of other artifacts, are all considered traits of the Austin Focus.

Austin Focus (and Toyah Focus) material in the Colorado River region south of Belton apparently occurs only in thin deposits, frequently overlying earlier components of the Edwards Plateau Aspect. The occasional presence of European trade artifacts suggest historic occupation. Krieger (1946, pp. 165-8) and Kelley (1947b, p. 127) assigned a minimum date of *circa* 1500 A. D. for the appearance of the Austin and Toyah foci in Central Texas, but data from the Belton sites indicates a much earlier appearance.

Kelley's and Krieger's estimates were based primarily on evidence from sites on the Colorado near Austin. While it is possible that the Austin Focus components there are somewhat later than the ones at Belton, an appreciable time difference is extremely doubtful.

The apparent association of Austin Focus material at Belton with Alto Focus trade pottery and arrow points, *Copena* knives, and dart point types *Ellis Stemmed* and *Yarbrough Stemmed* suggests a relatively early appearance for the Austin Focus. This probability is strengthened by recent River Basin Surveys investigations in the Whitney Reservoir, not yet reported, where an Austin Focus component consisting of deposits approximately five feet in thickness (a striking contrast to the thin Austin Focus deposits on the Colorado River) was excavated in a rock-shelter. This component, as well as the ones at Belton, contained no evidence of contact with white man, consequently its terminal date was almost certainly prior to the 18th century and its beginning some centuries earlier.

Available evidence, then suggests that the Austin Focus existed for several centuries in the Brazos-Leon area. Disappearance from the area by the beginning of the 18th century is indicated by the complete absence of associated trade

material of European manufacture.⁴ That Austin Focus components in the Colorado River region *are* sometimes associated with European trade material suggests a continuation there into the historic period. The writers believe that the Austin Focus appeared in the Brazos-Leon area no later than 1200 A. D., and possibly long before.

The principal argument here—that the Austin Focus was in existence in the Brazos-Leon area by 1200 A. D. or earlier—is based largely on the assumption that the sherds of pottery type *Holly Fine Engraved* found at Belton were associated with Austin Focus components. As the tables show, no identified sherds were found *in situ*, consequently there is a possibility that the *Holly* sherds actually belong with the Edwards Plateau Aspect components in the multiple-component sites. This does not seem likely, however, since no pottery whatsoever was found at the Johnson Hole and Horse Creek burnt rock middens—the only two sites investigated which contained no Austin Focus material. The other burnt rock midden (Grimes-Houy) did contain pottery, including type *Holly Fine Engraved*, but *all sherds came from the top level where Austin Focus artifacts also occurred*. In addition, the Austin Focus components at the Johnson Hole and Urbankte Sites, where *Holly* sherds were found, *yielded no indigenous artifacts except those of the Austin Focus complex*. Thus the evidence leans toward the Austin Focus as the source of the *Holly* sherds with a preponderance that amounts to virtual certainty.

Other evidence supporting a proposed linkage between the Austin Focus and the Alto Focus exists in a surface collection from the Chupek Site (Watt), on the Brazos River in McLennan County. A number of potsherds collected there by Mr. Frank H. Watt of Waco are of Alto Focus types. Also picked up from the surface of the Chupek Site were several arrow points, all apparently Austin Focus types. Again,

4. Indirect evidence of historic occupation exists in the sherds of one pottery vessel found at the Grimes-Houy shelter by Mr. Hill. This vessel is similar to a type which is present at the Clements Site, Cass County, in association with European trade material.

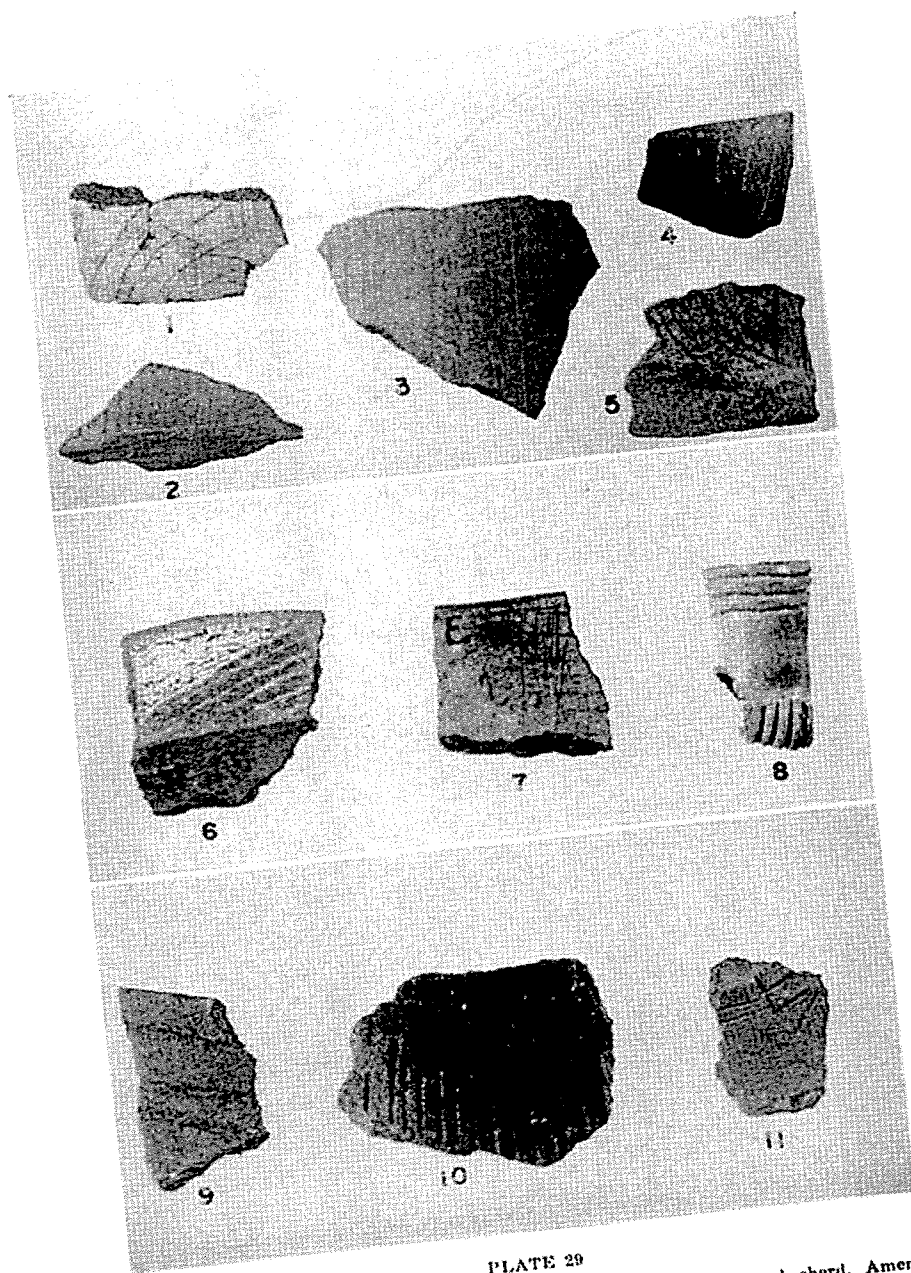


PLATE 29

Potsherds. 1-6, Holly Fine Engraved; 7, unidentified engraved sherd, Ament shelter; 8, pipe bowl, Ament shelter; 9-11, incised sherds, Urbankte Site. All approximately $\frac{1}{2}$ size.

however, the evidence for association is only circumstantial since none of the Chupek artifacts were found *in situ*.

Looking toward the Caddoan area for further data, we find that three *Perdiz* points and two possible *Cliffton* points were found at the Davis Site, type site of the Alto Focus (Newell and Krieger, pp. 164 and 191-2, Fig. 56, and Table 18). Although Krieger attributes their presence to a post-Alto Focus occupation by the Frankston Focus, it is of interest that one of the *Cliffton* points and two of the *Perdiz* points came from excavation units in phase three of the Alto Focus occupation (Newell and Krieger, Table 18). The other possible *Cliffton* point came from the temple mound phase, the second of the three Alto Focus phases. Thus the Austin Focus artifacts found at the Davis Site were all in levels which also contained Alto Focus material.

The broad distribution of arrow point type *Perdiz Pointed Stem* involves problems which cannot be dealt with here. The complete absence of European trade material and the apparent contemporaneity of *Perdiz Pointed Stem* and Alto Focus pottery, however, argue for an earlier appearance of *Perdiz* in the Belton area—and probably in other areas—than has heretofore been postulated.

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TABLE 1. Tabulation of artifacts, Urbankte Site (41-39D4-15).

		TEST SQ. 1		TEST SQ. 2		Surface Random
		0-6"	6-12"	0-6"	6-12" 12-18"	
Arrow Points	Scallorn S.					4
	Perdiz P. S.			2		4
	Cliffton C.S.	1				2
	Foyle Flake					1
	Triangular					1
	Unclassified		1			1
	Indeterminate		1			1
Dart Points	Ensor S.					2
	Darl S.			1	1	
	Ellis S.				1	2
	Unclassified					2
	Indeterminate					2
Knives	Copena					4
	Concave base					1
	Convex base			1		3
	Straight base				1	
	Double pointed					1
	Indeterminate		1			1
Scrapers	Side					18
	Snub-nosed					13
	Trimmed flake				2	7
Drills	Large					1
	Small					
	Gravers			1		
Hammerstones	Blades	1			1	1
	Quartzite		1			3
	Flint					1
	Choppers					1
	Sandstone abraders					1
	Hematite fragments					3
Potsherds	Holly Fine Engr.					3
	Incised					5
	Engraved					4
	Brushed					10
	Punctate					1
	Plain			21		88

TABLE 3. Tabulation of artifacts by 6-inch levels, Grimes-Houy burnt rock midden (41-39D4-19).

	TEST A			TEST B	TEST C	TEST D	TEST E	TEST F	Unknown Provenience	Random Surface	TOTALS
	0-6"	6-12"	12-18"								
Arrow Points	0-6"	18-24"		0-6"	12-18"	0-6"	12-18"	0-6"		1	1
	6-12"	12-18"		6-12"		6-12"				1	1
	12-18"										1
									1	1	2
									1	1	1
Dart Points	0-6"			0-6"	12-18"	0-6"	12-18"	0-6"			1
	6-12"			6-12"		6-12"					1
	12-18"										1
									1	2	3
									1		1
Knives	0-6"			0-6"	12-18"	0-6"	12-18"	0-6"			1
	6-12"			6-12"		6-12"					1
	12-18"										1
									1	2	3
									1		1
Scrapers	0-6"			0-6"	12-18"	0-6"	12-18"	0-6"			1
	6-12"			6-12"		6-12"					1
	12-18"										1
									1	1	2
									1		1
Potsherds	0-6"			0-6"	12-18"	0-6"	12-18"	0-6"			1
	6-12"			6-12"		6-12"					1
	12-18"										1
									1	5	6
									1	8	9

TABLE 4. Tabulation of artifacts by 6-inch and 12-inch levels, Johnson Hole Site
(41-39DA-20)

		TEST A	TEST B	TEST C	TEST D	TEST E	TEST F			
		0-6"	0-6" 6-12"	0-6" 6-12" 12-18"	0-6" 6-12"	0-12" 12-24" 24-36" 36-48" 48-60"	0-12" 12-24"	Unknown Provenience	Random Surface	TOTALS
Arrow Points	Seallorn			2 1			1	4	1	9
	Perdiz						1			1
	Cliffton		1					1		2
	Alba							4		4
	Triangular			2						2
	Unclassified									
	Indeterminate							1		1
Dart Points	Ensor			1		1	1	2	1	6
	Darl			1 1				3		7
	Ellis	1					1	3		4
	Yarbrough			2 1			1	1		5
	Martindale					1				1
	Bulverde					1	2			3
	Gastroville					1			1	2
	Pedernales						4	4		11
	Gary						1	1		2
	Wells or Morrill (?)					2 3	2	2		5
	Unclassified		2			1	2 3 1	2 2	2	17
	Indeterminate		1					2	1	6
	Triangular							3	1	4
Scrapers Knives	Copena							2		2
	Concave Base		1							1
	Convex Base		1	1		2	1	2	1	8
	Straight Base					1				1
	Indeterminate									
Scrapers	Side		4			3	2	3 3	3	18
	Snub-nosed								1	1
	Trimmed flake	2	2	1 4	1	1	1	4	3	19
	Drills, Large								1	2
	Blades					2	1 4 4	3	2	16
	Gravers					1			2	3
	Hematite			1			9 1	5 4	1	21
	Choppers			1				1 1	1	4
	Metates							2		2
	Hammer stones	Quartzite			2	2	1	1 3	1	
Flint										
Bone Awls	Bone Beads, Tubular							1		1
	Deer Ulra Flakers		1							1
Pot- sherds	With joint						1	3		4
	Splinter					1		3		4
	Holly Fine Emgr.							1		1
	Incised									
	Brushed									
	Plain									
	Engraved							3		3

TABLE 5. Tabulation of artifacts 12-inch levels, Horse Creek Site(41-39D4-21) and Ament Shelter (41-39D4-23).

	Horse Cr. Site					Ament Shelter Unknown Provenience	
	12-24"	24-36"	36-48"	48-60"	60-72"		
Arrow Points	Scallorn					11	
	Perdiz					5	
	Cliffton					4	
	Alba					3	
	Triangular					10	
	Unclassified					2	
	Indeterminate					8	
Dart Points	Ensor			1		6	
	Darl	1				4	
	Ellis					3	
	Yarbrough		1			7	
	Castroville			2			
	Federnales				1	1	
	Nolan					1	
	Unclassified		1	2	1	4	
	Indeterminate				1	16	
Knives	Copena					2	
	Convex Base			1		2	
	Straight Base					1	
Scrapers	Side		2		2	1	
	Trimmed flake	2			1	1	
	Blades		1	3	1	2	3
	Hematite						1
Choppers						1	
	Quartzite		1		2		
	Flint	1					
	Mano			1			
Hammer- stones	AWLS, Splinter					2	
	Obsidian flakes					3	
	Bone tablets					1	
	Shell pendants					1	
	Pottery pipes					1	
	Pot- sherds	Incised					1
Plain						10	
Gravers			1				

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REPORT ON ARCHAEOLOGICAL SALVAGE IN FALCON RESERVOIR, SEASON OF 1952

JOE F. CASON

Introduction

The Falcon Reservoir is located on the Rio Grande in Starr and Zapata Counties, Texas. Falcon Dam is situated in Starr County and is being built by a group of construction firms working under the supervision of the International Boundary and Water Commission.

The filling of the reservoir will initiate a program of power production, flood control, and irrigation designed to be of considerable aid to adjacent areas. There are certain byproducts of the program which take on critical significance: the water covering the reservoir area will deny archaeologists and historians access to the artifacts and structures within the reservoir, will displace the population now living within the reservoir area, and will by that displacement, create what may well constitute a major change in the life way of those displaced.

Archaeological salvage has been undertaken in the area for the past two years. Krieger and Hughes (1950), and Aveleyra (1951) have produced papers dealing with several facets of anthropology and history of the area, as well as the salient data of their thorough archaeological reconnaissances. In these papers there is also a statement of the problems encountered in the area and recommendations as to their solution. Hartle (1951) has done salvage work in the area and in a preliminary report thereon not only published on the material susceptible to immediate analysis but also contributed to the tentative description of the archaeological column. In addition, Hartle pointed up several specific problems related to the archaeology.

Too much emphasis cannot be placed upon the desirability of studying these papers prior to an examination of the present report.

As in previous years, the efforts and interest of Dr. Erik K. Reed of the National Park Service were largely responsible for the continuance of the salvage operations. Dr. Reed's recommendations concerning the desirability of further work resulted in the National Park Service's entering into a contract with the University of Texas wherein the National Park Service agreed to provide the funds necessary for the actual expenses of the operation, the major outlay in funds, and the University of Texas agreed to furnish the necessary technical supervision.

Mr. Alex D. Krieger, Archaeologist for the University of Texas, undertook the supervision of the project in addition to his regular duties. The writer was placed in charge of the salvage operations for the 1952 season.

There were other organizations and individuals who materially contributed to the operation. In the International Boundary and Water Commission Messrs. L. M. Lawson, R. B. Ward, Roger Collins, Robert Bickle, Isom H. Hale, N. S. Smith, and Hugh Findlay contributed technical advice or instruments and machinery. Messrs. Phillip C. Royer and Richard Wheaton of the Falcon Dam Constructors were especially helpful. Mr. Royer, the General Superintendent, in effect adopted the salvage operation from its inception and was most generous in his assistance which included machinery, tools, repair, aerial photography, skilled technicians, and an unflagging interest in the daily progress of the work.

Mr. and Mrs. Robert Sherron of Zapata displayed an interest rare in laymen. Mr. Sherron, whose work with the Department of Agriculture has given him an intimate knowledge of the area, was instrumental in the recovery of the aboriginal burials. Mrs. Sherron, an instructor in the Zapata School System, brought her entire class to the excavation for a first hand period of instruction in the materials and methods of prehistorical investigation, a new departure in primary education which speaks for itself.

Mr. Lester Marks of the United States Custom Service extended every possible courtesy to the salvage group.

Mr. Glen Evans of the Texas Memorial Museum made a trip to the area for the purpose of offering his assistance with the geology of the terrace system and pointed up the

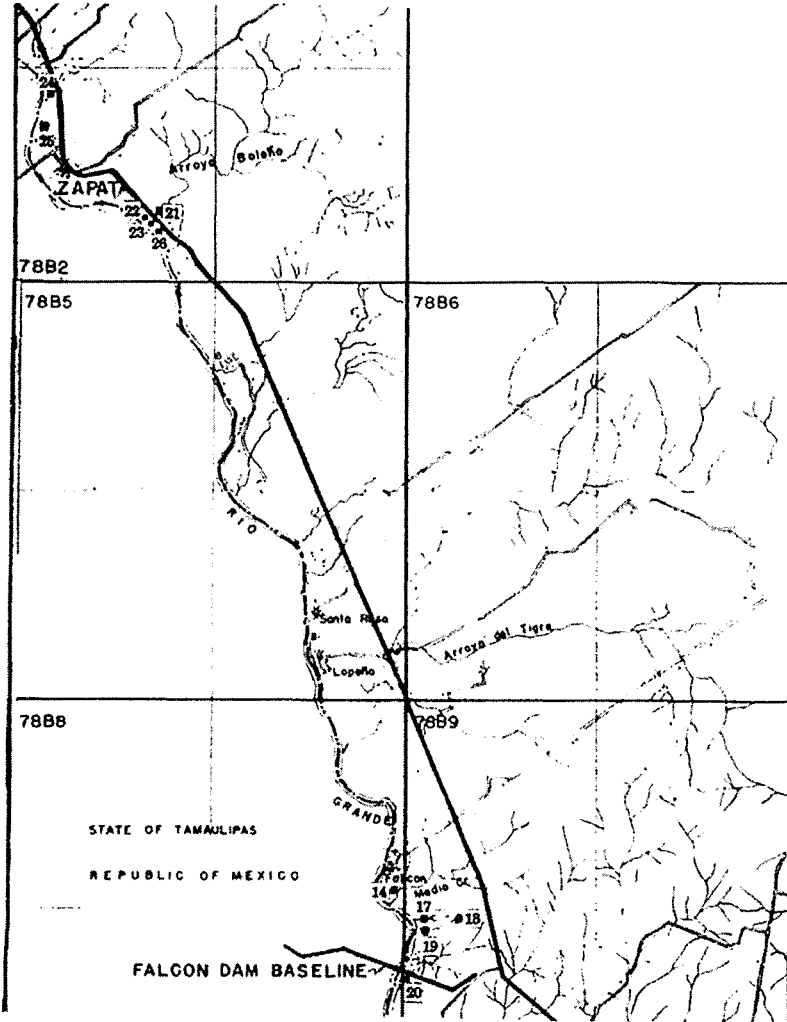


FIGURE 11

Map of area showing sites located during 1952 season.

complication of the bedding through the action of both the river and the lateral drainage. It is hoped that circumstances will be such as to allow him to make a detailed study of the terrace system in conjunction with any future archaeological work in the area.

Last, but certainly not least, Mr. Tom L. Williamson, student in training who was engaged in learning field methods, and Messrs. Juan and Roberto Castillo worked hard and intelligently during the entire operation.

Preparatory Study

The 1952 season of salvage operations in the Falcon Reservoir began on 2 January, 1952. Prior to going down to the reservoir area, the writer made a study of the previous publications concerned with the area (Krieger and Hughes, 1950, and Hartle, 1951), of the cultural material obtained during both seasons, and an examination of some of the documentary sources available in the Library and Archives of the University of Texas. The potential documentary sources proved to be of such proportions that the examination was abandoned, and the widely known and variously interpreted journal of Cabeza de Vaca and the comparatively obscure *Historia de Nuevo Leon* written by Capitan Alonso de Leon, an anonymous author, and General Fernando Sanchez de Zamora were studied because the ethnography contained in both seems more or less germane to the general area of the lower drainage of the Grande.

Reconnaissance

On 19 January Krieger and the writer went down to the Falcon area. Some three days were spent in examining the previously excavated sites and other promising sites located by Hughes during the 1950 season. Since the reservoir extends some thirty-seven miles along the river, only a general impression of terrain and the potential characteristics of the sites was obtained so that the writer spent an additional two weeks in walking out the arroyo system and in examining more of the sites located by Hughes.

Natural Stratigraphy

The stratigraphy encountered in the face of the arroyo banks merits considerable discussion because of the interrelation between the zones containing cultural material and the physiography and historical geology of the area. The face of an arroyo bank has one of two generalized forms: that of a vertical cliff or that of an upper vertical face with a lower slope. It would further seem that some factor other than the nature of the material of the bedding sometimes determines the presence or absence of the lower slope. Material in both types of face was sometimes homogeneous, sometimes not. These materials may be pure silt or a layer of silt above a layer of yellow material (this term will be employed throughout the remainder of this report for a yellowish, partially granular, partially clayish earth which

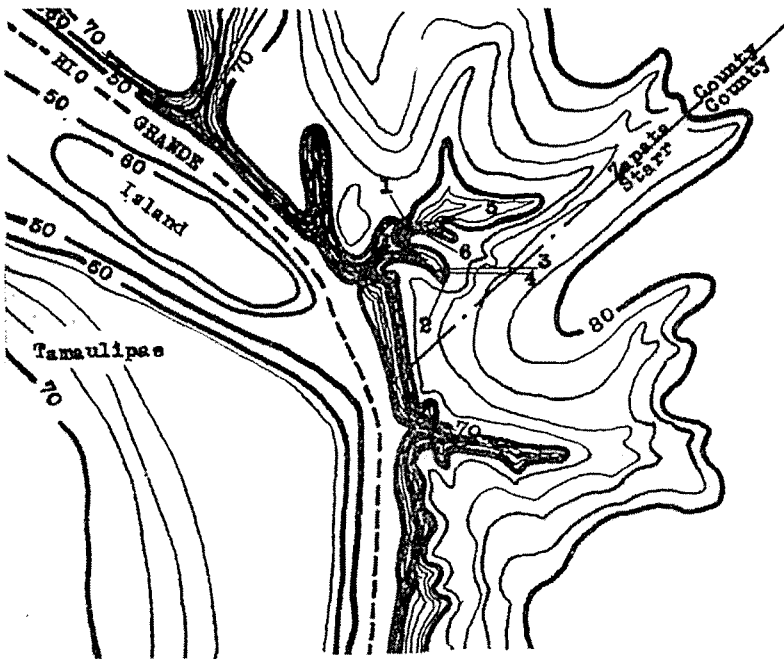


FIGURE 12

Philip C. Royer Site (78-B9-17). 1, Felipe Test. 2, Wheaton Test. 3, Isla Test. 4, Roberto Test. 5, Mesa Test. 6, Nariz Test. Elevations are in meters.

seems to be in large part a disintegrated sandstone. When wet, this material has a clay-like consistency and is more cohesive than the silt. Permeability by water is high for silt, low for the yellow material. Retention of moisture is low for the silt and high for the yellow material). Other faces of arroyo banks show an upper layer of silt, a middle layer of yellow material, and a bottom layer of stone. In general the stone layer will show a vertical face. A further complication consists in the sporadic appearance of layers or beddings of gravel which may be over and underlain by silt layers. The appearance of the gravel bedding in one arroyo and its non-appearance in the next some 150 yards distant is a matter to be explained by the geologists.

All types of arroyo face are sometimes covered with a silt coating which conceals both the nature of the beddings and the presence of burial cultural material. There are, however, enough exposed faces of arroyo banks to permit a thorough reconnaissance for the beddings to be encountered in the area and for archaeological stratigraphy.

The Miniature Beddings

The exposed faces generally reveal miniature beddings or seams varying in thickness from a quarter of an inch to two or three inches. These seams are characterized by greater density and hardness than the silt above and below and in general show fracture lines at right angles to the usually horizontal line of the bedding. Where the silt crumbles, the material in these seams shows clear-cut cleavage. There is no great difference in color between silt and seam, but the seam material feels as if it consisted in appreciably smaller grain size resembling talc. Several seams may appear in roughly parallel order in the silt bedding of the arroyo face. In addition to appearing as lines of demarcation in the vertical faces of the arroyo banks, these beddings produce a form of miniature step terracing because of differences in hardness and density. These seams would seem to represent old land surfaces which have been overlaid with the type of silting found in dry stream beds where dessica-

tion has produced a tile-like pattern of fracture of the sun-baked mud of the stream bottom.

Archaeological Stratigraphy

In those places where arroyo banks and hill slopes draining into adjacent arroyos indicate the presence of buried cultural material, there seems to be two well defined zones of cultural material. The upper zone extends from the surface to a depth of about one foot. The lower zone appears in the faces of the arroyo banks about four feet below the general surface of the surrounding terrain. In particular the lower zone shows a fairly wide distribution and is generally characterized by relatively heavy concentrations of carbon and flint chips in the face of the bank.

In addition to the two above described zones a small number of sites show flint and carbon, jointly or separately, at an approximate depth of ten feet below the present surface. Hartle (1951) excavated such a site (78-B9-4), one of the six which Krieger and Hughes (1950) describe as being deeply buried. Two more such sites were located during the 1952 season: 78-B9-17-2 and 78-B2-25.

Conclusions

The reconnaissance of the area led to two general conclusions: 1. The vast majority of the aboriginal surface sites are immediately contiguous to an arroyo and are generally close to a *tinaja* or the river. The uplands were examined as well as the arroyo system and do not show the concentration of cultural material found on arroyo banks nor such clear indications of occupancy in the form of hearths, snail shell, mussel shell, and flint work, especially piles of flint chips which are common in the arroyo sites. 2. Wherever possible, those sites should be excavated which would allow a balance of emphasis upon the working out of the physiography and historical geology of the site and the recovery of cultural material. This course of action would bring about the fullest exploitation of the carbon samples, which reconnaissance had shown to form a sig-

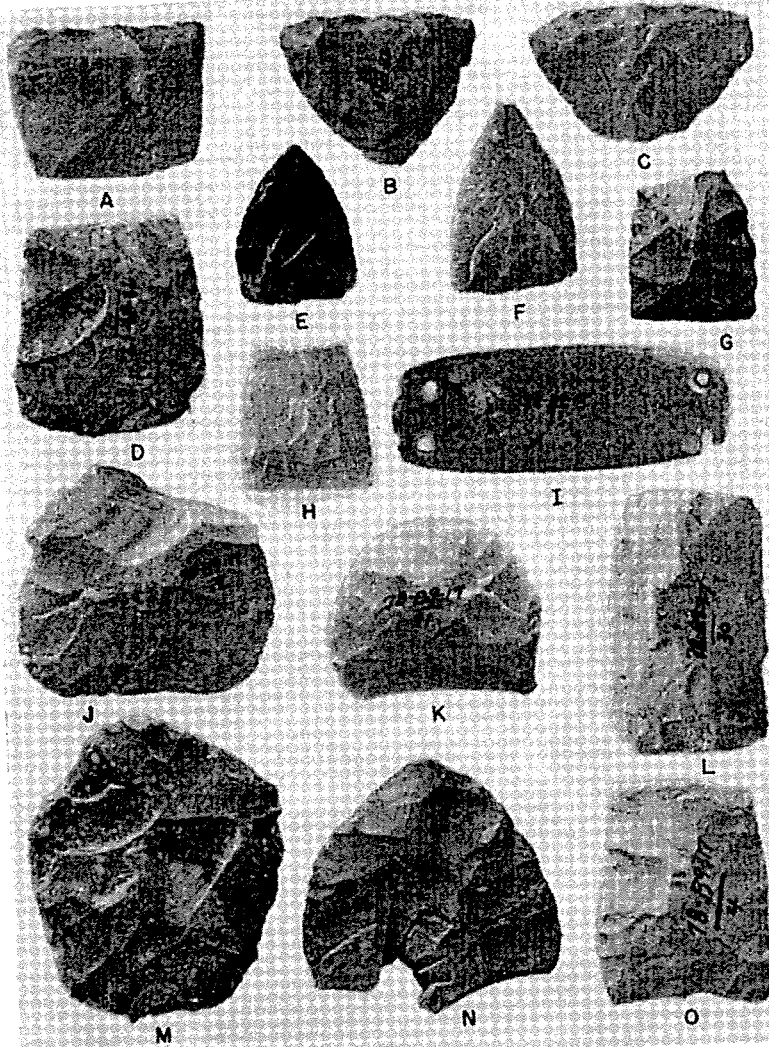


PLATE 30

Artifacts from Royer Site, Felipe Test (78-B9-17-1). A-C, end scrapers chipped on the thick edges of broken blade fragments. E-H, triangular projectile points or small knives; I, polished pendant of hard limestone, length $2 \frac{13}{16}$ -inches, width $1 \frac{1}{16}$ -inches, thickness $\frac{1}{4}$ -inch; upper edge has 13 small notches, lower edge 24 notches. D, J-O, knives (?); D, J, L, O have tips missing. N has base missing; M may be a small axe blade. The position of these specimens can be obtained from Table I by tracing the catalog numbers, as follows: A (79), B (72), C (99), D, (53), E (96), F (104), G (115), H (123), I (73), J (12), K (91), L (30), M (27), N (24), O (4). Size $\frac{1}{2}$.

nificant portion of cultural remains, through Carbon 14 dating. This decision influenced most of the excavation during the 1952 season.

Excavation of Site 78-B9-8

After the surface and the faces of the arroyo banks had been studied, subsurface testing was begun at 78-B9-8. This site was close enough to the dam to allow the use of the caterpillar, furnished by Mr. Rollins of the International Boundary and Water Commission, and the caterpillar operator and the necessary maintenance, furnished by Mr. Royer of the Falcon Dam Constructors. The availability of this equipment also influenced the choice of other nearby sites for excavation.

78-B9-8 is situated in an arroyo bed and upon the adjacent banks. The maximum relief is perhaps ten feet from the bed of the arroyo to the top of the banks. On the upstream end there is an outcropping of stone which continues for some miles up and down stream more or less parallel to the river. The site is approximately a half mile from the Grande and is some eighty feet above the river. It is marked by a heavy concentration of flint chips, several hearths apparently more or less *in situ*, and numerous flint artifacts.

A test pit eight feet square was dug in the arroyo bank at this site. Fired sandstone, flint chips and a small amount of carbon were encountered in a zone approximately six inches thick some two feet and three inches below the surface. Immediately below this cultural zone the soil changed from silt to the yellow material previously described at a depth of two feet and nine inches. Excavation in this yellow material was extremely difficult, a state of affairs later appreciated as a harbinger of any excavation attempted in this material. The yellow material, except for small particles of caliche, was completely sterile. Since no cultural material susceptible to analysis had been found, and the excavation indicated but one cultural zone, the site was abandoned.

Royer Site 78-B9-17

During the period of surface and stratigraphic reconnaissance, Mr. Richard Wheaton, an indefatigable week-end collector, had shown us a site in Zapata County about 400 yards north of the Zapata-Starr Counties common boundary line and about three hundred yards east of the Grande. This site proved extremely rich in surface material and gave promise of containing considerable stratigraphy. The terrain, in general, consisted of a bowl-like depression draining into an arroyo system. Extending back about three hundred yards from the river a particularly deep *tinaja* marked a general area (above the *tinaja*) of well defined cultural zones in the face of the arroyo banks. From this *tinaja*, both south and east for four or five hundred yards there were large concentrations of old hearths eroded out of the immediately subsurface zone, myriad flint chips, and many artifacts.

The site was named for Phillip C. Royer and six test areas were designated. All tests were conducted on a five foot

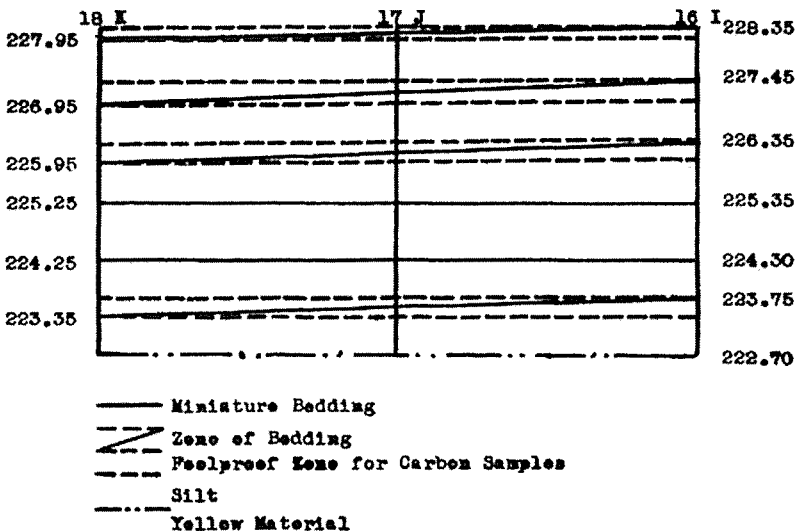


FIGURE 13

Total column of natural stratigraphy in excavation of 78-B9-17-1. Profile taken from point 16-I to 18-K as shown of figure 14.

square system oriented on magnetic north except the Wheaton Test, North 30 degrees East, and Roberto Test, North 45 degrees East. Testing was undertaken for the purpose of establishing stratigraphy and determining the advisability of salvage operations with the caterpillar.

Felipe Test 78-B9-17-1

The testing resulted in the recovery of a few artifacts and a prodigious amount of carbon from old hearths. The cultural material in no place protruded through the various miniature beddings or seams herein before described but seemed to show the heaviest concentrations immediately below such beddings and immediately below the carbon of the old hearths. In some five foot squares as many as 800 flint chips were recovered from a single three inch vertical layer.

The significance of the stratigraphy will remain in doubt until such time as a detailed analysis may be made of the cultural material and the carbon collected can be dated. The richest cultural zone occurred approximately four feet beneath the surface. In view of the paucity of artifacts in higher levels, it was decided to remove some three and one-half feet of overburden for the exploitation of the rich zone.

The caterpillar was used to remove this overburden and hand excavation was then resumed for the exploitation of the heavy zone. A great amount of carbon was recovered and a sparse collection of artifacts. (Plate 30).

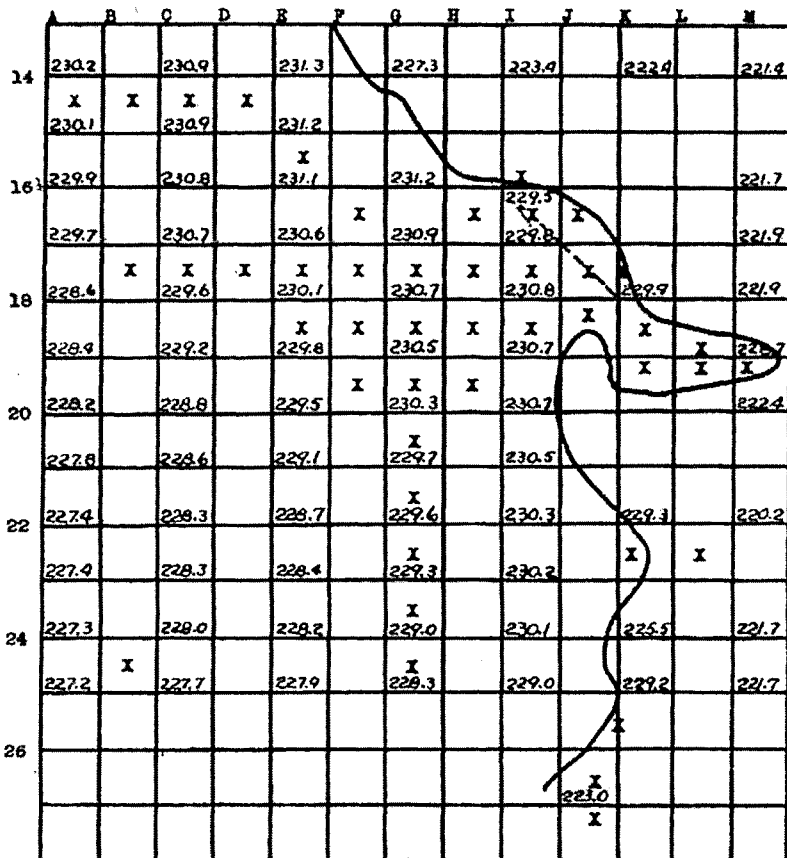
Wheaton Test 78-B9-17-2

In the meantime a flint blade or point had been found in the vertical face of the Wheaton Test at a level nine feet and ten inches below the surface at elevation 221.1. A second blade or point was found at elevation 222.3, and a hearth with associated flint chips between 222.3 and 221.4. This material seemed to warrant an assumption of a deeply buried cultural level.

Whereas in the Felipe Test the yellow material was encountered at an elevation of 222.70, some six feet below the

surface of the squares contiguous to the face of the arroyo bank, and further excavation into this material revealed the usual caliche particles but an otherwise sterile condition, both of the flint points and the hearth in the face of the arroyo bank at the Wheaton Test were well within the bedding of the yellow material. An apparent disconformity between the silt and the yellow material occurred at 223.70 and was marked by a concave banding on the face of the bank.

The Wheaton Test was then excavated by means of the



X: Excavation

FIGURE 14

Partial grid of 78-B9-17-1.

caterpillar to an elevation approximately one foot above the deeply buried cultural zone. Following the dozing operation, a test pit was sunk with the usual finding of caliche in the yellow material. Further excavation produced flint chips and fine particles of carbon, much like those described by Hartle. Eventually a few artifacts were found. (Plate 31, B).

The digging was of a character to defy description. Eight and ten pound picks were substituted for the light mattocks with little better results, so that the sterile twelve inches above the cultural zone came to constitute altogether too much of a waste of time and effort. The caterpillar was used to remove an additional nine inches or so of the yellow material. This second excavation was done by an operator who had had prior experience with archaeological field methods in the removal of overburden from Nebraskan sites. The second dozing left the excavation entirely smooth and removed all loose material from within the excavation area. Excavation by hand was continued with sparse results in the shape of artifacts, the hardness of the yellow material abating in no fashion whatsoever, but a hearth *in situ* was encountered which yielded more than a quart of relatively pure carbon. Burned flakes of flint, as well as the usual fired sandstones, were also recovered.

Excavation was again halted and a dam built across the front of the Wheaton Test whose grid system began back of any portion of the arroyo face which had been removed by the caterpillar. Ten thousand gallons of water were then dumped into the test in an attempt to soften the yellow material. Ten days later the "water cure" had reduced the yellow material to the consistency of wedged potter's clay with a fairly dry surface or skin about one inch thick. This partially dried surface was removed and screened so that another inch or so of the material might be exposed and subsequently dried. Further intermittent excavation was continued until the end of the season.

It seems important that the Wheaton Test, unlike the Felipe Test to the North and most of the exposed faces of that finger of the arroyo upon which the Wheaton Test is found, does not show more than the single concave band marking the apparent disconformity between silt and yellow material. In no fashion does it show the six miniature beddings revealed so clearly at the Felipe Test and upon most faces of the arroyo banks within the drainage bowl. This lack of miniature beddings may be a result of differential erosion which degraded the terrain to the north of the Wheaton Test without materially affecting the overburden at the test itself. Subsequent deposition would then account for the miniature beddings to the north.

Isla Test 78-B9-17-3

The Isla Test is located in the bottom of the arroyo some fifty yards northwest of the Wheaton Test. A small island had resisted erosion to the extent that the original beddings were preserved about six or seven feet above the floor of the arroyo. Two five foot squares were cut down from the top, elevation 226.00 feet, through the silt bedding and into the yellow material. Here again the caliche appeared in the yellow material and numerous flint chips and three artifacts were found between the elevations of 224.00 to 222.00 feet, this flint material perhaps constituting a continuum of the culture zone found in the Wheaton Test. The Isla Test did not contain miniature beddings in the silt above the yellow material which could be identified. The character of the material from the top to a considerable depth showed a disintegration of the bedding which consisted of vertical fissures. These fissures had the effect of producing a crumbling, flake-like texture in the soil which extended into the yellow material. Consequently the disconformity was not so clearly marked as in the Wheaton Test but seems to have been slightly higher in elevation, somewhere around 224.00 to 224.25. The apparent slope from north to south of the yellow material between the Wheaton and Isla Tests exactly reverses the modern drainage of south to north and is

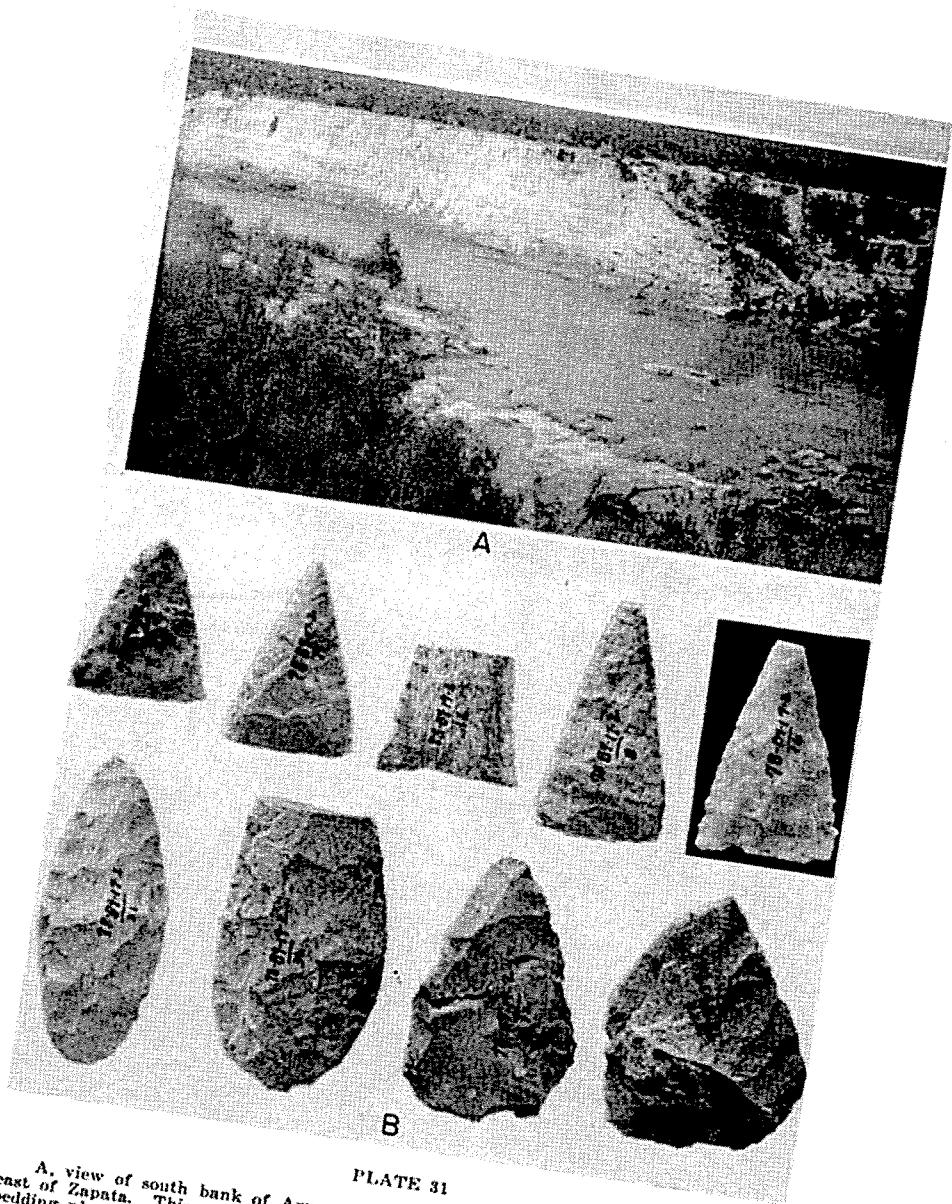


PLATE 31

A, view of south bank of Arroyo Belesho from highway bridge two miles south-east of Zapata. This arroyo is usually almost dry. The high bank exposes typical bedding planes in silt terraces of the Falcon Reservoir area, each plane representing one step in the building up of the valley fill before the process stopped and the valley was dissected by erosion. No archaeological remains were found in this bank, but remains found elsewhere are buried at various depths in similar terraces. B, artifacts from the Royer Site, Wheaton Test (78-B9-17-2). Top row, presumably projectile points, complete except that the middle specimen lacks the tip. Bottom row, two knives (?) and two crude blades. The position of these specimens can be obtained from Table I by tracing the catalog numbers for the Wheaton Test, from left to right as follows: top row, 7, 19, 32, 8, 16; bottom row, 31, 36, 12, 22. Size $\frac{1}{2}$.

supported by a few indications of the cultural zone in the Wheaton Test showing a tendency to slope from north to south, *i. e.*, in the opposite direction from the modern drainage.

Roberto Test 78-B9-17-4

The Roberto Test, some seventy-five to one hundred feet northeast of the Wheaton Test, showed fired sandstones in the west face of the arroyo bank, elevation 223.97. Below these stones, elevation 223.36, there is a thin layer of soft sandstone some nine inches thick which gives every indication of being of fairly recent origin. Above and below this layer of sandstone there is a bedding of the yellow material. The beddings in the face from top to bottom consist in silt, yellow material, recent sandstone (?), yellow material, and a bedrock which seems to be an upper Crockett Formation. These beddings are described because of the fact that the Wheaton and Isla Tests do not show either the thin sandstone layer or the bedrock. It is supposed that past erosion has removed the thin sandstone layer as well as the lower bedrock. Consequently the yellow material in both the Wheaton and Isla Tests may be the result of redeposition at a time later than that for the yellow material at the Roberto Test—if the yellow material is not the result of leeching.

Excavation at the Roberto Test produced flint chips, carbon, and a few artifacts, but no carbon in the immediate vicinity of the burned sandstones previously mentioned. A particularly rich carbon strike continued down some feet from the elevation at which it was first encountered, probably the result of a burned tree root. Enough carbon was obtained in the very bottom of the excavation for dating purposes, and this carbon, found some four feet from the rich vein, was stored separately. The excavation in the Roberto Test ended at 225.00 with the appearance of the bedrock in square "A", at 225.24 in Square "B", but a two foot section was continued down to the burned hearthstones in the west face of the bank in a search for carbon.

Mesa Test 78-B9-17-5

The Mesa and Nariz Tests immediately across the arroyo from the Felipe Test were excavated for the purpose of obtaining carbon samples of the same relative elevation as that of the heavy zone in the Felipe Test. These tests were small and shallow since erosion had progressed more rapidly on the south bank.

The surface of the ground of the Mesa Test seems to consist of an example of the step-terracing sometimes produced by the miniature beddings. To the west of the test the

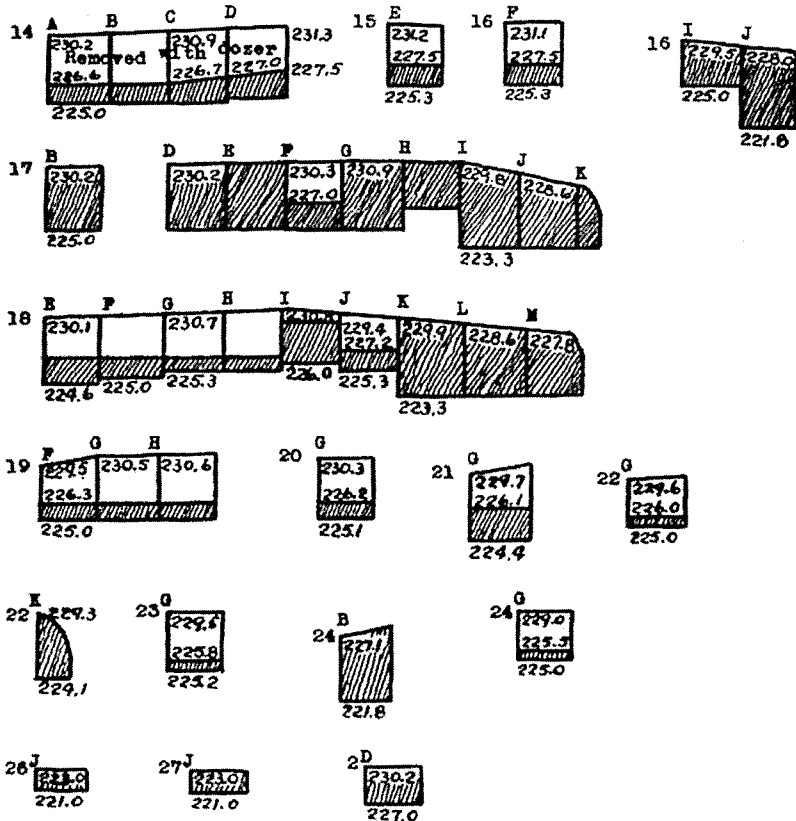


FIGURE 15

Excavation in 78-B9-17-1. Hatched columns excavated by hand, blank columns by dozer.

ground rises about a foot from a vertical face which shows the miniature bedding denuded at the position of the test itself. The higher ground to the west also seems to mark a surface preserved by the harder material of the next higher miniature bedding. As the ground slopes down toward the east (upstream) from the position of the test an old hearth appears denuded and surrounded by flint chips. The difference in elevation between the west side of the Mesa Test, 227.00, and the east side, 226.2, in a distance of twenty feet might be explained by a relatively more efficient surface erosion proportional to the distance from the next higher level of the terracing. In any event, the material lying below the elevation of 226.20 feet can possibly be taken as lying below a miniature bedding whose lower limit is at that level.

A carbon sample, flint chips, and a couple of artifacts were recovered from the Mesa Test.

Nariz Test 78-B9-17-6

The Nariz Test consisted in reducing a small spur or nose extending from south to north into the arroyo bed. Conditions of the material approximated those at the Isla Test. The material was disintegrated and broken by vertical cracking and there were animal burrows in the northern portion of the spur. Results of the excavation were nil until the 226.3-226.1 level was reached where three artifacts and a carbon sample were obtained. A miniature bedding occurs at about 226.3.

The Elenita Site 78-B9-19

The problem of the miniature beddings in relation to the arroyo pattern was the motivation for two small test pits being made in the Elenita Site. This site lies on the south bank of the arroyo 200 yards south the Zapata-Starr Counties boundary and some 100 yards east of the Grande. A finger of the arroyo drains due north into the east to west main drainage. Upon the east bank of this finger the Crockett

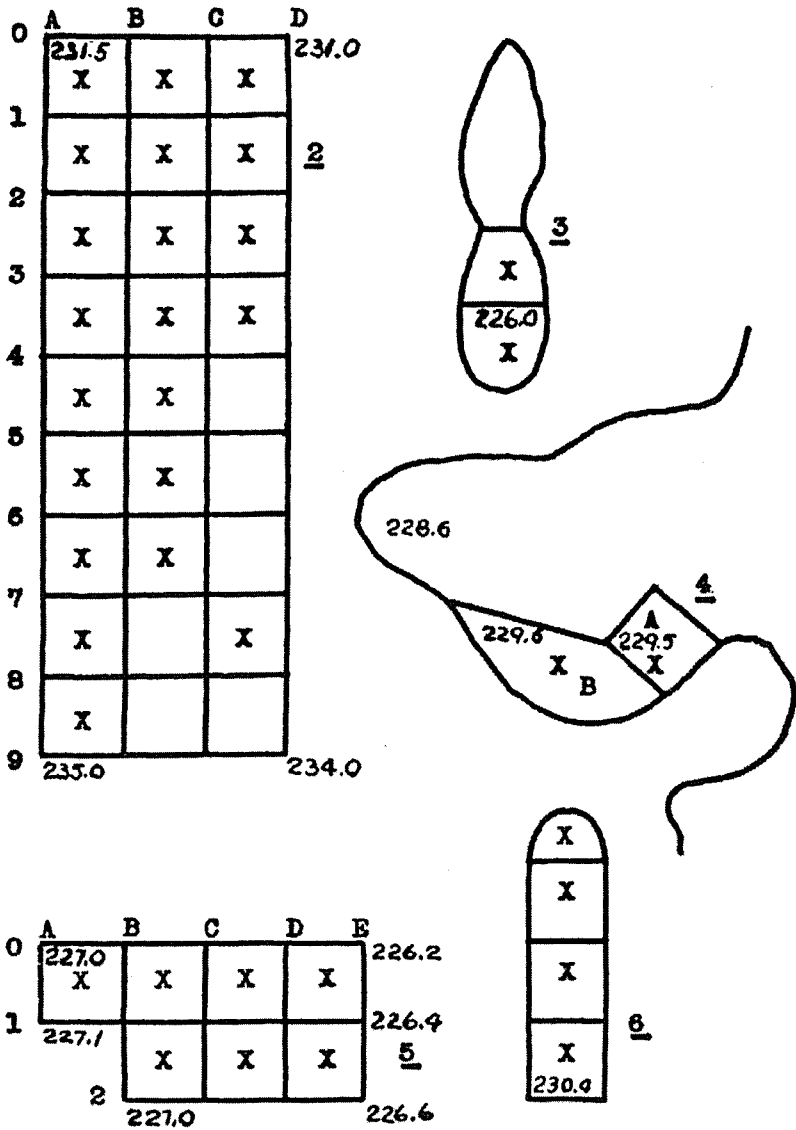


FIGURE 16

Grids for tests in Royer Site. 2, Wheaton Test. 3, Isla Test. 4, Roberto Test. 5, Mesa Test. 6, Nariz Test. X: Excavated squares.

sandstone is exposed in identical fashion as at the Roberto Test of the Royer Site.

Two five foot squares were excavated in an island rising from the floor of the arroyo finger from elevation 233.00 to 229.7, and a large collection of mussel shells and a carbon sample were obtained. A clay seam overlay the hearth which contained the mussel shells and the carbon so that a Carbon 14 date might be correlated with the seam which has a lower limit of 230.2 feet elevation.

Smith Site 78-B9-20

The Smith Site was uncovered immediately south of the dam axis by earth-moving equipment excavating a borrow pit. Mr. N. S. Smith, Soil Analyst for the International Boundary and Water Commission, noticed that a caterpillar had exposed a large hearth and stopped the excavation long enough to recover carbon and a flint chopper. This hearth, according to estimates by Smith and others, was struck some ten feet below the original surface of the ground and gave every indication of being *in situ*. A check of the excavation could not be made in time to effect further salvage.

Castillo Site 78-B2-22

Mr. Robert Sherron of the U. S. Agricultural Department informed us of a burial discovered in one of the small arroyos immediately adjacent to the Arroyo Beleno. This site, named after Juan Castillo, lies upon the lip of the arroyo bank some two hundred yards east of the Grande. A sparse surface collection of points and scrapers was collected in the general vicinity of the burial. The burial itself was apparently about fourteen inches below the surface. Erosion had exposed part of the skeletal material to the extent that Mr. Gaspar Garcia, who discovered the burial, had recognized the character of the bones. Mr. Garcia had either partially or completely excavated the burial some six months prior to our arrival. He had removed some six or eight points and the left half of a mandible. One point had been found in contact with the lingual surface of the body of the mandible.

Subsequently, Mr. Garcia had covered over the material after removing the mandible and the points.

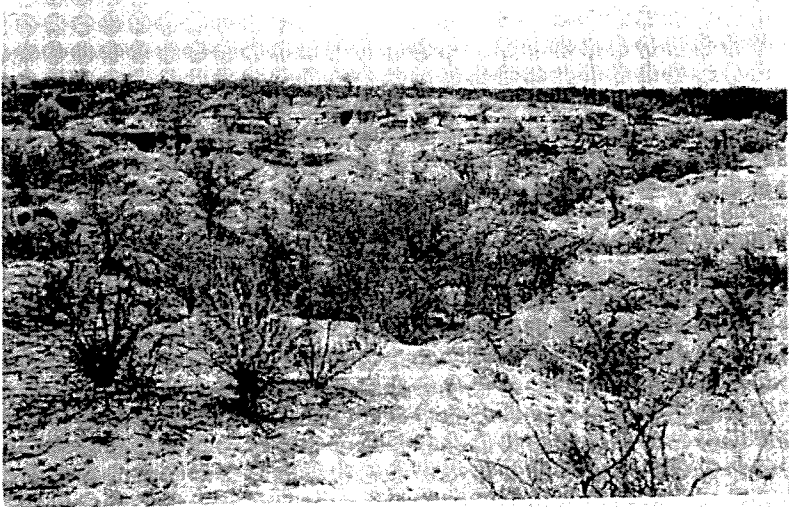
Examination of the site showed small fragments of bone exposed on the surface. Excavation revealed considerable skeletal material which included a complete skull, except for the left half of the mandible previously mentioned, cervical vertebrae, ribs, fragments of the long bones of the arms, and very small fragments of the femora. A second complete mandible was also recovered. The location of most of the material indicated that it had either been disturbed by Mr. Garcia or was in part a secondary burial. There was some slight indication that not all of the material had been disturbed since the relation of the cervical vertebrae and the ribs to the skull seemed more or less normal. The axis of skull, cervical vertebrae, and ribs was from east to west, but lack of sufficient post-cranial material precludes any statement concerning flexure.

Recovered with the skeletal material was a large quantity of tubular bone beads, ochre, flint points, a bone awl, and a bone tube.

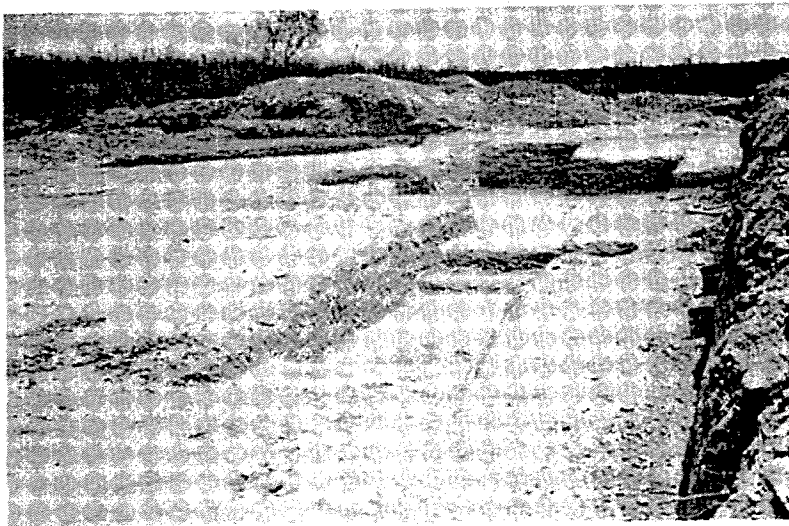
Excavation was continued until sterile silt was encountered around and under the skeletal material.

Garcia Site 78-B2-21

Mr. Garcia showed us a second burial to the west of the highway some 500 yards from the Castillo site. Here again erosion had uncovered skeletal material and small fragments lay exposed upon the surface. This material lay at the foot of a vertical three-foot bank. Immediately subsurface excavation of the area of exposed fragments laid bare more bone in a very fragmentary state, but relatively well-preserved teeth indicated the presence of parts of at least two individuals, since molars of an adolescent or young adult with negligible wear of the cusps, as well as molars showing such wear of the cusp surfaces as to more or less obliterate the cusps, were found.



A



B

PLATE 32

A, view of eroded basin in which parts of the Royer Site are located, before excavation. The material is practically all silt, resting on bedrock. Bedding planes which form "miniature terracing" may be seen in the middle distance. The artifacts, hearths, and carbon samples obtained from several of these planes will help to reconstruct the post-glacial geological history of the Rio Grande and its tributaries. B, view of excavations in Felipe Test. Earth was removed by bulldozer down to the main flat surface after the cultural levels were delineated by test pits, as in Plate 4.

Numerous tubular bone beads were mixed in among the skeletal fragments, and an old wrought iron nail was found on the surface. This was named the Gaspar Garcia Site.

Evans Site 78-B2-26

In another finger of the arroyo system containing the Juan Castillo Site, rotted fragments of tusk of elephant or mammoth were encountered in the bed of the arroyo where they lay exposed. Superficial excavation below the exposed fragments revealed more fragmentation. Samples of the tusk were collected, but the site was otherwise left undisturbed, since Krieger had indicated at the beginning of the season that paleontological finds would be left for removal by professional paleontologists.

After the close of all excavation Mr. Glen Evans visited the area with Doctor T. N. Campbell and the writer for the purpose of giving us any possible aid with the geology which he could offer. He pronounced the sand upon which the fragments lay and were embedded to be stream-washed. Mr. Evans made a further superficial excavation that produced more fossils which he described as skull and tooth fragments. In addition, just beneath the skeletal material and some nine inches beneath the surface, he exposed a flint flake showing unmistakable signs of human manufacture.

This site, the Glen Evans Site 78-B2-26, is situated approximately 100 yards east of the Grande at an elevation of forty to fifty feet above the river. The bottom of the arroyo is perhaps eight feet below the adjacent area. The topmost bedding seems to be the usual silt found throughout the reservoir area. This bedding is followed by the stream-washed sand, and the arroya has cut down two or three feet into this sand. Below the sand there is a tightly compacted bed of gravel. Small nodules of this gravel are found in meager quantities in the higher sand, there being some small nodules mixed with the sand in which the skeletal material was found.

Tecolotero Site 78-B2-25

A heavy seam of charcoal was found in the face of the bank of the Arroyo Tecolotero. The charcoal was approximately ten feet below the surface of the adjacent terrain and some four feet above the floor of the arroyo. A sample of the carbon exposed in the arroyo face was first collected, and then the bank was undercut so that an uncontaminated sample might be obtained from a sufficiently interior position in the bank as to preclude contamination from the atmosphere. Excavation seemed unwarranted without the aid of the caterpillar which was some twenty-five miles downstream.

Gutierrez Site 78-B2-24

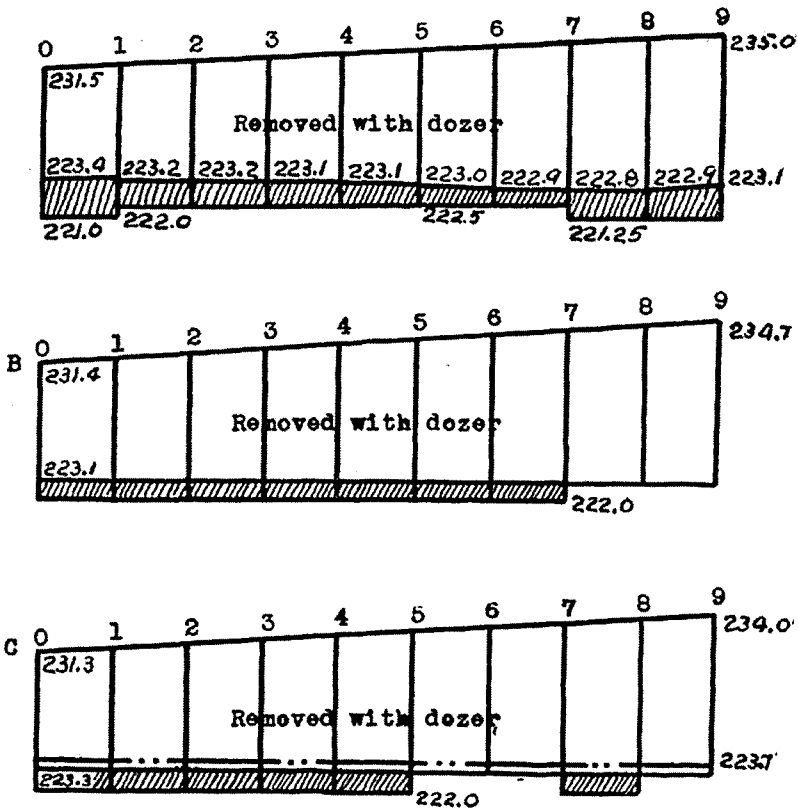
Surface collections were made at several sites found during the 1952 season. The Gutierrez Site was found by Krieger and the writer during the first few days of the season. This site lies upon the old Gutierrez *porcion* to the north of Zapata, about five hundred yards from the river and at an elevation of fifty or sixty feet above the stream at that point. It is situated upon the top of the arroyo bank which consists of silt with an underbedding of gravel. The cultural zone seems to be confined to the surface which seems to have been eroded down some two feet or more below the general level of the rather flat terrace top at this point.

De Cuellar Site 78-B2-23

This site is located upon the top of the terrace between the Castillo and Evans Sites. It is perhaps sixty feet above the river at that point. The de Cuellar site seems to be colonial Spanish in character. The site is marked by stone from a completely destroyed building, a profusion of potsherds, and other typical artifacts of colonial or later times. As is usual in most colonial sites there is also a profusion of flint work and crude, utilitarian pottery fragments which might lead the unsuspecting to conclude that the pottery was aboriginal. In this connection it must be reported that not a

single potsherd has been found in the excavation of a pre-colonial site.

An arroyo finger which reaches to within fifty yards of the ruined building revealed a tremendous mass of skeletal material which Mr. Glen Evans identified as that of cattle and sheep or goat. This material lies buried in a zone from four to eighteen inches below the surface similar to the skeletal remains at the Castillo Site and at about the same elevation above the river. These skeletal remains would seem to be the remnants of an old abbatoir.



Silt
 Yellow Material Same elevation for A & B

FIGURE 17

Excavation in Wheaton Test (78-B-9 17-2).

Rio Corto Site 78-B8-14

This site lies on the north bank of a tributary of the Arroyo Grande to the south of the village of Falcon. This tributary drains south into the main arroyo and the site is situated in the face of the bank as well as in a small remnant or island rising from the arroyo floor. The general surface of the terrace below which the arroyo has cut is about sixty feet above the river. Cultural material is found in profusion upon the terrace surface, in a zone perhaps one foot beneath the surface, and in a zone approximately four feet below the surface. The deeper zone appears, from the amount of flint chips exposed in the face of the bank, and exposed artifacts which give every indication of having been weathered from this zone, to be the richest zone of the site. All zones bearing cultural material lie within a silt bedding.

Escondido Site 78-B9-18

This site lies upon a north branch and upstream from the arroyo upon which 78-B9-8 is located. The elevation of the site is about eighty feet above the Grande, and it is about six hundred yards east of the river. The Escondido Site is marked by rather precipitous banks and the floor of the arroyo is fourteen to eighteen feet below the surface of the surrounding terrain. The face of the arroyo bank shows that the major portion of the bedding is silt. In this site the cultural zone is not well defined but seems to lie in an immedi-

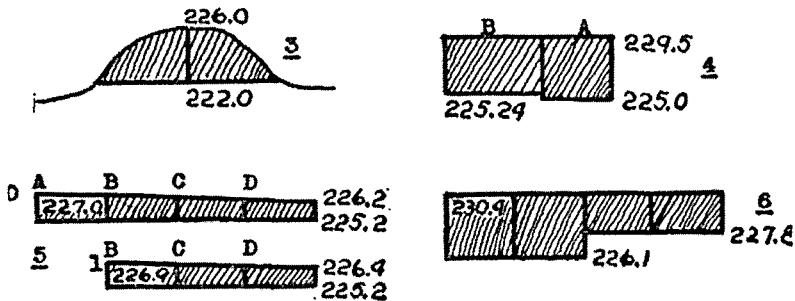
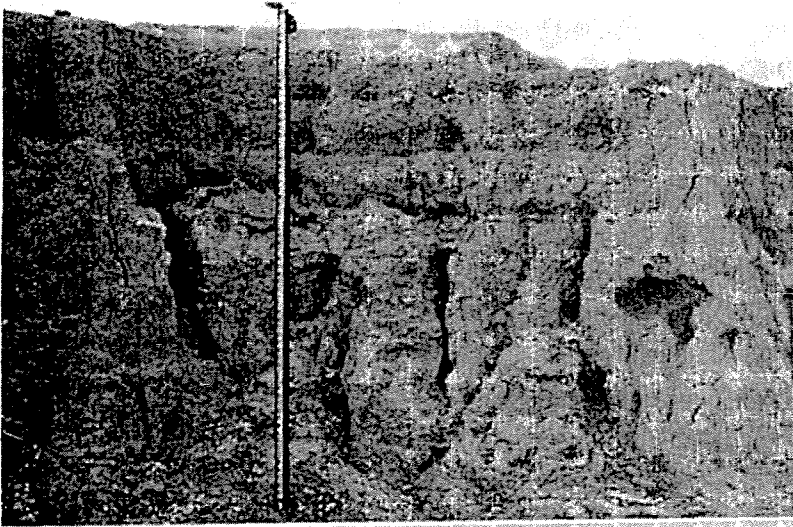
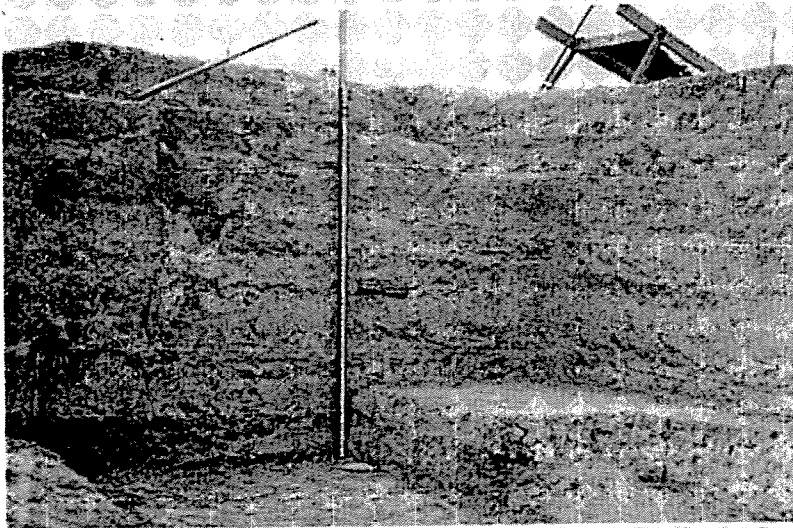


FIGURE 18

Excavation in 78-B9-17-3, 4, 5, 6.



A



B

PLATE 33

Felipe Test. A, eroded bank before excavation. Note bedding planes and columnar structure of silt. Snail shells spilled at foot of bank are from several cultural levels and are characteristic of all buried archaeological sites in the Falcon Reservoir area. B, view of same bank after excavation. Strings denote bedding seams in silt.

ately subsurface zone beneath the present general level of the terrace. Material was found on the floor of the arroyo as well as high on the sides of the arroyo face, but debris eroded from what appears to have been the single cultural layer can be traced upon the slope of the arroyo bank to an immediately subsurface location.

Summary

For all sites excavated during the 1952 season, the geologic column from the water's edge of the Grande to a point immediately beyond the sites consists of a bedrock which seems to be fairly continuous throughout the entire reservoir area and would seem to have a general upper limit of between twenty and thirty feet above water level. In many places the so-called modern terrace at the edge of the Grande abuts against the face of this bedrock but does not completely cover it. Above the bedrock there is a bedding of gravel or yellow material, and above this a bedding of silt. Outcroppings of hard layers of stone are exposed in the silt in successively higher levels, and these outcroppings form lines roughly parallel to the river. In general there is some evidence to support the contention that the twenty to thirty foot level of the bedrock is continuous for two or three hundred feet back from the river, and that the outcroppings which are distinctly higher, may represent previous stages of erosion.

This idealized column seems to have been complicated by erosion and deposition both from the lateral drainage systems and from the river itself, so that each individual site constitutes a separate problem.

The relative abundance of carbon recovered should furnish some illumination of the problems of physiography and climate related to the upper beds, as well as provide dating for the cultural remains.

Since the carbon from the old hearths constitutes the bulk of the material found, some discussion of the hearths is in order. In general, the hearths consisted of a few burned sand-

stone chunks and carbon. In rare instances there was a considerable quantity of burned earth or of earth so heavily impregnated with carbon as to have a dark, distinct color—quite different from the tan silt or yellow material. There was no symmetric pattern of disposition of the hearth stones. Generally there would be three or four stones about six to eight inches in diameter and several smaller fragments. Carbon was also found in many instances where only a few small fragments of burned sandstone were in association. Snail shell and flint were generally more plentiful immediately contiguous to the carbon finds, and in many instances flint chips and broken artifacts were found below the hearths but showed no indication of damage from heat.

In some squares considerable carbon was recovered in small, discrete particles, much in the fashion described by Hartle (1951). Subsequent excavation in adjacent squares exposed a hearth or mass of carbon upon the same level so that one might tentatively conclude that the discrete particles had in some fashion or other been scattered, washed or blown away from the adjacent fire.

The presence of carbon could sometimes be suspected several inches higher in the excavation than the actual material. In such cases the silt would appear slightly moist above the area of the buried carbon and the carbon, upon excavation, would contain moisture. Practically no rainfall was had during the entire excavation, but a heavy rain of eight inches had fallen the prior September. In general the moisture content of the silt and the yellow material seemed negligible although some evaporation was perceptible because of color change after exposure and the increase in dust, a condition readily noted because of continuous wind. This observation is made because it makes possible some contamination of the carbon from rainfall and seepage.

The lists of materials excavated are included for the purpose of showing not only the general types of material found but also the quantities. The descriptive terminology is extremely tentative insofar as the flint work is concerned so

that any permanent classification differentiating blades and projectile points will have to await the detailed analysis of all the material. Hartle's finding of relative uniformity of artifacts from top to bottom of the archaeological column must stand because artifacts excavated during the 1952 season show a similar uniformity.

Recommendations

Insofar as the archaeology is concerned further work in the area is needed, particularly in working out the correlation between cultural horizons and physiography and climate. In addition there is a considerable body of information to be had in the area concerning the remains of elephant or mammoth. Reports of findings of elephant bones are almost as numerous as the arroyos in the drainage system in the area and considerable skeletal material is now in the possession of lay collectors, most of whom can relocate the areas from which the bones were collected. A majority of the finds seem to have come from the gravel beddings, but a few have been recovered from the silt. The probable occurrence of associated cultural material with these elephant remains merits investigation.

In any event, the services of a competent geologist who could devote enough time to the project to help work out a joint plan of attack upon the problem and accomplish the necessary surveys of the terrace system seem vitally necessary for a well-rounded future program.

The excavation of prehistoric sites in this reservoir must also be planned around the essential point that vast quantities of terrace silt must be removed in order to clear archaeological sites which are, at best, very thin zones with a few widely scattered artifacts and hearths. Such excavation will be rewarding, however, for this season's work showed that cultural material is buried in terraces which had reached (before their subsequent erosion) heights of sixty, seventy, and perhaps even eighty to ninety feet above the present Rio Grande water level. Consequently, despite

the simplicity of the artifacts, a very long history of human occupation and climatic changes over several thousand years can be expected.

TABLE I

Provenience of Specimens

CO: Co-ordinates.

F : Fragment.

W : Worked.

Point: Projectile Point (?).

Felipe Test (78-B9-17-1)

Catalog Number	Specimen	CO	Elevation of Level in which found	
			Upper	Lower
1	Carbon sample ---	2D	227.3	227.0
2	Blade, F -----	15E	227.0	226.65
3	Blade, F -----	15E	227.0	226.65
4	Blade, F -----	15E	226.2	225.75
5	Blade, F -----	15I	225.75	225.5
6	Ochre -----	15I	225.75	225.5
7	Blade, F -----	14A	226.6	225.0
8	Carbon sample ---	14B	226.0	225.65
9	Carbon sample ---	14D	227.0	226.5
10	Blade, F -----	16F	225.75	225.5
11	Flint, W -----	16F	225.5	225.3
12	Blade, F -----	16F	225.3	225.0
13	Carbon sample ---	16I	227.1	226.75
14	Carbon sample ---	16I	226.0	225.75
15	Snail Shells, smp.	16I	226.0	225.75
16	Carbon sample ---	16I	225.75	225.5
17	Flint, W -----	16I	225.75	225.5
18	Carbon sample ---	16I	225.25	225.0
19	Carbon sample ---	16I	225.5	225.25
20	Carbon sample ---	17B	225.5	225.0
21	Carbon sample ---	17DE	227.5	227.0
22	Carbon sample ---	17F	226.45	225.8
23	Flint, W -----	17F	226.45	225.8

Number Number	Specimen	CO	Elevation of Level in which found	
			Upper	Lower
24	Blade	17F	225.8	225.3
25	Carbon sample --	17G	228.25	227.75
26	Shell, W	17H	229.0	228.75
27	Blade	17H	227.5	227.25
28	Flint, W	17G	226.9	226.0
29	Flint, W	17G	226.9	226.0
30	Blade, F	17I	228.25	227.85
31	Carbon sample --	17I-N½	227.35	227.1
32	Blade, F	17I-S½	227.35	226.6
33	Carbon sample --	17I-S½	227.35	226.6
34	Carbon sample --	17I-N½	227.1	226.75
35	Carbon sample --	17I-N½	225.85	225.75
36	Carbon sample --	17I-N½	226.25	225.85
37	Chopper	17I-N½	225.85	225.75
38	Carbon sample --	17I-N½	225.75	225.5
39	Carbon sample --	17I-N½	225.5	225.25
40	Bone, F	17I-N½	225.5	225.25
41	Point	17I-N½	225.5	225.25
42	Flint, W	17I-N½	225.5	225.25
43	Flint, W	17I-N½	225.5	225.25
44	Chopper	17I-N½	224.75	224.5
45	Carbon sample --	17I-N½	224.25	224.0
46	Carbon sample --	17I-N½	224.0	223.75
47	Carbon sample --	17I-N½	223.75	223.5
48	Carbon sample --	17I-N½	223.5	223.25
49	Mussel shell	16I	228.6	228.35
50	Ocher	16I	228.35	228.1
51	Carbon sample --	16I	227.35	227.1
52	Carbon sample --	16I	227.35	227.1
53	Blade F	16I	227.35	227.1
54	Carbon sample --	16J	225.85	225.35
55	Pebble, polished --	16J	225.85	225.35
56	Carbon sample --	16J	225.35	225.2
57	Chopper	16J	224.6	224.35
58	Shell bead	17J	227.35	226.85

Catalog Number	Specimen	CO	Elevation of Level in which found	
			Upper	Lower
59	Carbon sample ...	17J	227.35	226.85
60	Burned earth	17J	227.35	226.85
61	Carbon sample ...	17J	226.35	225.85
62	Carbon sample ...	17J	225.6	225.35
63	Carbon sample ...	17J	225.35	225.1
64	Flint, W	17J	225.1	224.85
65	Carbon sample ...	17J	224.35	224.1
66	Carbon sample ...	17K	226.35	226.1
67	Flint, W	17K	225.6	225.35
68	Flint, W	17K	224.35	224.1
69	Pebble, polished ...	18E	225.6	225.4
70	Point, F	18E	225.6	225.4
71	Carbon sample ...	18F	226.25	225.85
72	End scraper	18F	226.25	225.85
73	Pendant, stone ...	18F	225.85	225.5
74	Flint, W	18F	225.85	225.5
75	Carbon sample ...	18F	225.85	225.5
76	Carbon sample ...	18G	226.75	226.1
77	Carbon sample ...	18G	226.1	225.5
78	Carbon sample ...	18G	225.5	225.0
79	End scraper	18G	225.5	225.0
80	Carbon sample ...	18H-W $\frac{1}{2}$	226.75	225.4
81	Carbon sample ...	18H-E $\frac{1}{2}$	226.7	226.2
82	Flint, W	18H-W $\frac{1}{2}$	226.75	225.4
83	Carbon sample ...	18H-E $\frac{1}{2}$	226.7	225.4
84	Carbon sample ...	18I	226.15	
85	Carbon sample ...	18I	226.15	225.95
86	Carbon sample ...	18I	225.95	225.45
87	Flint, W	18I	225.95	225.45
88	Blade, F	18I	225.95	225.45
89	Flint, W	18I	225.95	225.45
90	Blade	18J	225.95	225.45
91	Blade	18J	225.95	225.45
92	Flint, W	18J	225.95	225.45
93	Carbon sample ...	18J	225.95	225.45

Catalog Number	Specimen	CO	Elevation of Level in which found	
			Upper	Lower
94	Blade, F _____	18J	225.95	225.45
95	Bone, F _____	18J	225.95	225.45
96	Point _____	19G	226.3	225.7
97	Blade, F _____	19G	226.3	225.7
98	Blade, F _____	19H	226.2	225.3
99	End scraper _____	19H	226.2	225.3
100	Point, F _____	19H	226.3	225.2
101	Shark Tooth _____	20G	225.75	225.1
102	Point _____	20G	225.75	225.1
103	Pebble, polished _____	21G	225.2	224.75
104	Point _____	21G	225.2	224.75
105	Bone, F _____	21G	224.75	224.4
106	Carbon sample _____	22K	227.15	
107	Carbon sample _____	22K	227.15	226.65
108	Flint, W _____	22K	227.15	226.65
109	Carbon sample _____	22K	226.15	225.9
110	Mussel shell _____	22K	225.6	225.2
111	Coal (?) _____	22K	224.4	224.1
112	Stone, painted (?) _____	22K	224.4	224.1
113	Carbon sample _____	22K	224.4	224.1
114	Flint, W _____	24G	225.5	225.2
115	Point, F _____	24G	225.5	225.2
116	Carbon sample _____	25JK	222.5	221.8
117	Carbon sample _____	25JK	221.8	221.3
118	Point, F _____	26/27J	222.3	221.8
119	Carbon sample _____	26/27J	221.5	221.1
120	Flint, W _____	26/27J	221.5	221.1
121	Carbon sample _____	25JK	221.3	221.1
122	Scraper _____	22L	225.0	224.7
123	Point, F _____	26/27J	221.5	221.1
124	Flint, W _____	28J	221.75	221.5
125	Carbon sample _____	28J	221.3	221.0

Wheaton Test (78-B9-17-2)

Catalog Number	Specimen	CO	Elevation of Level in which found	
			Upper	Lower
1	Carbon sample	OA	222.75	222.0
2	Carbon sample	OA	222.0	221.75
3	Carbon sample	1A	222.75	
4	Point	1A	222.5	222.25
6	Ocher	2A	222.25	222.0
7	Point	2A	222.75	222.5
8	Point	2A	222.5	222.25
9	Carbon sample ...	2A	222.5	222.25
10	Blade, F	2B	222.25	222.0
11	Point	2B	222.25	222.0
12	Flint, W	2B	222.25	222.0
13	Blade, F	2C	222.25	222.0
14	Point, F	3A	222.5	222.25
15	Flint, W	3A	222.5	222.25
16	Point	3C	222.25	222.0
17	Carbon sample	4B	222.25	222.0
18	Ocher	4B	222.25	222.0
19	Point	4C	222.25	222.0
20	Carbon sample	7A	222.5	222.25
21	Spokeshave	7C	222.25	222.0
22	Blade	7C	222.25	222.0
23	Blade, F	7C	222.25	222.0
24	Scraper	7C	222.25	222.0
25	Blade, F	7C	222.25	222.0
26	Flint, W	7C	222.25	222.0
27	Blade, F	8A	222.25	222.0
29	Scraper	8A	222.0	221.75
30	Point, F	8A	222.0	221.75
31	Blade	#	222.75	222.5
32	Point, F	#	222.75	222.5
33	Blade, F	#	222.75	222.5
34	Flint, W	*	223.7	

Catalog Number	Specimen	CO	Elevation of Level in which found	
			Upper	Lower
35	Blade, F	*	222.3	
36	Blade	*	221.1	
37	Carbon sample ---	2B	223.75	
38	Carbon sample ---	2B	223.75	

* Removed from vertical face of arroyo bank prior to excavation.

Removed from material excavated by dozer.

Roberto Test (78-B9-17-4)

1	Carbon sample ---	A	228.96	228.71
2	Carbon sample ---	A	228.21	227.95
3	Carbon sample ---	A	227.71	227.15
4	Point	A	225.99	225.78
5	Scraper	A	225.48	225.27

Mesa Test (78-B9-17-5)

1	Carbon sample ---	1B	227.0	226.0
2	Point	0B	226.80	225.8
3	Flint, W	1D	226.6	225.6

Nariz Test (78-B9-17-6)

1	Blade, F	3A	226.3	226.1
2	Carbon sample ---	3A	226.3	226.1
3	Blade, F	3A	226.3	226.1
4	Blade, F	3A	226.3	226.1

Elenita Site (78-B9-19)

1	Blade, F		230.5	229.5
2	Carbon sample ---		230.21	
3	Mussel shells ----		229.93	229.75

Smith Site (78-B9-20)

1	Carbon sample		10 feet below surface
2	Flint, W		10 feet below surface
3	Sandstone, smoothed....		10 feet below surface

Garcia Site (78-B2-21)

1	Bone beads	Zero to one foot
2	Point	Zero to one foot
3	Flint, W	Zero to one foot
4	Pebble, polished	Zero to one foot
5	Flint, W	Zero to one foot
6	Pebble, polished	Zero to one foot
7	Ocher	Zero to one foot
8	Flint, W	Zero to one foot
9	Nail	Zero to one foot

Castillo Site (78-B2-22)

1	Point	Zero to eighteen inches
2	Point	All remaining material
3	Point	in same level
4	Point	
5	Blade	
6	Blade	
7	Blade	
8	Blade	
9	Blade, F	
10	Blade, F	
11	Blade, F	
12	Ocher, scratched	
13	Ocher, scratched	
14	Ocher	
15	Bone beads	
16	Bone awl	
17	Bone tube	
18	Ocher	
19	Scraper	

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THE OLMEC PHASE IN EASTERN MEXICO

ROBERT E. GREENGO

Introduction

It is proposed here to survey cultural manifestations on the Gulf coast of southern Mexico. These range from the Rio Papaloapan drainage in southern Veracruz to that of the Rio Tonala in Tabasco. The area extends about 30 miles inland from the coast up the Rio Coatzacoalcos system. The whole area has a tropical rain-forest climate.

We will employ the cultural terminology suggested by Dr. A. V. Kidder in a seminar on Meso-America given at the University of California in the spring of 1951. He recognizes six main periods or stages: Early Man, Emergent Agricultural-Ceramic, Pre-Classic, Classic, Post-Classic, and Proto-Historic. It should be realized that there are several other "systems" of cultural designation for Meso-America, which cannot be discussed at this time. The stages postulated by Dr. Kidder may be subdivided on the basis of site-to-site differences, as well as differences within stratified sites. Such subdivisions are called phases as defined by Kidder, Jennings, and Shook (1946, p. 9): "A cultural complex possessing traits sufficiently characteristic to distinguish it, for purposes of preliminary archaeological classification, from earlier and later manifestations of the cultural development of which it formed a part, and from other, contemporaneous complexes."

The Pre-Classic Stage

We will be concerned primarily with the Pre-Classic stage in this study, which appears to be the earliest at a number of Meso-American sites on the east coast. This is characterized by well-developed complexes of pottery, maize agriculture, and hand-made clay figurines which bespeak a pattern of living similar in most essentials to that of the Indians living in the same rural districts today. These characteristics of the Pre-Classic are the few general ones on which archaeologists have attained a measure of agreement. Certainly,

another trait of this stage was that of constructing mounds of earth and rubble for ceremonial purposes. Beyond this, however, the special details which set off Pre-Classic mounds and (or) pyramids from those of the following Classic period are not clear. Until quite recently the criteria of bar-and-dot dates, hieroglyphic inscriptions, and fine stone carving have been considered Classic traits. Evidence is now accumulating that the concept of the Classic stage can no longer be so simply stated, and that regional variations, rather than time, may be responsible for the presence or absence of such traits. Wauchope (1950, pp. 212-214, 218) has stressed the differences between Pre-Classic sites which appear to be on the same general time level.

Since the main purpose of this paper is to present some of the data which bear on the definitions of Pre-Classic and Classic, we will withhold further comment for the present.

The Olmec Problem

The word "Olmec" signifies "inhabitants of the rubber region," as it derives from a Nahua (?) word *olman*, "where there is rubber", or *olli mani*, "where rubber is gathered" (Jimenez Moreno, 1942 b, p. 119).

Sahagun (translation, 1830, Vol. 3, Book X, Chap. XXXIX, pp. 136-137), writing shortly after the Conquest, gives a good account of a people called the Olmec who lived toward the east (of Mexico City) on the Gulf Coast. He mentions that they had elaborate clothes, gold, rubber (including rubber sandals) and jade as well as an abundant supply of Quetzal feathers. They were said to have spoken a barbaric language, although some also spoke Nahua.

Beginning with such information from the Chronicles, much controversy has arisen over the identity of these rubber people, what language they spoke and what their culture was like. Quite distinct from the question of the identity of the *proto-historic* Olmec through the literature, knowledge of this area can be said to have been approached from the opposite angle, through strange and supposedly

very old archaeological finds. From the late nineteenth century to the present, discussion has revolved around the antiquity and origin of bar and dot glyphs of apparently 7th and 8th Baktun dates, as well as of beautiful jade carving of humanized jaguar faces, crying babies, combinations of both and other features to be discussed below. Though not the first such find, the controversy was touched off in 1907 when Holmes published an illustration of a curious little jade figure, the now famous Tuxtla Statuette from near San Andres Tuxtla in southern Veracruz. Most remarkably this object has inscribed on its surface a series of bars and dots which may possibly represent an 8th cycle date of the Maya Initial Series. Such a date is controversial because (1) this is supposedly a non-Maya region; (2) the bars and dots do not have accompanying glyphs (as do most Maya date inscriptions); and (3) the date appears to be much too early for the Maya long count. The gist of these objections is that Maya-type Initial Series dates have been confined to the Classic Maya area and have not preceded the 9th cycle. To understand how the Tuxtla Statuette with its 8th Baktun date ties in with the Olmec problem we must first discuss another find.

At an archaeological site called Tres Zapotes, about 15 miles from the locale in which the Tuxtla Statuette was found, are groups of earth mounds. In the front of the second largest mound at the site (C, 1), a fragment of a stela (Stela C) was unearthed standing on end next to a flat circular stone which may have been an altar. This stela fragment measuring approximately 88 cm. wide and 50 cm. high was apparently broken from a larger piece. One side of the stela contains a bar and dot inscription which, if it represents the Initial Series, bears a date of the 7th Baktun, the earliest date yet found. On the other side of the stela is a very weather-worn carving of a conventionalized feline face in low relief. The supposed history of the stone involves: first, use of the stone as a larger monument which fell, date side down; considerable time then elapsed in order for the feline carving side to weather (the material is very hard);

secondly, the large original stela was found and broken, this fragment being set on end near the stone altar in front of mound C, 1.

Due to the facts that the dates on Stela C and on the Tuxtla Statuette are executed in a very similar manner, that they were found in the same general region and that they are both supposed to be quite early, there is good reason to believe that there may be a close cultural connection between the two. As we shall see below, the "tiger" mask on Stela C is of an artistic tradition which apparently centers in that same area. This tradition has a number of aspects which connect it quite certainly with the Pre-Classic horizon (as defined above), some of which seem to have persisted in and influenced the later, Classic art styles. On the other hand there are also found here several categories of rather unique objects whose cultural connections apparently do not extend beyond the southern Veracruz-Tabasco Gulf Coast.

The initial step toward identifying this mysterious artistic tradition was made by Saville (1929) in his study of "Votive Axes." He found at least two types of representations, the "tiger face" and the "baby face" which sometimes appeared separately while at other times features of the two were merged. He also found that they were encountered in two different media, on votive axes and in relief sculptures. However, it was not until 1932 that Vaillant, in publishing an illustration of a beautiful jade "jaguar-baby" figurine from Puebla, suggested the name "Olmec" for this artistic tradition. He pointed out that people in an area often build up semi-mythical legends about those who have gone before. Examples of the art of the Toltecs, the early Zapotecs and even the early Totonacs who appear in Nahua legends have been partially extricated from mere legendary existence via the medium of archaeology. One such half-legendary people, the Olmec, is described as having lived as far north as Tlaxcala, but were later dispersed to southern Veracruz, Chiapas, southern Puebla and eastern Oaxaca. They were

well known for their jade work and their utilization of rubber. Therefore, because the area from which the "tiger face" and "baby face" representations come was roughly the same as that which the legendary Olmec were supposed to have occupied. Vaillant suggested that the unique art was the product of the Olmec, although he admitted no other material culture could be assigned to them.

While no one knew very much about this artistic complex and almost nothing culturally about the people who practiced it, at least now it had a name as well as a sort of working hypothesis with which to probe deeper into the problem. Almost all of the objects which could be called Olmec had become known under unscientific circumstances. There still remained the problem of finding and excavating an "Olmec" site.

As a matter of fact, two sites of this nature were already recorded in the literature. As early as 1869 Melgar had mentioned the colossal head of Tres Zapotes and in 1871 published a paper on it. From time to time others mentioned either pottery material from the area or the colossal head (e. g., Seler-Sachs, 1922). Wyerstall in 1932 published a paper which gave more than an inkling of the nature of the archaeology of southern Veracruz. Finally, during the dry seasons of 1938-1939 Stirling commenced excavation at Tres Zapotes (Stirling, 1939).

The other Olmec site which had been mentioned in the literature was that of La Venta, on the Tonalá River in Tabasco not far from the Veracruz border. The first notice of this site was recorded by Charnay in 1887. Blom and La Farge visited the site in 1925 and published several photographs of La Venta's stone monuments (as well as of two statues from there, which had been removed to the city of Villahermosa). They also drew a rude sketch map of the site. Joyce (1931) wrote a brief notice accompanied by several photographs of the La Venta site. Excavation was initiated there in 1940 by Stirling (1940) for a period of 10 days, while more extensive work was done in 1942.

Tres Zapotes

Before launching into a resume of the material manifestations of this and other sites it might be well to state the major categories of evidence with which we are to deal: architecture, stone monuments, pottery and figurines, and jade work.

Architectural remains at Tres Zapotes consist of mounds of earth, arranged in irregular groups. The only pattern apparent is that of building "a relatively high steep mound, often circular but sometimes four-sided in plan, adjacent to a long narrow mound. Smaller mounds, usually rather low domes, were built as flankers, often in pairs, to complete the group." This pattern is significant because it recurs in other sites in the region (Stirling, 1943 a, pp. 10-11).

The two highest mounds are about 40 feet high and some 150 feet square at the baselines. Perhaps the largest mound is a long one (425 feet), 57 feet wide and 25 feet high. There are also very small mounds 6 to 8 feet high and 40 to 50 feet across. None were stone faced and, in fact, the only stone used was in a small stone platform and on two short sandstone treaded stairways. (Stirling, 1943a, p. 11; pl. 2b, 3; Drucker, 1943a, pl. 2-4). Stirling (1943a, p. 11) in generalizing about the stone monuments of Tres Zapotes states that they occur "singly and are widely scattered over the large site (2 miles long in the floor and on the slopes of an arroyo). Most of them are carved from basalt, a rock which is abundant in the region, especially around the base of nearby Tuxtla Mountain. All of the monuments have suffered intentional mutilation in greater or less degree, suggesting the work of an invading people. Likewise, it is probable that many of them had been moved from their original locations."

We have already discussed Stela C. Another and certainly the most spectacular stone monument is the colossal head, measuring about 6 feet high and eighteen feet in circumference. It is made of gray basalt which matches that of some large blocks 10 miles distant. The facial features are

sensitively carved to represent an individual with large eyes, low wide nose and thick lips, with a headdress, perhaps somewhat conventionalized or difficult to represent in stone, that looks like a football helmet. Ears are represented by an open "S" design, and the back of the head is flat with parallel vertical incisions probably representing hair (Stirling, 1943a, p. 16, pl. 4; 1939, p. 185). Other monuments at Tres Zapotes of especial significance are Stela A which has a center portion missing, yet measures 17 feet 7 inches long. On it is carved a mask quite similar to that on Stela C (Stirling, 1943a, pp. 11-14, fig. 3, and pl. 12). Stela D (*ibid.*, pp. 14-16, fig. 4 and pl. 14a, b) represents a conventionalized open-mouthed animal, probably a jaguar, on which the back of the mouth is flat with low relief figures. Another figure is carved into the roof of the mouth. The stela is 58 inches high.

Another most significant type of stone monument are two large stone boxes, Monuments B and C. They both have a maximum length of about 5 feet and a maximum width of around 3 feet, with sides 5 to 8 inches thick and bottoms 12 to 16 inches thick. Monument C has elaborate curvilinear designs and human figures carved on the 4 outer sides. (*ibid.*, pp. 17-21, pl. 5, 7a, 17a, b, 18a, b).

Monument E (*ibid.*, pp. 22-23, fig. 5) consists of a rectangular slab 5x6 feet and 10 inches high carved in the living rock in the Arroyo de Hueyapan. On this slab are carved a dot and two bar numerals. This monument is now under 4 feet of water in the dry season. Its significance lies in its connection with the earliest stratified deposits at the site (Drucker, 1943, p. 34).

Monument M is quite interesting because it resembles more closely than most others at this site particularly characteristic features of Olmec art—drooping mouth, flat nose, rectangular shaped ears, high head, flat in the back with a turban-like headdress (*ibid.*, p. 24, pl. 11 b-d).

Although two reports have appeared on the pottery of Tres Zapotes (Drucker, 1943; Weiant, 1943) only Drucker's

was based on careful stratigraphic excavation, which makes it, for our purposes, the more important of the two. He found three ceramic levels, Lower, Middle and Upper Tres Zapotes. These levels agree with similar stratigraphic differences in figurine types.

Lower Tres Zapotes

The lower level is characterized almost exclusively by coarse or medium coarse paste Brown and Black monochrome wares, "which emphasize vessel form as a field for esthetic elaboration . . . the net effect is that of a pure and self-contained pottery complex" (Drucker, 1943 a, p. 115). Features of this pottery indicate that ceramic techniques were well advanced in the earliest deposits at this site: "Well-made Brown and Black ware vessels with their sophisticated composite shapes and numerous subtypes, flaring-side bowls with simple to wide flat everted rim; incurved-side bowls with tapered everted rims; composite silhouette bowls, spouted (unsupported) vessels," and others. (*ibid.*).

Human figurine types are especially important at Tres Zapotes, not only because of stratigraphic differences, but also because we have in them a possible stylistic clue to the origin of the motifs of the colossal heads. In the Lower level the closely related figurine subtypes A and C were found. Subtype A has characteristically elaborate turbans which vary a great deal, wide heavy-jowled, slightly prognathic faces with punctated eyes, nostrils and mouth. The back of the head is flat or slightly concave, while ears may or may not to be represented though large circular ear-plugs are always present. Some masculine heads appear in this type with a short beard. (*ibid.*, p. 78).

Many of the figurines have somewhat flattened body forms representing females more or less impressionistically treated with wasp waists, small breasts and the navels often indicated by a punctation. Dress is sometimes indicated by applique representing necklaces, short skirts, and breech

clouds. Legs may be simply tapered stems or stubby with heavy modeled thighs and reduced lower legs with feet indicated by a few vertical striations sometimes with a deep notch at the bottom. The arms are in various postures and are usually stubby in form, while the figures themselves may be standing or seated.

One figurine head form is that called "Subtype E" or "Baby-face" variety, of which only one example was found in the Lower phase. These are modelled realistically, especially in the eyes and cheek contours. Some of them have drooping mouths or an appearance of crying (Drucker, 1943a, pl. 26 e, 270, 38 a, b; Weiant, 1943 pls. 18, 19). This figurine type is considered to be a basic trait of the Olmec phase. There is reason to believe that in its realism and simplicity it may be a proto-type of the beautifully executed colossal heads which form another basic trait of this phase.

Middle Tres Zapotes

In Drucker's words (1943 a, p. 115) this level is characterized as, "a period of elaboration and development," the Lower level wares continuing to be predominant. However, "Polychrome ware, whose roots might possibly lie in the Lower Complex, or more likely at the base of the Middle, occurs in modest, although constantly increasing, quantity." Unfortunately poor preservation ruled out intensive study of the design elements on Polychrome ware.

A diagnostic trait of the Polychrome ware is, "finely divided, compact clay, with no visible temper." Characteristically the color is bright orange, frequently with a gray core. This ware is quite hard and the vessel walls, even of large pots, "tend to be thinner than those of other wares" with thickness ranging from $5/32$ to $1/4$ inch. (*ibid.*, pp. 36-37). Slips include cream, white, buff, gray, orange, and smoked-black shades.

While vessel forms vary, "the significant characteristic of the group is that composite silhouettes definitely never occur." On the other hand this form is a moderate constant

among the Brown and Black wares. Polychrome shapes include flat base, flaring side, curving to flat everted rims, bowls and dishes some with slab or cascabel feet, while many were legless. Also found were unsupported spouted vessels, and ollas with distinctive rims which rise sharply from the body, usually vertically or slightly flaring (*ibid.*, pp. 37-44).

Middle Tres Zapotes figurines give evidence of "manipulation of fundamental patterns," with grotesque subtype B and subtype F probably being derived from A and C forms in Lower Tres Zapotes. Another subtype, D, may be extraneous but the punctation technique of the Lower period is apparent in many specimens.

The Middle period subtype E or "baby face" heads are more elaborate than the Lower period specimens, many with forelocks deriving from subtype C.

"It is in the Middle too, that the infrequent bearded forms, and those with what looks like a muffler about their chins occur, and the more variant types of bodies, the angular wide-croched forked-foot type, and those with tripods, and socket-like whistles occur" (*ibid.*, p. 115).

Upper Tres Zapotes

Cultural continuum from the lower strata is represented in this level by a number of persistencies including all the wares present in the Middle period. Polychrome becomes increasingly abundant at the expense of the monochrome wares, while Tres Zapotes hand-made figurine types persist much as before. Innovations apparently made by the potters at the end of the Middle period are *incensarios* and *comales*.

However, the most important manifestation of the Upper period is the "influx of new traits which have no discernible local antecedents." (*ibid.*, p. 116). Much of this new material is found in the mounds, the building of which must have been accelerated at this time.

While jade carving is a characteristic Olmec trait elsewhere, it is all but absent at Tres Zapotes. Drucker mentions a jade bead and a pendant, while Weiant (1943, pp. 120-121; pls. 74-75) devotes a short section and a few photographs to some small jade beads and ornaments.

We have gone into some detail in discussing the site of Tres Zapotes because with the stratigraphic sequence established by Drucker (1943), we are able to correlate it temporally with other sites to see how it fits into the Pre-Classical stage. This can only be done in a general way, for many details are lacking or are too obscure to make more than tentative broad scale correlations. (e. g. Wauchope, 1950).

La Venta

This site is situated on a sandy island between the Tonalá river and its tributary, the Blasillo, somewhat over ten miles from the ocean and about 90 miles east and somewhat south of Tres Zapotes. Excavation was carried out by Drucker in 1942 (Stirling and Stirling, 1942), and Stirling and Wedel in 1943 (Stirling, 1943 b).

The largest feature of an architectural nature is a truncated pyramidal mound, on a platform, approximately 100 yards square and 105 feet high (Stirling, 1943 a, p. 48). There are at least eight other mounds of good size. Covarrubias (1946 b, p. 92) gives a sketch map of the La Venta site showing the arrangement of the mounds that could be seen. His description of the site is the best published thus far; "The entire complex runs directly in a north-south direction, with all sorts of mounds—large and small, round and long—neatly aligned to form extensive plazas." While mounds of the same general shape may contain vastly different kinds of material, it is of interest to note the existence of long narrow mounds here and at Tres Zapotes.

A very unique feature at La Venta is to be found north of the large pyramid. This is a rectangular enclosure measuring 54 by 68 yards surrounded by pillars of columnar basalt 10 feet high arranged side by side, resting on a foundation

of clay. A sunken court was thus formed, the floor of which is still undetermined. At the south end of this court is a gate formed by two smaller rectangular enclosures measuring 21 by 27 feet also made of basalt columns. The easternmost of the small enclosures was found to be filled with rubble and adobe bricks to a considerable depth. Under this fill was a cache of 37 serpentine axes arranged in the form of a cross. Below the axes to a depth of 23 feet the filling was of earth, while at the bottom was a floor representing a highly conventionalized jaguar mask. It was made of well shaped, close fitting blocks of green serpentine set in asphalt on a base of crushed stone. In the words of Covarrubias, "The open spaces within the mosaic that stood for the jaguar's eyes, eyebrows, nose, and mouth were filled with blue clay, while a border of yellow ochre framed the green mosaic, setting it off against the reddish soil of La Venta." (Covarrubias, 1946 b, pp. 92-93). Another mosaic floor lay in front of the pyramid.

There are 19 stone monuments known from this site including the two now in Villahermosa. Four of these monuments are classified as stelae by Stirling (1943 a). These range in height from 5 feet to 14 feet. Stela 1 at La Venta (*ibid.*, p. 50, pl. 33a) bears a close resemblance to Stela A and D at Tres Zapotes (*ibid.*, pp. 11-16 and pls. 12, 14a). All seem to represent figures standing in the open mouths of jaguars or have conventionalized jaguar masks above the figures. Stela 2 is remarkable in that its half-relief figure wears a headdress almost as tall as himself. He carries a sort of baton or mace and is surrounded by six human figures who seem to have snarling jaguar mouths, and who also carry club-like instruments (for illustration of this see Covarrubias, 1946 b, plate 3 and Stirling, 1943 b, p. 24). Perhaps the most interesting stela is the largest, Stela 3, which shows in low relief two figures facing one another. One of these personages has a long beaked nose and a beard, while the face of the other is mutilated beyond recognition. The second person wears a very tall headdress and carries a club. These two personages seem to be surrounded by six figures, one

of which has a snarling jaguar-like face while two of the others appear to be wearing helmet-like headdresses. Long nosed personages are represented on Monument C at Tres Zapotes which bear a certain resemblance to those on Stela 3 at La Venta. (Cf. Stirling, 1943 a, pl. 18 and Covarrubias, 1946 b, pl. 4).

Six monuments are called altars by Stirling. They are rectangular in shape, about five feet high with the top foot or so overhanging the lower portion as a sort of table-top. All of these are badly battered as if some attempt was made to destroy them. These monuments are particularly important because in their decorative motifs they embody almost all of the traits which are here considered as diagnostic of the Olmec phase. Among these are, jaguar masks, representations of nude babies with "V" notch in the head, drooping mouth, figures emerging from the mouth, and simple realistic representations (see Stirling, 1943 a, pp. 52-56, and pls. 36-41).

Perhaps the most striking class of stone monuments at La Venta are the colossal heads. There are 4 of them ranging in height from 6 feet to 8 feet 5 inches. They all appear to have a definite orientation with relation to the great mound. Monument 1 is erected facing south on a north-south line near the south base of the large mound. It measures 8 feet high and nearly 21 feet in circumference. Of the four, this head most nearly resembles that at Tres Zapotes, with a sensitively realistic likeness to a person of the physical type with large eyes, broad flat nose, thick lips, and relatively short face. The curve of the mouth forms an arc with the ends lower than the center, though it is not "drooping". It appears to be wearing a helmet-like headdress, another feature which it shares with the specimen at Tres Zapotes. Also as with the other three here, the back of the head is flat. On top of the head are a number of rather haphazardly arranged grooves which may be the result of vandalism. Large ear plugs are shown decorated with a cross. That the heads may have been painted is shown by a fragment of this head with

a smooth-surfaced, dark purplish-red paint coating it. About 200 yards north of the great mound and of the columnar stone enclosures lay the other three heads arranged in a row from east to west. The westernmost of these is Monument 4, the largest at the site (8 feet 5 inches high, 21 feet 7 inches in circumference). In common with Monument 1 and the one at Tres Zapotes it appears to be carved in a life-like manner. The personage is again wearing a helmet-like headdress, but the main distinction of this head is to be found in the mouth. The lips are again full and thick, though parted with the four upper incisor teeth represented, also a feature of Monument 2 a few yards to the east. Besides the "buck-tooth" effect, the corners of the mouth appear to be drawn up in a smile, quite unlike the serious or even dour aspect of the other heads.

The easternmost of the three heads north of the great mound is said to be flatter (only 2 feet 9 inches thick) than the other heads and of a somewhat different style. Much of its relative crudity may have been due to erosion but even so there are a number of distinct features about it. Stirling says that the eyes are large and deep set, but the photograph (1943 a, pl. 42 b) seems to show two gouges for each eye. The mouth appears to be unfinished (or else badly eroded) with the lips slightly parted and the upper incisors vaguely represented. This head appears not to wear a helmet, the head having an angular outline from the front. There are many striated grooves on the back which may be a crude conventionalization of hair. Circular ear disks are shown with holes in the center.

A stone carving which Stirling considers the "most typically 'Olmec'" of any at La Venta is that of a human figure somewhat over four feet high with a "baby-face" complete with drooping mouth. It is kneeling holding a rectangular bowl in its hands. Representations of kneeling or squatting figures holding bowls are to be found at Tres Zapotes in Monuments I, J, and K (cf. Stirling, 1943 a, pl. 45 a and pl. 9).

Monument 6 at La Venta is a stone sarcophagus, one end of which is carved in low relief to represent a conventionalized jaguar. It was covered with a slab of stone 10 feet long by 3½ feet wide which overlapped the sarcophagus slightly on all sides. Burial furniture found in Monument 6 consisted of two thin circular jade ear plugs to which had been attached a jade jaguar-claw representation; a serpentine figurine of a nude male with slanting eyes, flat nose and narrow head; and an awl-like implement of jade.

Near the sarcophagus was a tomb constructed of columns of columnar basalt, called Monument 7. The columns were set vertically to form a rectangular enclosure on three sides. The roof was formed by similar columns laid parallel, while the fourth side was formed of columns resting at an angle against the last roof column. Three burials were on a platform of clay one foot high, covered with limestone slabs which were coated with a thin layer of blue clay. Above this was an irregular six-inch layer of cinnabar which may have originally been in wrapped bundles. Among the ornaments were a seated green jade figurine; a standing blue one; a reproduction of a fresh water clam shell under which was a seated female jade figurine with a circular mirror of crystalline hematite over the chest; a jade frog; flowers; leaves; rectangular ear ornaments; jade beads carved like sections of bamboo; a necklace of sting-ray tails inset with hematite crystals (one of the sting-ray tails was a jade reproduction); another standing jade figurine; and some jade beads.

The only paper on La Venta pottery is Drucker's preliminary report (1947). He points out that the pottery is rather plain, although this may be due partly to poor preservation. Painting seems to be all but absent. Other decorative techniques are limited to modeling, pre-firing incising, heavy pre-firing grooving, punctation and rocker stamping, but these are also infrequent. Paste seems to be very much like that of Tres Zapotes pottery with coarse grayish colors, and a finely divided clay with no temper, fired from orange to buff as well as black and gray. Drucker prefers to call this

ware "Fine Paste" rather than "Polychrome" as he did in the Tres Zapotes report. He believes that La Venta (and Tres Zapotes) Fine Paste ware was ancestral to the well known Fine Orange of central and southern Mexico. It occurs in the lower La Venta levels (in deposits 9 feet in depth) but is more frequent near the top.

Vessel shapes compare quite closely with dominant Tres Zapotes forms. Flat-bottomed low bowls or dishes are common in all wares, while "composite silhouette" bowls occur but infrequently. With these, as at Tres Zapotes, is associated an elongated "S" design. Footed vessels seem to be rare or absent at La Venta but annular bases are quite common. These also occur at Tres Zapotes. Drucker states that the over-all La Venta ceramic pattern is close to that at Tres Zapotes and specifically to that of the Middle Period.

La Venta figurines are all hand made, usually solid with applique and incised features. The types are in the main like those in Middle Tres Zapotes, corroborating the pottery relationships of these two sites.

Because Fine Paste ware occurs rather frequently at the bottom of the La Venta deposits but not in great abundance until the Upper period at Tres Zapotes where a number of Teotihuacan traits are evident, Drucker feels that "the zone of development of the Fine Paste ceramics must have been in or near the La Venta region, and that they or at least the increased emphasis on them, diffused in a westerly direction; that is, to Tres Zapotes, affecting the latter site at the same time as a series of new influences, presumably from the Highland, made themselves felt" (1947, p. 6).

The relationship between these two sites is close, but that one is not merely an adjunct of the other is shown by a fairly long list of differences. One such dissimilarity is the presence of a coarse buff ware at La Venta in all strata which does not occur at Tres Zapotes, nor at any other known site.

Drucker mentions another Olmec site, that of San Miguel, not far up the Rio Blasillo from La Venta, but says only that it, "was presumably an occupation center tributary to the ritual focus" (*ibid.*, p. 7).

Apropos of occupation sites *versus* ceremonial centers, there is reason to believe that more and deeper occupation deposits will be found at La Venta itself. Such deposits are extremely hard to find in the jungle, and in fact, all of the finds now known at La Venta are the results of digging near monuments which obtrude above ground. Their relationships can be summarized as "well-rooted local manifestations, which, though descended from common ancestral patterns, and though influencing each other throughout their history, nonetheless were sufficiently well established to have developed local specialties to which they clung" (*ibid.*, p. 6).

San Lorenzo Tenochtitlan

The newest and the most spectacular Olmec phase site in Veracruz was discovered by Stirling in 1946 (Stirling, 1947). Tenochtitlan is a small village established only about 14 years ago. It is situated on the Rio Chiquito, an affluent of the Coatzacoalcos. In a direct line the site is 30 miles south of the Gulf coast, some 60 miles southwest of La Venta, and 70 miles southeast of Tres Zapotes. This village is on two parallel ridges which run north and south, and four miles south of it on the same formation but apparently at a somewhat higher elevation are the mounds of San Lorenzo. Stirling speaks interchangeably of these mounds and another mound group across the river from the village. Apparently we are dealing with either a very large site or with two very similar and intimately connected sites. San Lorenzo seems to be the main one, and it is here that more colossal heads are found.

The modern village itself is built on archaeological remains, for Stirling says (p. 157) that the ridge nearest the river is covered with a series of small mounds which are pre-historic.

On the ridge 400 yards west is a series of very large mounds, "including a rectangular court flanked on either side by a long, high embankment, and at each end by a tall pyramidal mound—these mounds command a fine view of the spacious plain below."

At San Lorenzo Stirling mentions that they mapped mounds, courts and plazas (p. 170), and that there was a central mound group consisting of a central mound with a court in front of it containing earthworks (p. 159). There must, however, be several courts, since Stirling says that they excavated in the "principal" court (pp. 160, 170). Stratigraphic trenches were dug at various places at San Lorenzo and along the river bank below Tenochtitlan. From the excavations were recovered large quantities of pottery, clay figures, "and other artifacts of the ancient inhabitants and we were able to trace the changes in style and form with the passage of time as revealed in our trenches."

Stirling continues: "In our big stratigraphic trenches by the river we found an early occupation site of the monument carvers, buried under 20 feet of soil. Above this and 10 feet beneath the surface was another occupation level with a different style of pottery and different clay figures, showing that after the site had been abandoned by its original builders another people had arrived and occupied it" (p. 171).

One of the most remarkable features of the Olmec phase is the apparent distances that they transported huge blocks of basalt. The only place where outcroppings occur of the materials from which the stone monuments were carved is in the Tuxtla mountains in the vicinity of San Andres Tuxtla, Veracruz. This is only about 15 miles from Tres Zapotes by air line, but La Venta is 80 miles in a direct line from this source and probably well over 100 miles by the water routes they must have taken. San Lorenzo is 60 miles in a direct line, but a water route from the Gulf and up the Rio Coatzacoalcos would be closer to 100 miles. The argument that they transported these stones great distances by water is based on both the swampy nature of the terrain around La Venta

and the hilly terrain at San Lorenzo Tenochtitlan. Log rafts could have been made to float the stones.

It is the stone monuments of San Lorenzo Tenochtitlan that are described in greatest detail by Stirling. These may be grouped as follows: statuary figures such as colossal human heads; human figures; animal figures; human and animal combined; altars; and others including long stone columns, an aqueduct, and a spherical stone.

By far the most spectacular are the colossal human heads of the same type of basalt as found in the La Venta monuments. There were five of them, better made and better preserved than any found at La Venta. Two heads are about 9 feet tall, but measurements of the others are not given. They all wear "football" helmets as do those at La Venta. In the pictures of one of the heads which is said to be the finest and largest of all in the "La Venta Culture" the same "Negroid" physical type is represented in the delicately modeled features.

Human figures other than the colossal heads are two small four-legged rectangular stone vessels each carved with an Olmec style face, the front legs of the vessels in the form of recumbent bent elbows. In the jungle on the plain below San Lorenzo was a well-fashioned Olmec style head, 3 feet 4 inches high. It is made of pitted basalt and wears a head-dress or hat consisting of a rounded crown with a thick up-turned brim and appears to be not unlike several of the hats or headdresses depicted on Altars 4 and 5 at La Venta (Stirling, 1943 a, pls. 37, 40, 41), but it is perhaps most similar to those represented in petroglyphs at Chalchuapa, El Salvador (Boggs, 1950, fig. 1, d, p. 92). On the site of San Lorenzo is a statue representing the seated figure of a woman holding a chubby infant, while another figure of a woman, also seated, holds a cylindrical bar in her hands. Both of these have their heads missing.

The figure holding the cylindrical bar may be similar to a stone monument on the rim of the crater of the San Martin

Pajapan volcano in central Veracruz. Blom (1926) published a photograph of this monument and Covarrubias (1946 b, p. 80) made a drawing from the photo. This figure is shown on its knees leaning forward. Its features are pure Olmec including, drooping mouth, broad nose, and large ear plugs. The height of the statue is over four feet, one and one-half feet being taken up with an elaborate headdress, part of which is a face or mask representation as large as the face of the personage wearing the headdress.

Most of the animal carvings at San Lorenzo mentioned by Stirling represent jaguars. One is 3 feet long and depicts a crouching, snarling jaguar. A similar aspect was found in a gracefully carved elongated jaguar figure. A four foot high seated "jaguar god" figure was located in the bottom of a ravine at San Lorenzo. One of the animal-human figures is described as being in its original position and consisted of, "a large stone figure—of an anthropomorphic jaguar seated on a human figure lying on its back with crossed legs" (Stirling, 1947, p. 158). A better made and larger one was discovered at San Lorenzo. The only other human and animal representation was found at Potrero Nuevo about 4 miles east of San Lorenzo which was "in the form of a heroic sized human figure holding up a large serpent gracefully draped over the lap" (p. 171). The author does not say that the human figure is of an Olmec type, but the notation occurs in context with discussion of finds which are (or were) Olmec. This point is significant in that it can be said that a negative trait of the Olmec phase is the absence or scarcity of serpent representations in contra-distinction to a later Mexican period wherein serpents became a fundamental motif. In this connection it is of interest to note the jadeite figurine from Coatepeque, Guatemala, published by Kidder (1942, p. 37, fig. 40 d) which depicts an Olmec-looking human figure inside the coils of a snake. Appearing especially Olmec in the front view are the eyes, the shape of the head, nose and the rounded rectangular ears. But the side view shows that the head shape is due to hair piled up on top of the head, and the nose is typically Mayan.

Another animal represented is the duck which occurs in the form of a stone fount. The swimming bird has the back hollowed out with sides carved in the form of wings, "and between them was a series of water glyphs" (Stirling, 1947, p. 160). On the breast carved in low relief is a small duck figure with open beak, extended wings and projecting web feet as if in an attitude of landing.

The monument which ties in most closely with the site of La Venta is a table-top altar of the same pitted basalt as the two large altars at the Tabasco site. Not only is the San Lorenzo altar similar in appearance but it is almost the same size as the largest one at La Venta (11 feet 4 inches long by 5 feet wide across the top and 6 feet high). The most striking resemblance is in the front of the altar which bears a human figure sitting in an arched niche holding what may be a baby in its lap. There are other carvings on the sides of this altar in a manner similar to that on the La Venta examples. Quite different from anything at other Olmec sites is a table-top altar at San Lorenzo, the top of which appears to be supported by figures in front holding their hands above their heads. Judging from the workmen standing around the altar in the photograph, the total height must be about 3 feet, while supporting figures would be about two feet high. These figures, carved half-round are remarkable not only for their "Atlantean" posture but also because of their close resemblance to some of the handsome clay figurines at Tres Zapotes and La Venta. They appear to be males wearing breech clouts and helmet-like head coverings. On the front side of the top of the altar are four rectangular designs which may be parts of conventionalized representations of jaguar eyes (*ibid.*, p. 171 and plate xii).

Another object which may have been an altar or part of one is a large rectangular stone slab found in a ravine at San Lorenzo. On one side a shallow depression was carved, leaving a frame-like border around the sides. The flat surface of the enclosed portion contained six symmetrically-placed depressions in the form of stone celts (votive axes?).

Stirling found what may have been an aqueduct at San Lorenzo. He describes a mass of hollowed-out, tile-shaped stones each measuring about 32 inches long, 15 inches wide and 10 inches high. With them were a number of flat stones of the same length and width, which he thinks were used to cover the others. Since concentrations of these stones appear at three localities stretching over a distance of half a mile he suggests that they were used to convey water, even bridging a ravine to do so (*ibid.*, pp. 159-160 and pl. xiii).

Two other types of monuments were found. One was a spherical stone in circumference about 36.6 inches in diameter reminiscent of Monument 3 at Cerro de las Mesas (Stirling, 1943 a, p. 45, pl. 30 d), and one of those recently discovered in Costa Rica. In the deepest level of the river bank excavations near Tenochtitlan were two granite columns 14 feet long and 2 feet in diameter. This is the first mention of granite columns in this area.

From stratigraphic evidence there appear to have been at least two distinct cultural manifestations at the large site of San Lorenzo Tenochtitlan. This view is corroborated by the fact that all but one (the jaguar on the human figure in Tenochtitlan) were removed from their original positions, usually rolled down into ravines and battered. These ravines had apparently cut through the site after it had begun to be occupied. None of the monuments stood in relation to mounds or mound groups as they did at La Venta and Tres Zapotes. Another feature that all three sites have in common is an iconoclastic mutilation of the stone monuments. This does not necessarily mean that the iconoclasts were all the same people nor that they lived at the sites after they had done their vandalism. La Venta seems to have been occupied only once for a period long enough to accumulate 9 feet of debris, yet the monuments there are all battered. In Upper Tres Zapotes an influx of new traits appear pointing to the valley of Mexico Teotihuacan III Culture. This could mean that the people at Tres Zapotes were overrun and mingled with their conquerors who destroyed their captives'

works of religious (?) art. Even though the evidence indicates that La Venta was probably no longer occupied at this time, the supposed conquerors may have gone down there and wreaked havoc on the abandoned site.

It is not, however, necessary to postulate invasion from outside peoples. In the first place we do not know when the monuments were battered. Secondly, internal revolt among the inhabitants could be postulated. That would make it somewhat easier to explain why La Venta monuments were mutilated also. An argument against the internal revolt theory is that we know that strong new influences did come in at Tres Zapotes. San Lorenzo Tenochtitlan was probably contemporary with La Venta and therefore with Middle Tres Zapotes, as evidenced by the colossal heads, the stone altar and perhaps the stone columns.

Cerro de las Mesas is another site which shows some Olmec influences. Drucker does not consider it an Olmec site. It is affiliated with Tres Zapotes in that they have in common certain widespread Pre-Classic ceramic traits. He indicates that the bulk of Cerro de las Mesas culture—pottery, figurines, jade-carvings and stelae, “represent transplantations of Highland patterns” (1947, p. 7).

Extent of Olmec Traits

Much has been written on the Olmec problem, especially since the round table conference in 1942 (see: *Mayas y Olmecas*, 1942). This was held for the express purpose of examining the archaeology, physical anthropology, linguistics, ethnography, and history of the region. The meeting was held while stratigraphic excavation was still being carried on at La Venta.

Since at that time La Venta was believed to represent the purest manifestation of “Olmec” culture, the conference decided that the name should be changed to “La Venta Culture”. Apparently not all were in accord, for Covarrubias, the most prolific writer on the Olmec and their art, prefers to continue the use of “Olmec culture”. Drucker states that

"Olmec", with its "shadowy ethnic connotations", is perhaps not the best choice, but "La Venta Culture" is even worse because it "should more properly be restricted to the particular component or horizon of Olmec culture represented there" (1947, p. 1). Stirling entitled his last (1947) publication on this area "On the Trail of La Venta Man," yet often refers to the Olmecs or to "Olmec Art."

A long list of "La Venta Culture" traits was given at the conference to which Stirling added a number which had not been encountered anywhere but at La Venta. It is not necessary to list all these traits here, since most of them have been given in the site discussions above, while others are not acceptable on the grounds that they are too widespread to be diagnostic of the Olmec phase (e. g., use of jade, clay figurines in Tres Zapotes style, and various types of ear plugs).

Jimenez-Moreno presented to the assemblage an all-inclusive scheme to account for the Olmecs from Pre-historic times to the historic period. The scheme is based on linguistic, historic and legendary evidence and was published in full later the same year (1942 a; 1942 b). He postulates five Olmec periods consisting of Pre-, Proto-, Paleo-, Neo- and Post-Olmec, grouping known and unknown peoples under these various categories.

However, Covarrubias (1946, pp. 122-124) goes even farther than does Jimenez-Moreno in attributing almost all Mexican and Central American prehistory to one or another Olmec stage. While there are in the Jimenez-Moreno and Covarrubias schemes a few points which may be acceptable and eventually verified, for the most part the hypothesis has not been borne out by known facts. In attributing most of Meso-American Pre-Classic and Classic cultures to an Olmec root and stem, the term Olmec is rendered almost meaningless. We are left with a vague regional delineation, not a concise workable concept.

Krickeberg (1950) uses Jimenez-Moreno's framework, but

interprets the known data somewhat more cautiously than the above authors. His use of the term Old Olmec corresponds roughly to what is here called the "Olmec Phase," and his evaluation of the role of the "Old Olmec" in Meso-American pre-history appears to be essentially tenable.

Covarrubias is the unsurpassed expert on Olmec art and many of his interpretations of it can be accepted, but an art style is not synonymous with a culture or a way of life. Several aspects of the problem brought out by him are quite important. One is what he calls perhaps the most characteristic Olmec trait, the drooping mouth. This trait apparently originated at our postulated culture center of Tres Zapotes-La Venta. However, it was one of the traits which persisted longest in Meso-America, probably in conjunction with a jaguar cult which may also have had its beginnings at the culture center in southern Veracruz and Tabasco.

Another suggestion by Covarrubias is that the Olmec phase can possibly be divided into sub-periods which may correspond to the three periods at Tres Zapotes. When we know more about San Lorenzo Tenochtitlan, we can work it into the scheme. Certainly part of the occupation of that site corresponds to the La Venta-Middle Tres Zapotes period.

With regard to contemporary relationships outside our area there are first of all certain relationships with the early periods of Uaxactun, Guatemala. In comparing ceramics of Lower Tres Zapotes to Mamom, Drucker (1943, p. 118) finds parallels in punctate faces on olla necks and small whistles in the form of birds with loops on the back of the heads for suspension. In figurines he points out certain resemblances to some at Uaxactun and even to Kaminaljuyu in the Highlands of Guatemala, from which came "figurines similar in form to Tres Zapotes B and E subtypes" (p. 119). It is interesting to note that punctated nipples and navels are among the figurine body features from La Venta (Drucker, 1947, pl. 6 d, e, f) a feature of some Uaxactun figurines (Ricketson and Ricketson, 1937, pl. 70, a-c, e, g-w). Drucker says that "it can scarcely be doubted that we are dealing

with a single monochrome handmade figurine complex that extended from the Peten to (at least) southern Veracruz."

There are some resemblances between Lower Tres Zapotes and the Tampico-Panuco area in that they both show some relations to Mamom-Chicanel pottery. From Tampico-Panuco comes a ware called El Prisco Black (Ekholm, 1944) which is somewhat similar to Chicanel redware, while according to Robert Smith, the early Tres Zapotes monochrome pottery is even more closely related to Chicanel than is El Prisco Black. Ekholm makes Lower Tres Zapotes equivalent to his Period I at the Pavon site of Panuco on the basis of pottery, while in figurine types there is closer correlation of his Period II with Lower Tres Zapotes. This is because of the great similarity of Panuco type A to Tres Zapotes type A figurines (*ibid.*, pp. 445-446). Later contact between the two sites is not indicated for the respective figurine types diverge greatly.

Quite significant is the fact that Vaillant's type D figurine bodies (bulbous thighs, stubby arms) occur prominently at Tlatilco in the Valley of Mexico, and in Period II at the Pavon site at Panuco. There are also certain similarities between Tlatilco and the Olmec sites. Two figurines found at Tlatilco tie this site in with the Olmec phase (Covarrubias, 1943, p. 43).

As for the La Venta-Middle Tres Zapotes periods, Drucker suggests that because there are no Highland influences at La Venta perhaps that period lasted somewhat longer at the latter site than it did at Tres Zapotes. He speaks of a rough equation of this period with the Tzakol (early Classic) period in the Lowland Maya region of Guatemala. Kidder (1948, p. 343) agreed with Drucker, but he admits now (personal communication) that in view of radiocarbon dates at Tlatilco, the estimates of the age of La Venta and Middle Tres Zapotes may have to be revised downward.

Olmec traits which have been neglected so far in this paper are the carved jade figurines of crying babies, bold nude humans, dwarfs and deformed people. Their wide dis-

tribution points, I believe, not to a farflung Olmec culture, but rather to the fact that these beautiful little statuettes would have an esthetic value to almost anyone. Therefore their presence in later sites does not appear to be particularly significant. A polished stone figurine probably of an Olmec type has been found as far north as Baffin Bay on the Texas Coast (personal communication, Alex D. Krieger). Another comes from as far south as Guanacaste, Costa Rica (Lines, 1942; Covarrubias, 1946a, fig. 18). Since at least 10 handsome examples occur at La Venta (Stirling, 1942, pl. 1; 1943 b, pl. IV) they can truly be considered as Olmec. This is also true of votive axes which often bear conventionalized jaguar features (Stirling, 1943 b, pls. I, IV). As for jade working, Kidder (1946, pp. 104 ff) has shown that this art was widespread throughout Meso-America at a fairly early date.

Drucker's comments on diagnostic Olmec traits (1947, pp. 6-7) are important. He points out that "attempts have been made to delimit the Olmec area on the basis of the distribution of finds of Olmec figurines, particularly those of jade, but objects so portable are less trustworthy markers of culture than such things as stone monuments in the characteristic art style, ceramic complexes and patterns of mound construction."

Fairly certain evidence of the presence of Olmec phase people in an area are stone carvings which are on native rock or stones too large to be readily moved. We have such an example in the Highlands of Central Mexico in the state of Morelos where the site of Chalcacingo has a series of bas-reliefs with pronounced Olmec features (Covarrubias, 1946 a, p. 171 drawing; Drucker, 1947, p. 8 notation). A petroglyph carving apparently executed by an Olmec artist has been found on a boulder at San Isidro Piedra Parada, Quetzaltenango, Guatemala (Thompson, 1943, p. 104, 111a, photo; Covarrubias, 1946 a, drawing). Olmec artisans apparently got down as far as Chalchuapa, El Salvador, where, in the Las Victorias group, are a series of petroglyphs also on large

immovable rocks in good Olmec style (Boggs, 1950). All of these probably represent wanderings, visits or trading trips by Olmec people, since it has not been established that there is a true Olmec site outside of the southern Veracruz-Tabasco area.

Summary and Conclusions

Using the criteria of architecture, stone monuments, ceramics, figurines, and to some extent jade carvings, we can state that there existed at three sites in the Papaloapan-Coatzacoalcos-Tonala drainages of southern Veracruz and Tabasco a well integrated culture complex which we call the Olmec phase. These three components, Tres Zapotes, La Venta and San Lorenzo Tenochtitlan suggest a fairly long history within the Pre-Classic stage, which lasted perhaps into the Classic. There are apparently three subdivisions of the Olmec phase, based on the ceramic stratigraphy at Tres Zapotes. The two earliest developed on a Pre-Classic base with little or no outside influence, but the third period shows indications of strong influences from the Classic culture of Teotihuacan and may equate in time also to the Tzakol or Classic Maya period.

Knowledge of the area under consideration is too scant to postulate any reasons for the presence, rise or decline of the Olmec phase culture. A number of Olmec traits persisted into much later periods. Among these were large earth mounds, monumental stone carving, drooping-mouth-jaguar motif and perhaps some skill in jade carving. Traits which they developed but which did not pass out of their area were: realistic carving of colossal stone heads, use of columnar basalt for enclosures and tombs, and serpentine mosaic floors. Apparently developed by the Olmec and persisting for some time afterward but probably not into late Classic times, was the manufacture of small human figurines representing crying-babies, jaguars, dwarfs and deformed people. Also in this category are the small votive axes.

The carriers of the Olmec phase culture were a dynamic,

resourceful and technically capable people who for a time excelled their immediate neighbors, and left very significant influences on the cultures which followed.

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BAE-B—Bureau of American Ethnology, Bulletin.

CA—Cuadernos Americanos.

CIP—Carnegie Institution of Washington, Publications.

NGM—National Geographic Magazine.

SAA-M—Society for American Archaeology, Memoirs.

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THE AGE OF THE MELBOURNE INTERVAL*

IRVING ROUSE

In a recently published monograph on the archaeology of the Indian River region in eastern Florida (Rouse, 1951, pp. 21-34), the writer had occasion to define the following sequence of ecological periods:

1. **Anastasia Interval.** The sea covered the Indian River area, causing the accumulation of a layer of sea shells known as the Anastasia Formation.

2. **Anastasia-Melbourne Interval.** The sea fell and erosion took place, producing an unconformity at the top of the Anastasia Formation.

3. **Melbourne Interval.** The sea again rose, although not to such an extent as to cover the Indian River area, and a second cycle of deposition ensued. Authorities differ as to the setting: fresh water marshes and/or areas partially inundated by the sea. In any case, various land mammals became trapped in the deposits to such an extent that it is now known as the Melbourne bone bed.

4. **Melbourne-Van Valkenburg Interval.** Another fall in the sea level led to a second period of erosion and to an unconformity on top of the Melbourne Formation.

5. **Van Valkenburg Interval.** Most recently, the sea and, inland, the water table have been rising; both salt- and fresh-water marshes have formed; and deposition is once more taking place in them.

It is generally agreed that the first two of these intervals are interglacial and glacial respectively and the last two, postglacial. On the other hand, the intervening Melbourne Interval is the subject of much controversy, some authors believing that it, too, was interglacial; others, that it dates from a recession during the last glacial period; and still others, that it may be postglacial (cf. Hay, 1923, pp. 381-3; Gross, 1951, p. 116; and Rouse, 1951, pp. 31, 33). Simpson (1929, p. 262) perhaps best stated the case when he said that its age is "very dubious."

*Contribution from the Caribbean Anthropological Program of the Yale Peabody Museum. The support of this program by the Wenner-Gren Foundation for Anthropological Research, Inc. is acknowledged, and I also wish to express my appreciation to Alex D. Krieger for his advice and for suggesting that I write this article.

Since our monograph was primarily concerned with archaeology and none of the archaeological material then known seemed to date back as far as the Melbourne Interval,¹ we devoted relatively little space to the controversy concerning the age of that interval. However, new material has since been obtained which indicates that man may actually have been present when the Melbourne Formation was laid down,² and therefore it will perhaps be worthwhile to review the various possible hypotheses concerning its age.

The difficulty in dating the Melbourne Interval arises from the fact that there are two main lines of approach to the problem, each of which leads to a different solution. One approach is based upon the nature of the mammalian fauna, which includes such characteristically interglacial animals as the Columbian elephant, mastadon, horse, and sloth. The presence of these mammals led Hay (1923, pp. 381-3), for example, to place the Melbourne Formation in the Second Interglacial (Yarmouth).

The other approach is based upon the nature of the sea-level changes. These happen to be particularly well recorded in the stratigraphy of the Indian River area because the region is low and flat, so that its drainage was affected to a maximum extent by each rise and fall in the level of the sea. Geologists (e.g., Parker, 1945, p. 21) have concluded that the level of the land in the area has not changed since mid-glacial time. Hence, the rise in the level of the sea during the Melbourne Interval must have been purely eustatic, and its level can be compared with that in other areas of purely eustatic change, such as southern England, where it has been possible to date the various levels of the sea. Applying the dates for southern England to the Indian River succession of levels, we have come to the conclusion that the Melbourne Interval must have been in existence during Early and

1. In the writer's opinion, the remains of the so-called Vero and Melbourne Man, which have been found in the Melbourne Formation, are intrusive.

2. William E. Edwards, of Columbia University and the Florida Geological Survey, has discovered a new type of material which may well be contemporaneous with the Melbourne Formation. Edwards' material is unpublished, and therefore can not be discussed here.

Middle Postglacial times, i.e., during the Anathermal and Altithermal (postglacial optimum), to use Antevs' terms (Rouse, 1951, p. 31; Antevs, 1948, pp. 7-15).

We have, then, a marked discrepancy. The vertebrate fauna indicates an interglacial date, whereas the level of the sea points to postglacial time. No other fruitful line of approach has yet been found. The flora and invertebrate fauna are not diagnostic, and we have too little evidence on the climate and human associations to be able to draw any conclusions from them (Rouse, 1951, pp. 31-2). We are only able, therefore, to suggest possible solutions to this problem.

One solution would be to modify the sea-level chronology. This was the approach followed by Gross (1951, p. 116) when he wrote in the last issue of this *Bulletin*, without giving reasons, that the level of the sea during the Melbourne Interval "argues . . . in favor of a temperate Wisconsin interstadial . . . (most probably Peorian)." Gross failed, however, to take it into consideration that glacial geologists in this country have generally abandoned the theory of a Peorian recession marked enough to have raised the sea to its level during the Melbourne interval—presumably a little higher than at present (e.g., Antevs, 1948, pp. 2-5; Flint, 1947, pp. 267-76). As we have pointed out (Rouse, 1951, p. 31), there is no reason to believe that the sea, in rising from its Wisconsin low, reached the level of the Melbourne Interval before the Altithermal or postglacial optimum.

An alternative possibility is that the bones of the Melbourne fauna have intruded into their present position from an earlier formation. Cooke (1945, p. 305) made this suggestion with respect to the Vero site, but Sellards (1947, pp. 962-4), who is perhaps the leading authority on the Melbourne Formation, has argued against it and we see no reason to doubt his arguments.

A third possible solution would be to assume that the glacial fauna survived longer on the Florida peninsula than

elsewhere, owing, perhaps, to its peripheral position relative to the North American land mass. This has been our preferred solution. Gross (*op. cit.*), on the other hand, has rejected it, apparently because he finds it inconceivable that such a survival could have taken place, although to us it seems not incomparable with the known survival of the sloth in Cuba and Hispaniola until proto-historic time (*e.g.*, Aguayo, 1950).

This third solution could perhaps be made more palatable if we were to suppose that the bones were laid down in the Melbourne bed only while the sea was rising to its Altithermal peak, and not after it had begun to fall from that peak, as Gross (*op. cit.*) assumed when he stated that the theory of survival requires the Melbourne fauna to have persisted "up to about 1800 B. C." (or rather, 2000 B. C.; Gross cited our preliminary estimate instead of our final date: Rouse, 1951, p. 262). Indeed, if it is true that the animals became mired in marshes, their extinction may well have been due to the growth of the marshes as the result of the rise in sea level during the first half of the Melbourne Interval.

In other words, the age of the Melbourne Formation, as indicated by its extinct fauna, may not have coincided with that of the Melbourne Interval, defined in terms of sea-level changes. This seems to us to be the most plausible means of reconciling the discrepancy between the paleontological and sea-level chronologies. If the Melbourne fauna did survive only during the first part of the Melbourne Interval, *i.e.*, during the Anathermal and the beginning of the Altithermal, we might suggest a date of about 4000 B. C. for its extinction, using Antevs' latest estimate as to the age of the Altithermal (Antevs, 1952, Chart 1).

The Melbourne Interval would then be somewhat later. In this connection, it is perhaps worth citing several radiocarbon dates which have appeared since our monograph was published and which give some idea of both the beginning and the end of the Melbourne Interval. One is the date for the Mankato substage in the Wisconsin glaciation, which

Flint and Deevey (1951, pp. 261-9) give as ca. 9000 B. C. Since the Mankato should correlate with our Anastasia-Melbourne Interval, this provides an upper limit for the succeeding Melbourne Interval. As for the lower limit, we may cite a series of radiocarbon determinations for the Archaic cultural horizon in the eastern United States, which cluster around 3000 B. C. (Libby, 1952, pp. 77-8). Since the Archaic horizon is correlated in the Indian River area with the Melbourne-Van Valkenburg Interval, following the Melbourne, it would appear that the latter ended about 3000 B. C.

This closing date is somewhat earlier than our previous estimate of 2000 B. C. and it similarly fails to agree with Antevs' latest estimate of 2000 B. C. for the end of the Altithermal (Antevs, 1952, Chart 1). In addition, we might note that Flint, after surveying the Pleistocene radiocarbon dates, has arrived at a tentative estimate of 1500 to 2000 B. C. for the Cochrane substage of the Wisconsin glaciation in the Great Lakes area, following the postglacial optimum.³ Since the Cochrane stage should have been contemporaneous with the low sea level of the Melbourne-Van Valkenburg Interval, Flint's estimate, too, may be taken to indicate a somewhat later closing time for the Melbourne Interval than is suggested by the radiocarbon dates for the Archaic horizon. As a result, we are inclined to retain our original estimate of 2000 B. C. for the end of the Melbourne Interval.

To summarize, we have suggested that the Melbourne Formation may have been laid down only during the first part of the Melbourne Interval, *i.e.*, during the Anathermal and first half of the Altithermal or postglacial optimum. If this is so, the Melbourne fauna probably became extinct about 4000 B. C. The Melbourne Interval, on the contrary, probably lasted through both the Anathermal and Altithermal, *i.e.*, from about 9000 to 2000 B. C. It should be stressed that these dates are largely hypothetical and that much

3. Flint, personal communication. See also Kenneth P. Oakley in Tax, Eiseley, Rouse, and Voegelin, 1952, Chapt. 2, Sec. 4. Antevs (*op. cit.*), on the contrary, places the Cochrane before the post-glacial optimum.

work needs to be done before they can be safely accepted. The most that can be said for them is that they seem to provide the best means of reconciling the discrepancy between the chronologies based upon fauna and sea-level changes.

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KARL SCHMITT,

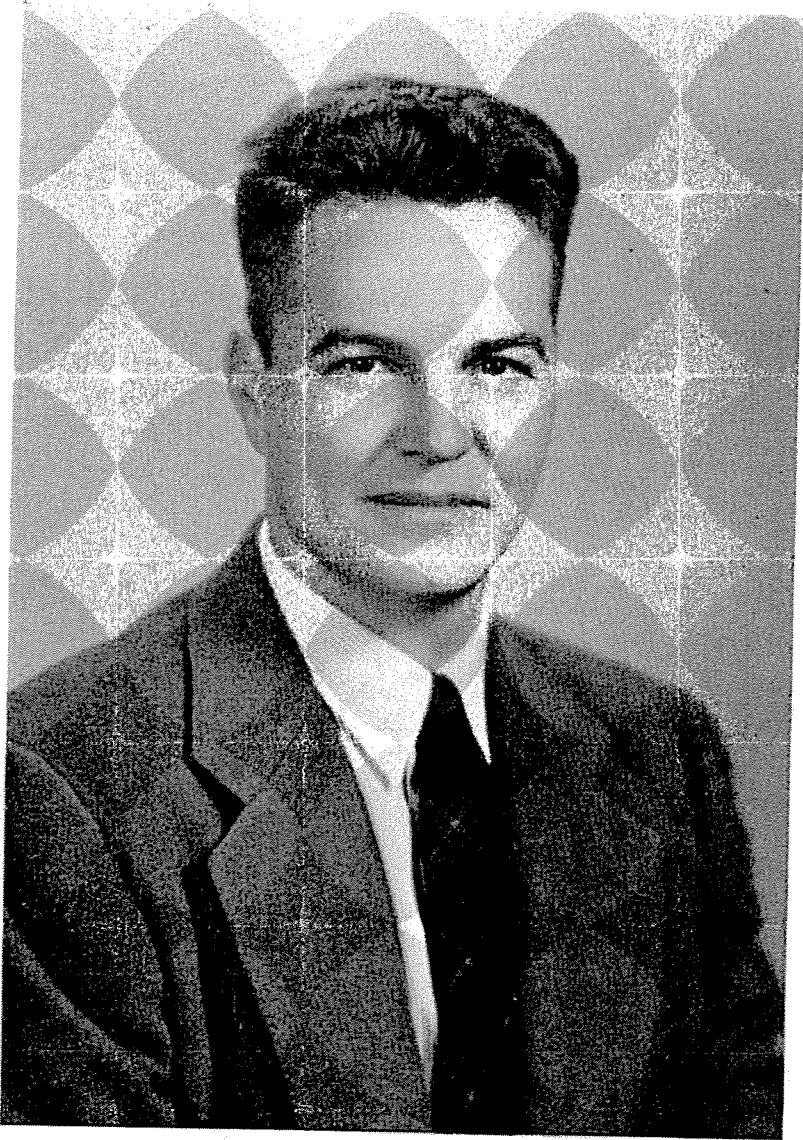
1915-1952

It will be a long time before the members of our Society, and anthropologists everywhere, recover from the shock of Karl's tragic death at Magdalena, New Mexico, on August 6. On a vacation tour with Iva and the two children, they had spent two days at the archaeological camp of our Editor, Curry Holden, then another two days at a camp supervised by Jane Holden near Corona, New Mexico. Then, at Magdalena, a few hours after leaving the latter camp, their car was struck by a train, which suddenly backed up without warning. Iva received a fractured hip from which she is now recovered, and the children fortunately escaped entirely.

To those who knew Karl it is hardly necessary to attempt an expression of the intense affection and admiration we felt for him. A big, hearty, spirited man, he attacked a host of archaeological and ethnological problems with unbounded enthusiasm. Coming to the Department of Anthropology at the University of Oklahoma in 1947, Karl embarked upon many projects: excavations in southern Oklahoma, and studies of the modern Caddo and Wichita Indians, their history, ethnology, music, dances, ceremonies, and mythology, not to mention their many personal problems of relationships with white civilization. To each of the Indians they met, men, women, and children, Karl and Iva became close friends, not only as scientists, but as warm and understanding human beings.

We learn that Iva has been offered Karl's position at the University of Oklahoma. To her we extend our deep sympathies and wish her every success in carrying on.

ALEX KRIEGER.



Karl Schmitt

NEWS NOTES AND EDITORIALS

THE 1951 ANNUAL MEETING

The twenty-fourth annual meeting of the Society was held in Junior College auditorium at San Angelo on October 27, 1951. On the evening before, Judge and Mrs. O. L. Sims and Mr. and Mrs. Harry E. Weaver entertained approximately eighty members and guests of the Society with a dinner at the Weaver's ranch home twenty miles north of San Angelo. The evening was most convivial and will long be remembered.

The following papers were presented:

Dr. Robert E. Bell, "Excavations in the Tenkiller Reservoir, Cherokee County, Oklahoma."

Charles Proctor, "Exploration in the Enfoula Reservoir, Eastern Oklahoma."

Dr. Karl Schmitt, "Wichita and Caddo Burial Customs."

Dr. Tom N. Campbell, "The Rockport Focus."

Edward Jelks, "The Towash Indians and the Stansbury Site."

Jane Holden, "A Further Report on the Bonnell Site."

Dr. E. H. Sellards, "Recent Evidence Concerning the Age of Folsolm Man."

Glen Evans, "Archaeological Problems in the Dune Belts of the High Plains."

Dr. Erik Reed, "The Historic Range of the American Bison."

Alex Krieger, "North American Archaeology in the Light of Radiocarbon Datings."

Dr. Cyrus N. Ray, "Two Mineralized Skulls from Texas."

R. B. Worthington, "Houston Area Archaeology."

THREE SITES NEAR BAYTOWN

On May 26, 1952, Mr. W. L. Atwood of 501 Ruth Street, Baytown, Texas, wrote us as follows (see Figure 19 for locations):

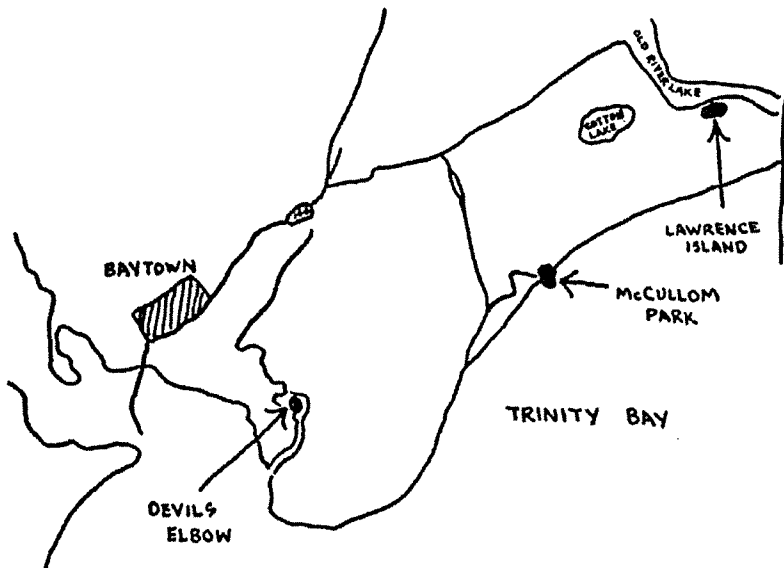
"I am attaching a section of a map covering three sites in east Harris and Chambers counties. The material sent from Devil's Elbow came from an old midden which is believed to have been occupied by an Atakapan tribe, perhaps the Bidai. The Arkrokisi pottery is a little different, being somewhat thinner, rarely incised, but usually with a scalloped decoration on the top of the rim.

You will notice on the map that an old county road goes right through the bend marked "Devil's Elbow." This road has since been abandoned and the ferry is no longer in use, traffic now going over a bascule bridge at the mouth of Cedar Bayou. On the west bank of Cedar Bayou stream, starting at the bascule bridge, are pre-historic mounds and midden representing a long period of time.

The first begins at the bridge, with a shell midden two or three feet in thickness. I have failed to find a single piece of pottery at this location and am of the opinion that it represents a pre-pottery occupation. A few unidentified bones found there were in a rotten condition.

A little to the north of Ash Lake is an old shell midden, with some pottery known as Goose Creek Plain and Incised. This site is later than the one near the bridge, but earlier than one located on the point of land shown protruding out into Iajms Lake. This point contains an artificial mound about six feet in height and probably 60 x 100 feet, shaped somewhat like a fish, with the soil from borrow pit removed in such manner as to form a moat. It has been quite interesting to study the method of construction of this mound, as there were baskets of clay carried to the site and dumped into the fill, leaving the imprints of large leaves around the individual loads. In some cases instead of leaf mold around the clay, it was a thin layer of lime. I finally decided the clay was being dug from a wet place and the leaves were used to line their baskets, with the whole business thrown into the mound. At first I could not account for the lime and thought it could have been caused by feathers of some sort. I finally came to the conclusion that garpike skins were used, and when rotted would leave a small amount of powdered lime around the clay. The reinforcing was rattan vines and these became silicitized and retained their original shape.

Projectile points were fashioned from bone in a few instances, but garpike scales were the usual type of point used, with some kind of fish bone that may have been used. The only type of rock material found at this site was a hoe and shovel fashioned from



Baytown Area Sites.

FIGURE 19

sandstone, an occasional axe from the same material, and one diamond shaped object, about 4" long, with one edge ground to a point. This object was made from the same kind of sandstone and could have been used to saw bones. This object was shaped like knives found in Oklahoma but the edge was not sharp enough for that purpose. I believe the hoe and shovel were used in constructing the mound. I was surprised that no artifacts fashioned from hematite were found here, nor was there any burnt pieces showing that it had been used in making a red pigment for warpaint or decorating pottery. There is a type of red clay at the site which leaves a very good wash on pottery and it may have been used for paint as well. I did not find a single piece of flint of any kind. There was evidence to show that clam and oyster shells were used as scrapers, and some of the refuse found in such scrapers were fishbones and small pieces of birdbones, probably wild pigeons. Pieces of tortoise and turtle shells were common, deer bones were plentiful and there was an occasional bone of a larger animal, perhaps a bison. Sharpened bear claws were occasionally found and were probably used for some purpose by the inhabitants. At the top of the midden some glass was found showing that they had come in contact with Europeans. An old oak tree at the site has markings of a striking adder coming down the tree, and I have been told this marking may have been put there by early Spanish explorers, perhaps of the 16th century. The pottery type found here is the same as that sent you last year.

At the Devil's Elbow site there is an old midden which fails to show any evidence of contact with European people. The pottery and other artifacts are about the same as mentioned above, although no agricultural implements have been found. Some of the pottery decorations are much on the same order as that found in Louisiana and known as Harrison Bayou.

Here comes the interesting part of this site. Professors and students from the University of Houston have been here a number of times, a road has been cut through the center of upper part of the mound, exposing large amounts of pottery, bones, shell, etc., only a few months ago was it discovered that the entire midden was located on the side of a large artificial mound, which may be the largest in Texas. The mound is 688 feet in length, 360 feet in width at the east end and somewhat less at the west end. The maximum height before the road was cut through there was approximately 15 feet.

I kept finding traces of a type of pottery similar to Deasonville 11:111:14 but could not find the midden representing the people who made this. Finally I decided to look for a Deasonville type of mound, and then the problem was easily solved. I have dug into the mound and found the pottery where it had been used with other refuse in filling in a trench containing cedar posts. These were found at a level about six feet beneath the surface of the mound prior to its disturbance by road construction workers. Beneath these post molds were a circular wall, which must have been a village site prior to the construction of the mound. The wall was circular in appearance, and probably constructed by wattle and daub. The thickness was rather uniform, and all that is left is a dark layer of soil about three inches in thickness, with clay and sand on each side of it. I estimate that 56,000 yards of soil

was used in constructing this mound. I dug to a depth of 10½ feet at the east end of it, and this showed that it was constructed by stages. I believe that there were originally two circular mounds, and these were later joined together by a plaza.

A little farther up the Bayou there are a couple of pencil marks. The first represents a circular mound, perhaps 150 feet in diameter and eight or ten feet in height. I have never made any kind of excavation or borings at this site, nor have I observed any shells or artifacts near there. I don't believe Indians ever lived there and it was undoubtedly used as a burial mound.

The only reason I have to state that it was an artificial mound is the large quantity of sand found at the site. Normally the soil near the top along the Bayou is a black gumbo. But in the construction of such mounds the natives dug soil from a site where it was easy to get with their crude tools. Naturally sand was easy to dig up and fill their baskets. Even today there is a distinct difference from the type of topsoil found on these mounds from that found on natural formations nearby. This makes it quite easy to determine if a mound is a natural formation or was constructed by humans.

A part of the site is below sea level. (See Figure 19.) It can be found protruding from the banks of Cedar Bayou stream when the wind is from the north and the tide quite low. About five feet of topsoil covers the site. I think this represents a period co-eval to the Tchefuncte period of Louisiana. A little distance from the bank is evidence of a small mound, which may be a burial location.

The place marked Lawrence Island is rich in cultural refuse, human burials, etc. About 15 or 20 years ago the University of Texas removed some skeletons from this site, but the owner of the land objected to further explorations. An oil company is to drill a well on the island, and it will be necessary to excavate a channel through the march to carry material to the site. This is land representing a large amount of cultural refuse, and it has accumulated over a period of many centuries.

The site marked "McCullom Park" is interesting from the standpoint of the amount of clam shells that have accumulated there. It is located on the A. B. Lawrence property and Chambers County road employees have been removing clam shells from a large shell midden there. This site probably represents the terminus of the Bidai trail. Potsherds found there show a variety of types, including one which I believe to be Tchefuncte Red Filled. The artifacts found there were turned over to Dr. R. A. Shearer, at Mont Belvieu, Texas. I visited Dr. Shearer last Saturday and he stated that they had given him about 100 pieces of pottery and a number of bones taken from the site. He stated the workers told him the pottery had come from all levels. The amount of pottery found at this site is surprisingly small considering the amount of material that has been hauled away. Shell in varying depths is to be found over an area about 800 yards wide by three miles in length. The lower level of the shell fails to show bones of any kind but an occasional piece of pottery is found. I sent what I found at the site to Dr. T. N. Campbell, and am sending you all that I found on my last visit to the site. They are prob-

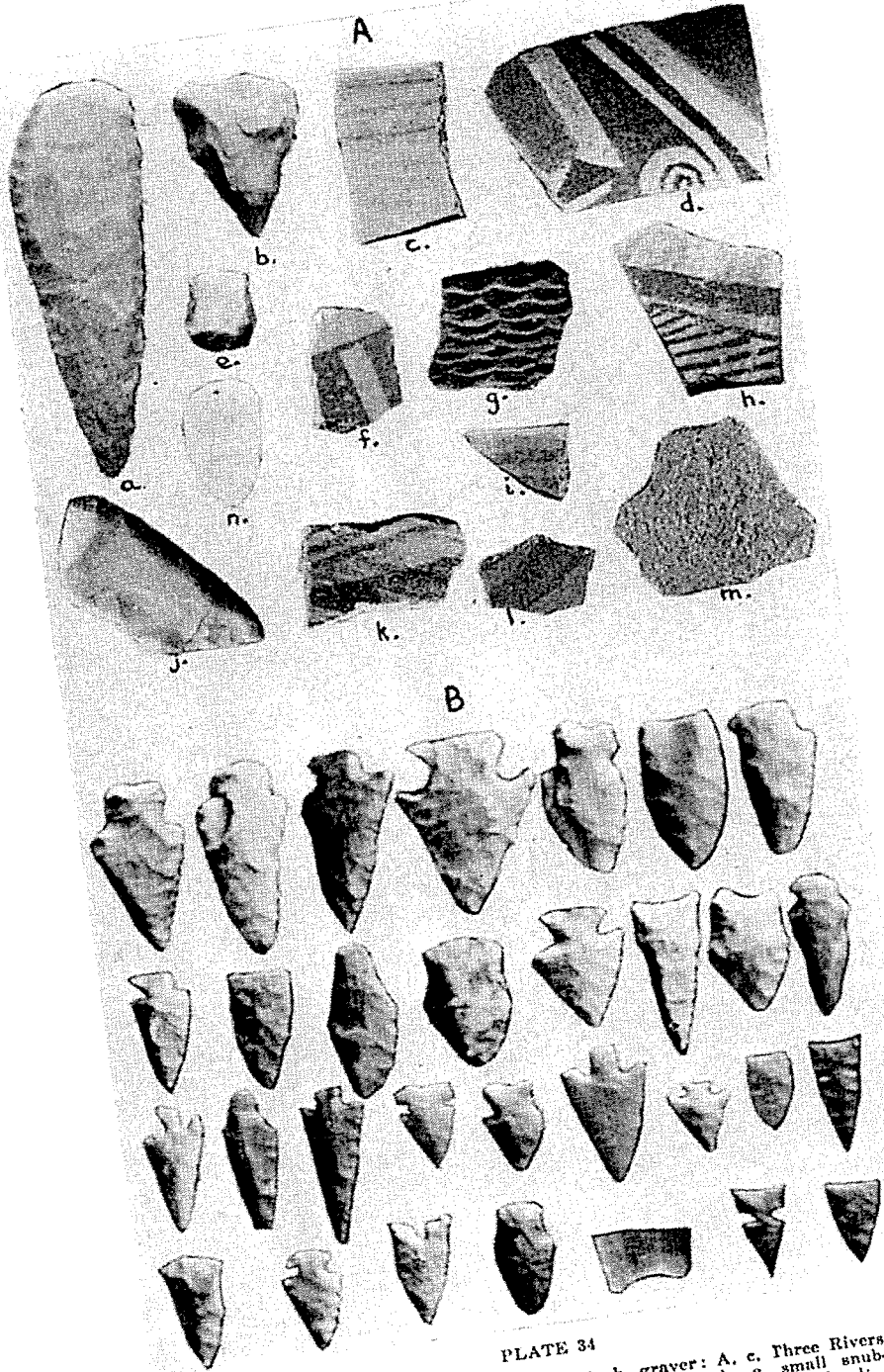


PLATE 34
 Mound Lake Site Artifacts. A. a, knife; A. b, graver; A. c, Three Rivers Red-on-terracotta potsherd; A. d, Gila Polychrome potsherd; A. e, small snub-nosed scraper; A. f, Rio Grande Glaze I potsherd; A. g, corrugated potsherd; A. h, Chupadero Black-on-white potsherd; A. i, Lincoln Black-on-red potsherd; A. j, side scraper; A. k, unidentified potsherd; A. l, El Paso Polychrome potsherd; A. m, Plain brown potsherd; A. n, Glycemeris pendant. B. projectile point types from Mound Lake Site.

ably too small to be of any value, but you might want to look them over and could possibly identify some of them. You may retain them or throw away if of no value.

I would like to see the State obtain some of this property along the banks of Cedar Bayou and keep these mounds, middens and an old corn-field as a State Park. Such locations that have not been disturbed by farming are getting rather scarce."

THE MOUND LAKE SITE

A surface site was discovered by the Carr Austin family of Brownfield, Texas, 14 miles northeast of Brownfield near Mound Lake, an alkaline body of water known to the Spaniards as Lake Umbilico because of its shape. Located on the Frank Roberts Z-Ranch in Lynn County, the site covers some two acres of a rising on the northwest side of the lake. There is no evidence of house structures. The lake is surrounded by sandy fields such as the one on which the site is located, so that frequent blowouts reveal new artifacts.

The artifacts collected by the Austins were donated to The Museum, Texas Technological College, Lubbock, Texas, and the following inventory made:

Flint Artifacts:

- 265 projectile points
- 191 broken projectile points
- 65 snub-nosed scrapers
- 98 side scrapers
- 52 knives (only two complete)
- 6 gravers

Stone Artifacts:

- 1 hammerstone
- 1 mano
- 5 grinding stones

Shell Artifacts:

- 1 *Glycemeris* pendant.
- 5 broken pieces

The pottery collection consists of 386 sherds. The percentage cannot be accurate in a surface site, but the sherds were so numerous at this site as to warrant mention.

Type	No.	Percentage
Brownware—		
(El Paso, Jornada, Alma Plain, Polished).....	181	46.77
Chupadero Black-on-White.....	110	28.42
Corrugated	40	10.33
Three Rivers Red-on-Terracotta.....	20	5.17
Gila Polychrome.....	17	4.39
Lincoln Black-on-Red.....	12	3.10
Rio Grande Glaze I.....	3	.78
Unclassified	3	.78

The similarities in pot sherds and the types of projectile points lead us to conclude that the people who inhabited such sites as

Bonnell, near Ruidoso, New Mexico, or Bloom Mound, near Roswell, New Mexico, may have spent their summers on the plains in search of meat for the winter. The Mound Lake Site is typical of many camp sites found in this area and doubtless has been used for centuries as a hunting camp.

NOYCE JENNINGS,

Lubbock, Texas.

THE MORRIS SITE, CHEROKEE COUNTY, OKLAHOMA

Robert E. Bell and Richard H. Frazier have recently published a twenty-page report entitled "Archaeological Discoveries at the Morris Site, Cherokee County, Oklahoma" in the *Chronicles of Oklahoma*, Vol. XXX, Number 2.

THE WHEELER SITE, DALLAS COUNTY, TEXAS

Wilson W. Crook, Jr. has published a paper, "The Wheeler Site: a 3500-Year of Culture in Dallas County, Texas," in the *Field and Laboratory*, Vol. XX, Number 2, April, 1952 (University Press, Southern Methodist University, Dallas).

BOOK REVIEW

The Comanches, Lords of the South Plains. By Ernest Wallace and E. Adamson Hoebel. University of Oklahoma Press, Norman, 1952. Pp. 381, map, photographs, bibliography, index. \$5.00.

This book is number 34 in the Civilization of the American Indian Series of the University of Oklahoma Press and attains the same high level of attractive printing and authentic scholarship of previous volumes. The Comanches have always held a special appeal for students of Southwestern history because these superb horsemen, warriors, and buffalo hunters ranged over enormous areas, sometimes hunting, sometimes raiding frontier settlements of the Spanish and later the Americans, but always defending their homelands against the advancing white man with unmatched bravery and shrewdness. Although most famous for their warfare, this tribe was also a powerful political factor in Southwestern history for over 150 years, entering into successful trade relationships with the Spanish and American settlers, and various alliances with both whites and other Indians. Only when they were outnumbered by 50 to one, decimated by war and smallpox, and brought to the verge of starvation through the destruction of the buffalo, did they finally surrender to life on a reservation in southwestern Oklahoma, in 1875. From a peak population of perhaps 20,000 in 1845, they were reduced to 1,171 in 1910. The number of pure-bloods has continued to decrease, but there are now many mixed-blood Comanches who still continue some of the ancient customs.

Ernest Wallace is Professor of History at Texas Tech College and has spent many years in the study of Comanche history in relation to the general history of the Southwest. Professor Hoebel is chairman of the Department of Anthropology, University of Utah, and is an outstanding authority on the legal codes, mores, and other customs of the Comanches. Both authors are eminently qualified to write the present book and have succeeded in producing a perfectly fascinating account, every page packed with information, and touching virtually every aspect of life of these people. The professional anthropologist will find it the first general source on the Comanches, weaving together information found in scores of special papers. The historian will find much on the movements, treaties, and wars of these people which affected the course of history in New Mexico, Texas, and northern Mexico from 1705 to 1875 and even afterward. And, to those many persons who simply wish to learn more about Indians, it will prove an endless source of interest; they can also expect to have many of their popular ideas about the Comanches uprooted.

It is difficult to choose any particular parts of the book for special consideration in a review. Contrary to my well-known habits, I could not find anything to criticize, and can only extend my sincere recommendation to all to obtain a copy and read it thoroughly. One thing did that strike me forcibly is that a way should be found to encourage public-school teachers in Texas and elsewhere to utilize such books in the teaching of history. While we in the United States boast unceasingly of knowing and teaching the truth, the biased and false information given out on the

American Indians is hardly less than criminal. While quick to praise any modern people for resisting aggression against their nations, we pass off the Indians as unfortunate collections of cruel and murderous savages who had to be exterminated as quickly and thoroughly as possible. Wallace and Hoebel do not, to be sure, even suggest that the Comanches are to be excused for many of their raids for plunder, but they do manage to show with great fairness that both sides had terrible problems of survival. The white man was determined to take the Indians' land and the Indian was just as determined to keep it. Treaties were made and broken by both sides, but in the matter of sincerity the Indian was clearly superior; both sides had men of integrity and honor who were respected by the other. In a sense the wars of the Comanche were one of the irrevocable conflicts of history: they had to happen. The least we can expect in modern history courses is a balanced treatment of events, causes, and blames. For this reason alone *The Comanches* should receive wide reading.

The authors also present valuable data on one of the neglected aspects of Comanche history, namely that the period of open warfare with Texans was preceded by a long period of relatively peaceful relations and trade. The Comanches established a flourishing business of raiding Mexican settlements for horses, mules, and occasionally children, which they sold or bartered to early American and German settlers in Texas, who were only too glad to get them. But it was the greed for more and more land, and a declaration of war against all Indians by the young State of Texas which finally forced the Comanches into the most desperate measures to retain at least part of their hunting grounds—and then the white man proceeded to slaughter the great buffalo herds. What could be expected of any people with pride and fighting ability?

But history is only part of the present book. There are chapters dealing with "Comancheria," the vast range of the tribe in its several divisions, and its geographical features; on "The People," a study of their physical appearance, language, family and band organization, tribal divisions and territories, and population figures; on "The Horse and the Buffalo," including a brief history of the acquisition of horses by Plains Indians, the revolutions brought about by the horse in their economic life, the great herds owned by the Comanches, treatment of the animals and their hunting techniques; on "Food, Clothing, and Dwellings"; "At Work and at Play"; "From Cradle to Grave"; "The Search for Power"; "Cosmogony and Folk Beliefs"; "Government and Law"; "Warfare"; "The Lords of the South Plains"; and "On the Reservation."

All of these subjects are written with consummate skill and ample documentation. A particularly interesting addition is that of photographs of several of the famed Comanche chiefs, and of drawings made in the early 19th century.

ALEX KRIEGER,
University of Texas.

**REPORT OF THE SECRETARY-TREASURER
OF THE TEXAS ARCHEOLOGICAL AND
PALEONTOLOGICAL SOCIETY**

Report for the twenty-fourth year from October 1, 1951
to August 31, 1952.

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Balance on September 30, 1951	\$ 1,228.85
1949 Dues, 1 @ \$3	3.00
1950 Dues, 4 @ \$3	12.00
1951 Dues, 128 @ \$5	640.00
1952 Dues, 12 @ \$5	60.00
Sale of <i>Bulletins</i> , 34 @ \$5	170.00
Sale of Showcases to Texas Tech Museum	700.00
Reimbursement for reprints for Articles in Vol. 22..	171.50
TOTAL RECEIPTS	\$ 2,985.35

DISBURSEMENTS

Abilene Printing & Stationery Co., printing 300 Copies of Vol. 22	\$ 885.20
Abilene Printing & Stationery Co., 1000 7½x10½ envelopes	21.75
Abilene Printing & Stationery Co., 1000 State- ment Forms	9.30
Abilene Printing & Stationery Co., Society Letterhead	18.85
Southwestern Engraving Co., Dallas, for Vol. 22....	238.09
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Postage: Mailing <i>Bulletins</i> @ 8c	\$13.58
Correspondence	10.55
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TOTAL DISBURSEMENTS	\$ 1,204.19

Balance on deposit in the First National Bank, Lubbock, Texas, on August 31, 1952	\$ 1,781.16
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TEXAS ARCHEOLOGICAL SOCIETY

Texas Archeological Society (TAS)

The Texas Archeological Society (TAS) offers a wide range of opportunities for those interested in Texas heritage. The mission of the Society is to promote study, preservation and awareness of Texas archeology. A recent strategic plan calls for the Society to create training opportunities for students, enhance and expand programs, increase and diversify membership, inform the community of their archeological heritage and cultivate and preserve resources. The membership generally numbers around 1400.

The Society calendar begins in October with the Annual Meeting, an event that has taken place since 1929. Archeologists, professional and avocational, get together to share information in research sessions and to hear from nationally renowned luncheon and banquet speakers. Friday is a popular evening for the public forum with high profile speakers and artifact identification. Meetings will be held in Lubbock (08) and Del Rio (09).

Each spring TAS offers sessions of the Texas Archeology Academy. Topics in this series of workshops include Archeology 101 (including a field day), Ceramics: The Stories Pottery Tells, Lithics: Reading Stone Tools, Historic Archeology and Rock Art of Texas. Each Academy features power point presentations, a manual and hands-on activities to reinforce concepts presented. In 2009 sessions will be held in Georgetown, Study Butte, and Lake Jackson. Surveys at the close of sessions reveal that participants greatly value the information imparted during the workshop and the camaraderie of fellow students.

The summer brings a field school that offers an opportunity for folks to contribute to research about Texas archeology. The principal investigator is supported by staff and experienced volunteers. Usually around 300 people participate. Newcomers appreciate an orientation session before joining crews in the field. Survey and lab sessions provide other venues for people who want to learn more about the archeological process. The field school in 2009 will be in the Panhandle near Perryton. We offer scholarships to college students and Native Americans. A youth program instructs around 60 students each year.

Publications of the Society include a journal, the Bulletin of the TAS, a quarterly newsletter and two web sites. www.txarch.org is the organizational web site that relates current programs and opportunities. The other web site is www.texasbeyondhistory.net, a venue that offers information in the form of multi-level exhibits. TAS has been a supporting partner of Texas Beyond History since its inception.

For more information about TAS see www.txarch.org or call 800 377-7240.

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