BULLETIN

OF THE

Texas Archeological and Paleontological Society

VOLUMES 13&14
1941-42

TEXAS
ARCHEOLOGICAL
SOCIETY

2009
REPRINT EDITION

BULLETIN

OF THE

Texas Archaeological and Paleontological Society

VOLUMES 13-14
1941-42

TEXAS
ARCHEOLOGICAL
SOCIETY

2009
REPRINT EDITION

BULLETIN

OF THE

Texas Archeological and Paleontological Society

Volume Thirteen
SEPTEMBER
1941

Published
by the
Society at
Abilene,
Texas

PRINTED IN THE UNITED STATES OF AMERICA

The Texas Archeological and Paleontological Society

OFFICERS

CYRUS N. RAY, *President*
JULIUS OLSEN, *Vice-President*
OTTO O. WATTS, *Secretary-Treasurer*

DIRECTORS

CYRUS N. RAY, D. O.
JULIUS OLSEN, Ph. D., Sc. D.
OTTO O. WATTS, Ph. D.
W. C. HOLDEN, Ph. D.
R. N. RICHARDSON, Ph. D.
C. W. HANLEY

REGIONAL VICE-PRESIDENTS

JUDGE O. L. SIMS ..... Paint Rock, Texas
A. E. ANDERSON ..... Brownsville, Texas
C. L. WEST ..... Hamilton, Texas
VICTOR J. SMITH ..... Alpine, Texas
COL. M. L. CRIMMINS ..... Fort Sam Houston, Texas
FLOYD V. STUDER ..... Amarillo, Texas
FRANK WATT ..... Waco, Texas
FORREST KIRKLAND ..... Dallas, Texas

TRUSTEES

ELLIS SHULER, Ph. D. ..... Dallas, Texas
STEWART COOPER, M. D. ..... Abilene, Texas
PRICE CAMPBELL ..... Abilene, Texas
A. T. JACKSON ..... Austin, Texas
RUSSELL STEPHENS ..... Abilene, Texas

EDITOR

CYRUS N. RAY, D. O.

Foreword

The society was organized and chartered in pursuit of a literary and scientific undertaking; for the study of the history and pre-history and the major and minor 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.

BULLETIN

of the

Texas Archeological and Paleontological Society

TABLE OF CONTENTS

1. Pendants and Their Uses, By A. T. Jackson 9
2. McKenzie Cave and Adjacent Sites in Pecos County, By W. C. Holden 46
3. A Greenstone Head From Travis County, Texas, By Carl Chelf 58
4. Petroglyphs of the Abilene District, By Forrest Kirkland 63
5. Infant Burial in Carrying Basket, By E. B. Sayles 77
6. Pottery Types From the Belcher Mound Site, By C. H. Webb and Monroe Dodd, Jr. 88
7. Certain Vessels From the Clements Place, An Historic Caddo Site, By S. D. Dickinson 117
8. Some Unusual Basketry From the Big Bend, By Victor J. Smith 133
9. Various Types of Clear Fork Gouges, By Cyrus N. Ray 152
10. Reports and Editorials 163
    (1) Some Texas Cave Dweller Artifacts. (2) A Texas Sandia Point. (3) Typographical Error. (4) Two Mistakes Made by the Editor. (5) An Agreement on Abilene Region Terminology. (6) Another Type of Gibson Site Point. (7) The Society Acquires a New Museum Case.
11. Secretary-Treasurer's Report 179
12. Membership List 180

Vol. 13, 1941, Price $3.00

Abilene, Texas

LIST OF ILLUSTRATIONS

PLATE 1 ..... Page 13
Pendants from Texas with single end perforation.

PLATE 2 ..... Page 19
Pendants from Texas with multiple perforations.

PLATE 3 ..... Page 25
Elaborately decorated stone artifacts.

PLATE 4 ..... Page 33
Specimens of pendants having notched edges and incised designs.

PLATE 5 ..... Page 41
Illustration of a probable use of stone pendants.

PLATE 6 ..... Page 47
No. 1, McKenzie Cave. No. 2, Close view of cave. Nos. 3 and 4, Matting from cave. No. 5, Sandals from cave. No. 6, Surface artifacts of cave region.

PLATE 7 ..... Page 51
No. 1, Firesticks, quids and wooden artifacts from McKenzie cave.
Nos. 2 and 3, Two skulls from burials in the region.

PLATE 8 ..... Page 55
Nos. 1 and 2, Specimens of cordage from McKenzie cave.

PLATE 9 ..... Page 59
Greenstone head and other artifacts found with it.

PLATE 10 ..... Page 65
No. 1, Petroglyph designs at Champion Creek site.
No. 2, Scratched designs on Brownsfield shelter.

PLATE 11 ..... Page 69
Designs on shelter west of Ft. Chadbourne.

PLATE 12 ..... Page 73
No. 1, Designs at site west of Ft. Chadbourne.
No. 2, Designs on shelter in western Taylor County.

PLATE 13 ..... Page 79
No. 1, Sink hole shelter. No. 2, Twined carrying basket containing infant burial. No. 3, Desiccated body of infant. No. 4, Rabbit skin blanket. No. 5, Mat of bunch grass.

PLATE 14 ..... Page 83

No. 1, Antelope skin. No. 2, String of olivella shell beads. No. 3, Squirrel skin covered with mat of bird down. No. 4, Bull roarer. No. 5, Prayer sticks. No. 6, Hair twine. No. 7, Human hair. No. 8, Cotton yarn. No. 9, White and brown dog skin. No. 10, Fox skin.

PLATE 15 ..... Page 93

Belcher mound engraved vessels.

PLATE 16 ..... Page 99

Types of Belcher mound engraved vessels. Bottle, effigy, compound and other forms.

PLATE 17 ..... Page 105

Type 2 Foster Trailed Incised, Smithport Plain, Belcher Stamped, and other types of pottery.

PLATE 18 ..... Page 111

Different types of sherds.

PLATE 19 ..... Page 119

No. 1, An engraved water bottle. No. 2, A diminutive bottle with an engraved design based on the scroll.

PLATE 20 ..... Page 123

No. 1, Pot having an angular design done in applique. No. 2, A small bowl having an all-over pattern done in applique.

PLATE 21 ..... Page 127

No. 1, Eccentric form with engraved scroll design. No. 2, Jar with an engraved pattern of two interlocking scrolls. No. 3, Vessel having engraved and applique decoration.

PLATE 22 ..... Page 135

No. 1, Small split stitch basket. No. 2, Plain twined basket with red cordage decorations.

PLATE 23 ..... Page 139

No. 1, Modified cross warp plain twined basket. No. 2, Plain twined sifter type basket.

PLATE 24 ..... Page 143

No. 1, Bag tied with rough cordage in bundle form. No. 2, Contents of bag which was evidently a tool kit.

PLATE 25 ..... Page 147

No. 1, Cordage loop net bag. No. 2, Additional loop cordage bags with open mesh assembly.

PLATE 26 ..... Page 149
Square checker weave basket.

PLATE 27 ..... Page 155
This plate shows pictures of eight of Clear Fork Gouge (1), and seven of Clear Fork Gouge (2).

PLATE 28 ..... Page 159
This plate shows pictures of five of Clear Fork Gouge (3), two of Clear Fork Gouge (4), two of Clear Fork Gouge (5) and two of Clear Fork Gouge (6).

PLATE 29 ..... Page 165
Hafted flints, painted pebbles, and fish hook from Texas caves.

PLATE 30 ..... Page 168
Nos. 1 and 2, Side and occipital views of an unusual skull. No. 3, A Texas point which resembles a Sandia point.

PENDANTS AND THEIR USES

By A. T. Jackson

One hesitates to discuss a class of problematical artifacts about which so much has been written. Jones,[1] Holmes,[2, 3] Fowke,[4] Moore,[5] Peabody, Moorehead,[6, 7] and various other writers have made valuable contributions to the subject of pendants. Apparently, however, further facts are needed which may shed even a small measure of additional light on this hazy subject.

Moorehead in a map accompanying his book on "Stone Ornaments" shows the ovate form of pendant as occurring in only the extreme eastern part of Texas. The gorget form he indicates as reaching only into the northeastern tip of Louisiana and eastern part of Arkansas—missing Texas completely. It, therefore, seems desirable to put on record the fact that these forms occur over a wide area in Texas.

Nomenclature

One of the apparent needs in connection with the study of this subject is a uniform nomenclature. Different writers use dissimilar terms for the same type of specimen. Among those used in the literature are gorgets, shuttle gorgets, pendants, perforated plates, pierced tablets, plaques, pendant ornaments, ovate ornaments and problematical objects.

The names more often applied are gorgets and pendants. In a few cases there seem to have been attempts—though rarely so stated—to apply the word pendant to specimens containing only one perforation, while those with two or more holes are called gorgets. But even this distinction often is ignored; as, for example, when Moorehead[8] speaks of "gorgets or pendants having one hole."

The Handbook of the American Indians[9] states:

* * * "Gorgets may have one or two marginal perforations for suspension, or they may be pierced centrally or otherwise for attachment * * * The name gorget is also applied to composite ornaments of various kinds suspended on or fixed against the chest." * * *

In this paper the meaning of the word gorget has been restricted to include circular, and in rare cases triangular and rectangular specimens that have two or more holes in horizontal line at or near the edge. The term pendant will be used to include oval, triangular

or rectangular specimens—of any material—that have a single perforation, or more than one when in a longitudinal line. When a specimen is broken and has a row of horizontal small perforations along the broken edge, it is assumed that the latter holes were drilled after the breakage occurred. The specimen, therefore, is classed as a pendant and not a gorget. Even with these distinctions an occasional questionable case may arise.

Stone Pendants in Graves

There have been a few cases in Texas where perforated stone pendants were in graves. These discoveries will be reviewed briefly.

Outstanding among such finds are some reported by Ray.[10] In this connection he states in part as follows:

* * * "A rock structure of circular form * * * was found. * * * Below the stones was 1½ feet of hard dry earth filled with small stones. * * * We came to * * * bed rock and apparently projecting out of the center of this were some large rough stones. * * * When these were removed more black earth was found beneath. * * * A round hole three feet across, which had been cut down into the solid bed rock for about a foot in depth, we found * * * to be full of small burned bone and shell fragments. * * * The writer unearthed the largest stone pendant that he ever saw, an oval gray stone pendant, with an hour-glass-shaped hole at one end. It was 5⅛ inches long and slightly over two inches across. * * * The fragments of bones were quite small and fire-blackened, and the finding of two very small milk teeth showed that the cremation was that of a very young child. * * * In addition to the large pendant, there were four other oval stone pendants. * * * A smaller pendant of shell * * * and a shell bead * * * were found." * * *

Among the numerous other artifacts accompanying the burial were fragments of polished bone tubes, quartz pebbles from what may have been rattles, and "three thick, roughly made, stemmed and shouldered flint projectile points"—all of which later may be helpful in placing the burial and the associated pendants in their proper age group.

In writing of another burial Ray[11] says:

* * * "This * * * mound consisted of only one burial slab cist containing one skeleton, * * * the shallowest long-headed flexed cist burial found in the Roberts site. * * * Closely against and on the outside of the two right forearm bones * * * were two artifacts lying flat on the bones and touching each other. One of the artifacts measures 2⅛ inches across and has a hole drilled through its center and dot decora-

tions in one edge. It is concave on the inner side and formed so as to fit one's wrist perfectly. * * * The other object is 1¾ inches long and 1 5/16 inches wide. * * * The surface lying against the wrist was flat and the other surface was rounded." * * *

Dr. Ray kindly sent the two last mentioned specimens to Austin for examination. The one containing the biconically drilled hole is made of a thick section of conch shell, probably *Fulgur perversum.* The convex side, highly polished, shows the remains of a shallow groove extending from the hole to the adjacent broken edge, where there remains on the concave side the edge of another perforation. The unbroken edge of the concave side is bevelled exactly like many shell "celts" from the Texas coast. It seems that when the proximal end of the original implement was broken the specimen was converted into an ornament or possible wrist guard. Still later the ornament was broken through one of its central holes.

The stone specimen, found on the back of the right wrist beside the shell one, apparently is an undrilled fragment of a pendant. Dr. E. H. Sellards identified it as a calcareous stone, and verified the identification of the other specimen as conch shell.

The fact that both specimens are broken, and one has no perforation, suggests that they may have been placed on the wrist, after burial, as ornamental offerings—rather than bracers or wrist guards, which usually were on the left wrist instead of the right. They accompanied a small adult. The bones, in bad condition, perhaps were those of a woman.

The position of these specimens on the wrist is much like that of a bone "gorget" reported by Webb and Dodd[12] from Louisiana, as well as certain shell specimens found by Duffen in South Texas and mentioned elsewhere.

A. C. Stearns and wife report finding a rock-covered burial, on the tip of a narrow high ridge, about 14 miles west of Robert Lee, Coke County. There were three individuals, "one large and the other two much smaller." With one of the smaller skeletons were two stone pendants (Plates I, 4 and III, 1) and a conch shell gorget.

The shell gorget, some 4x3¾ inches and slightly rectangular with rounded corners, was on the right chest. It has two worn holes near

the edge of the narrow end, two other holes near the center and a fifth at the edge of the wide end.

The smaller oval stone pendant, 4½x1½ inches, and without decoration, has a single perforation very near one end. It was at the right wrist. The larger stone pendant, also oval, is 6x2⅛ inches, has three holes in a longitudinal row—two near one end and the other spaced one-third length from the opposite end. It, decorated with carved designs, "was at the center and slightly below the chest."

In June, 1936, Woolsey[13] exhumed several burials at a site near Moran, Shackelford County. In one of these graves was a large undecorated stone pendant in a poor state of preservation and with fragments missing from one edge.

"The grave was located by a pile of rocks scattered over an area eight feet in diameter. Rocks were around and over the body. The skull was covered by a stone 23x17 inches and only eight inches deep. The space occupied by the skeleton was 27x17 inches. The head, badly crushed, was to the south. * * * The teeth were somewhat worn; the legs were flexed with the body on the left side. It seemed to be a small adult, probably a woman.

"On the chest, just below the chin was an artifact made of slate or black shale. It measures about 5½x3½ inches, and has a hole in each end. The wider end, with the smaller perforation, was toward the head; the narrow end, with a larger hole, pointed toward the hips. There were no other artifacts in the grave."

J. J. Howard gives a verbal account of the finding of a "butterfly-shaped" pendant of Ellenberger limestone in a shelter burial on Cave Creek, Coryell County. He reports that a metate was on edge along one side of the grave, with several limestone slabs that formed a cist-like enclosure. A large slab was over the flexed skeleton, which he thinks was that of a young woman. The grave floor was at a depth of about 5½ feet below the surface.

He states that the well worked pendant was on the chest in a horizonal position, slightly beneath the chin, and was broken across

PLATE 1

SPECIMENS WITH SINGLE END PERFORATION

1, Victoria County; 2, Uvalde County; 3, Williamson County; 4, Coke County; 5, Navarro County. No decoration. These specimens apparently would not have lent themselves readily to attachment as atlatl weights. They may have been worn as ornaments. No. 4 was in a grave at the right wrist of a small adult. No. 5 courtesy of Frank H. Watt.

Plate 1

the short axis when found. Despite the old break, the two pieces were together; and five small perforations near each edge of the break suggests that the holes were used in mending the specimen. Any sinew or cord that may have been laced through the small holes, to hold the pieces together, had completely decayed.

Two larger drilled holes, in the approximate center of the ornament, apparently were the first perforations. The break occurred at the edge of one of these holes, and may have resulted from the drilling operations. The stone, with a thickness of scarcely ⅛ inch, has a length of about five inches; wing width of some three inches and a neck width of less than two inches.

Around the neck were many lithospermum seed beads, possibly strung with the pendant. Other artifacts in the grave included two small bone "pins," sharpened at one end and rounded at the other.

Russell[14] reports the finding of a stone pendant, with three perforations, in a grave eight miles west of Belton, Bell County.

"The site is in a very rocky country, on a hillside near an enormous spring. The burial was about 18 inches under the surface and was an accidental find. The three-holer was with eight projectile points, buried with the adult remains of two males. All artifacts were with the skull, over which hillside stones had been placed. * * * Near this same site I found a soapstone gorget about five inches long by two inches wide and very thick, with three holes in it. I also found a piece very similar, but broken across at one of the holes. It originally had three holes."

Unfortunately Russell does not illustrate nor give detailed information concerning the eight projectile points reported from the grave in which the pendant was found.

Shell Ornaments in Graves

For the purpose of showing what may be significant similarities between the uses of stone and shell pendants in graves, a few additional cases of the finding of shell specimens will be briefly mentioned.

Pete Wiseman gives a verbal account of finding, in 1933, a shell disc on the chest of a skeleton in a grave on Owl Creek, some 16 miles north of Belton, Bell County. The center of the disc is cut away, leaving a circular hole about ½ inch in diameter. There

are seven shallow dots or punctations forming a line across the disc—which is scarcely two inches in diameter. There are no perforations other than the large central hole.

Wheat[15] reports the finding of a large abalone shell pendant associated with a bundle burial of a woman and a child in a small shelter, some 16 miles southeast of Lubbock.

E. D. Smith verbally states that several years ago he found a triangular shell pendant in a grave one mile west of New Braunfels, Comal County. The specimen, 4 3/10 inches long, has a drilled hole near the edge in each end. The ornament was on the chest of an adult.

In burial M-1 at the Oso site,[16] Nueces County, were eight small triangular shell pendants. They were just to the south and partly beneath the skull. The sizes of the specimens range from 1⅜"x1" to 1 13/16"x1⅛". The edges are covered with many small notches. There is a single perforation in the small end of each specimen.

In a child's grave in Val Verde County cave[17] were three complete shell pendants and part of another, all made from large fresh water mussel shells. An unbroken projectile-point-shaped specimen, with notched edges and remains of a knotted leather thong in the two stem-end holes, was near the right shoulder between two groups of reed tubes. A broken pendant, almost identical except for having only one perforation, was beneath the chin. A diamond-shaped pendant, with two closely spaced central perforations, was near the right femur. A third specimen was just above the hip.

Stone Pendants in Middens

The vast majority of the stone pendants are found in the rubbish heaps of village sites. Although the specimens are widely distributed, the available data indicates that they are much more numerous in certain areas.

In this connection two facts must be taken into consideration: (1) Many parts of Texas are little known archaeologically. (2) In some cases locally known facts regarding artifacts have not been published and, therefore, are not available for incorporation in comparative studies. It thus is evident that the present picture may be materially changed in some areas. The following statistics

concerning the regional distribution of stone pendants in Texas are given with the full understanding that many parts of the state are represented by very inadequate samplings. No pretense is made of an exhaustive study in any section.

Suggestive Distribution of Stone Pendants in Texas
(Based on Incomplete Reports)

Area	Number Specimens Whole	Broken	Total	Per Cent
Central Texas	57	61	118	70
East Texas	5	7	12	7
North Texas	2	3	5	3
West Texas	7	4	11	7
Southwest Texas	9	8	17	10
South Texas	2	3	5	3
Total	82	86	168	100
Per Cent	49	51	100	.....

The above figures suggest that Central Texas may easily rank first in the distribution of stone pendants. East Texas, where much intensive field work has been carried on for a number of years, seems to fall far behind as regards this particular type of artifact. Too much dependence cannot be placed on the percentages for the other areas.

Certain counties in Central and Southwest Texas run high in the percentage of broken specimens. These are the areas where burnt-rock middens predominate.

Distribution of Pendants in Concentrated Burnt-Rock Midden Areas Central and Southwest Texas

County	Number Specimens Whole	Broken	Total
Bell	4	3	7
Coryell	3	3	6
Edwards		2	2
Kinney		2	2
Llano	1	5	6
San Saba	1	3	4

Travis	30*	28	58
Uvalde	2	1	3
Williamson	12	17	29
Total	53	64	117
Per Cent	45	55	100

*Eleven specimens are not completed and have no perforations. If these are eliminated, we find that only 40 per cent of the perforated specimens in these areas have not been broken; while 60 per cent of them were in a fragmentary condition when uncovered in the middens.

Other Texas counties in which stone pendants have been reported include Bastrop, Burnet, Falls, Gillespie, Kerr, Limestone, McLennan, Navarro, Real, Cass, Cherokee, Gregg, Harrison, Henderson, Lamar, Red River, Sabine, Shelby, Titus, Van Zandt, Wood, Clay, Collin, Denton, Rockwall, Hutchinson, Oldham, Potter, Coke, El Paso, Mitchell, Shackelford, Stonewall, Taylor, Terry, Brewster, Presidio, Val Verde, Aransas, Bexar and Victoria.

Stratigraphic Evidence

Of 49 specimens excavated in Travis and Williamson Counties, in what seems to be the center of distribution, facts as to the comparative depths at which found are as follows:

	Arbitrary Midden Levels			
	Upper	Middle	Lower	Total
Number of specimens	20	26	3	49
Per Cent	41	53	6	100

The above statistics suggest that very few perforated stone pendants were made by the first occupants of these sites; that the culture trait flowered during the middle period of occupancy; and at most sites had started a definite decline in the latest period.

PLATE 2

SPECIMENS WITH MULTIPLE PERFORATIONS

1, Williamson County; 2, San Saba County; 3, Wood County; 4, Titus County; 5, Limestone County; 6, Henderson County, Texas; 7, Yell County, Arkansas. Several of these specimens might have been attached to an atlatl. Note groove above upper hole in No. 6. Nos. 4, 6 courtesy R. K. Harris; No. 5 courtesy F. H. Watt; No. 7 courtesy H. J. Lemley.

Plate 2

A few outstanding cases bearing on the comparative chronology of the specimens in various areas will be cited.

In a large burnt-rock midden at Cedar Park, Williamson County, Pearce and the writer found a number of stone pendants. Eight of the specimens were at depths ranging from one to 18 inches, thus falling in the so-called upper level. Five were at depths of 25 to 48 inches, coming in the middle level. The midden had a maximum depth of approximately seven feet, but no pendants were found deeper than 48 inches.

In the fall of 1932 two perforated stone pendants were found in a large rock shelter on the Fate Bell ranch, Val Verde County.[18] One of these, in a fragmentary condition and with the remains of a large perforation, was in an ash deposit at a depth of 36 inches. The other, with three holes partly drilled, also was in the ash deposit 27 inches deep. In the same level were many flint artifacts, manos, bone beads, etc. Above the ash was a "trash" deposit extending from the surface to a depth of about 18 inches. In that level were basketry, matting, sandals, cordage, etc. Two stratified levels were beneath the ash deposit and extended to 82 inches, where bedrock was struck. Nearly two-thirds of the midden depth thus was beneath, and older than, the deposit in which the pendants occurred.

The seven stone pendants from the Fall Creek sites,[19] Llano and San Saba Counties, in most cases were at depths of 12 to 36 inches and seem to be prehistoric. One specimen, however, was on the surface and another at a depth of only a few inches in association with potsherds that suggest mission influence.

Still another specimen, almost identical in shape to many stone pendants, was made of lead apparently "molded in an ordinary tablespoon." Eliminating this doubtful specimen, there remains evidence that the inhabitants used pendants from about the middle of their prehistoric occupancy down into the historic period.

In a rock shelter on the Lehmann ranch, Gillespie County, Woolsey in January, 1936, found a stone pendant with two perforations at a depth of 32 inches. Despite the depth the specimen seems to be comparatively recent. There were two sterile layers above: nine inches at the top containing loose sand and sheep droppings, with

five inches beneath made up entirely of creek-deposited sand. The pendant thus was only 18 inches beneath the sterile layers. The occupational level itself contained much gravel and sand from flood periods, suggesting that the deposit may have been laid down in a relatively short time. Some 30 inches beneath this upper habitation level was another with much ash but few artifacts.

In the spring of 1934 the writer excavated five rock shelters on the Craig ranch, Edwards County. In shelter No. 2 a fragmentary, well-polished pendant was found at a depth of 16 inches, and another small piece at 14 inches. One shows the remains of two perforations and the other is broken through a single hole. The midden deposit in the square from which these specimens came ranged in depth from 30 to 45 inches. It thus seems that the pendants are comparatively recent. At depths of 10 and 18 inches in adjacent squares were small arrowpoints confined to the upper level. At the deeper levels in this shelter were only large projectile points. This association of the pendants with the small points seems significant.

Stone pendants were plentiful at the Law Brothers site, Travis County, and were confined largely to the middle period of occupancy. The depth range of the pendants was from 11 to 26 inches. Eleven of the 15 specimens were in the rubbish of the adjacent campsite, one was on the surface and only three in the concentrated burnt-rock middens or "mounds." These facts agree with a statement made by Bliss,[20] who was in charge of the excavation:

"Results of excavations show that the burnt-rock areas of the mounds produce few artifacts compared with the peripheral areas. The deep mound of burnt rock produced very few artifacts."

Eight of the pendants are whole and seven are fragmentary. In addition, there are five incomplete and undrilled specimens.

An unusual fact, discovered in the laboratory, is that a fragment from the surface fits onto another piece secured at a depth of 26 inches.

At the Williams site, Travis County, was another broken pendant the fragments of which were found at different depths. According to George R. Fox, in charge of the excavation, one was at a depth of 18 inches; while the other, in a different square, was only eight inches deep. The restored specimen, with some still missing from

one end, has a length of 8¼ inches and a maximum width of 2¾ inches. The greatest thickness is 5/16 inch. Both surfaces are well polished. The material is slate and the edges contain 76 notches.

An interesting feature in connection with these fragments is the presence of two sets of two offsetting perforations along the broken edge of each piece. (Plate III, 3). They match so well as to force the conclusion that they were used in repairing the broken specimen.

The two original end holes are drilled from only one side; the four holes along the broken edges are drilled from both sides.

We have here the possibility that the specimen was used after its repair; later came apart, one piece was discarded and the other continued in use for a time.

In writing of the stone pendants from the Heffington site, Travis County, J. Charles Kelley,[21] in charge of the excavation, states:

"The two fragmentary specimens are both from the burnt rock midden at the Heffington site. One comes from the 6"-12" level (below surface), the other from the 18"-24" level. At the present stage of research no cultural differentiation of significance has been noted from one level to another. No clue to the relative age of the specimens within the midden is thus available other than the bare facts of their depths. The site itself is in every obvious way a typical burnt-rock midden, with the normal cultural associations thus implied. It appears relatively late in regional archaeological chronology. There is, however, no evidence that the site survived into historic times in the area; it is, therefore, presumably late prehistoric."

Kelley[22] also reports a broken "gorget" from the Jackson-Caldwell site, Brewster County. It came from the contact between the Kokernot and the Calamity formations and may immediately precede the chronological picture as given for the Bravo Valley aspect.

"Sites of the La Junta focus, Bravo Valley aspect, consistently produce ceramics of Southwestern origin; a complex of wares dated by tree ring methods at about 1200-1400 A. D. in the Southwest." * * *

William A. Duffen,[23] in charge of the excavation of a large midden on an old river terrace remnant known as Morhiss Mound, Victoria County, discusses the comparative ages of three stone pendants from that South Texas site:

"One of the few polished stone specimens from this site is a heavy pendant of a dense slate, occurring at a depth of nine inches in the midden material. It is oval in outline, having a length of 2 9/16 inches

and a width of 1 9/16 inches; with a thickness of 9/16 inch at the center, tapering off to a rather thin but rounded edge. The perforation is formed by two conical pits in opposition, showing a drilling from both sides. The material and the artifact form are intrusive to the coastal area. Dr. E. H. Sellards of the Bureau of Economic Geology of the University of Texas feels that the material might well be from the Ouachita area near the boundary of Arkansas and Oklahoma. The specimen was in the horizon with small projectile points and corner-tang knives and seems to be proto-historic. At any rate, it is a late period.

"The fragments of a banded slate pendant, or so-called gorget, came from a depth of 33 inches in the midden deposit. It is plano-convex in cross-section, and has been perforated by drilling from opposite sides. This material as well as the artifact are foreign to the area. The source of the stone could have been the same as in the preceding case. The specimen seems to belong to the late prehistoric period.

"A single object, which at one time had been a bannerstone, was recovered from a depth of 15 inches in the midden. The piece had been smoothed along the broken edges and then drilled with a single hole for suspension, thus converting it into a pendant. The material of which it is made and the resulting artifact are both intrusive to the area. It seems to be late prehistoric."

Materials Used

Various stones were used in the manufacture of the pendants. The most common were Packsaddle schist, slate, limestone, and sandstone. Others include limonite, hematite, steatite, banded siltstone, turquoise, etc. The colors range through gray, brown, green, blue, yellow, red and black. Some of the banded pieces are beautifully colored.

In many cases the stone used was secured locally; as, for example, the limonite and hematite in East Texas; the limestone and schist in Central Texas.

In certain cases, as that previously mentioned in South Texas, slate seems to have been brought in from other regions.

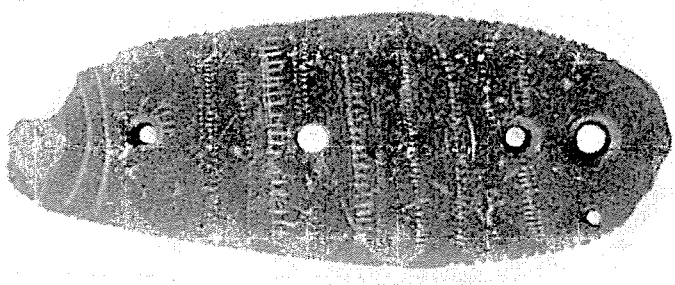
PLATE 3

ELABORATELY DECORATED STONE ARTIFACTS

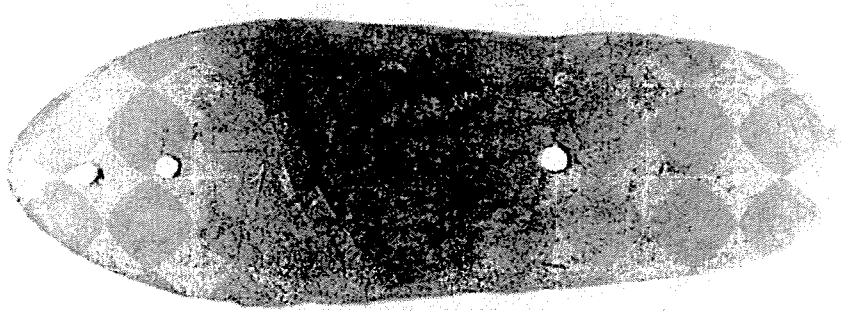
1. From a grave in Coke County. 2. From a burnt-rock midden, Travis County. 3. Fragments from different depths in midden, Travis County. Holes near broken edge apparently used in aboriginal restoration.

These specimens possibly may have been used—two strung together—in playing a game.

3



2



1

Plate 3

Varieties of Stone Pendants

The stone pendants tend to subgroup into varieties. Certain of these overlap, so there is not always a clear-cut line of demarkation.

It seems that shape alone is not the most desirable basis for classification. Neither can the matter of size be considered of primary importance. The method here employed is to consider (1) the number and position of the perforations; (2) the shape; (3) the size.

Data Regarding Perforations

Most of the perforations consist of biconically drilled holes, sometimes referred to as countersunk holes. Using a flint drill, or reamer, the drilling was done from both sides, the two parts of the hole meeting near the center. Often these were located with great precision. In other cases the holes were not exact offsets and were adjusted by enlargement. In a few specimens such action was not taken, leaving the crude asymmetrical perforations.

When the holes were small and the stone thin, drilling sometimes was done entirely from one side. In such cases there usually is evidence that the edge of the hole was somewhat shattered when the drill point emerged. This occasionally was remedied by a slight reaming of the hole on that side.

A third method of perforation was by the use of small reeds or bone tubes. In such cases the holes are cylindrical. A few holes have been noted where countersinking was employed. The hole first was put through with a small cylinder; then a larger one was used on each side to a shallow depth. There is a definite break between the holes of the different diameters. This feature is noted in a pendant from Val Verde County and another from Bell County.

Number and Position of Perforations

Number and Placement of Perforations	Number Counties	Number Specimens
Single perforation at one end	9	29
Single perforation at each end	10	12
Single center perforation	6	8
Two central perforations	11	22
Two or more perforations at one end and one perforation at other end	8	20

Two perforations at one end, one perforation at other end and one perforation in center ..	1	1
Two or more small perforations near broken edge	4	8

The pendants with a single perforation at one end are more plentiful than the other varieties. The only appreciable difference between the specimens with a single perforation at each end and those with two central perforations is that in the latter case the holes are somewhat closer together. One variety merges into the other.

Specimens with two or more perforations at one end and with a single hole at the opposite end also are fairly plentiful. They, however, are not distributed over as wide a region as some of the other varieties.

Many of the broken specimens have the breaks running through the center of one or more of the holes. Eighteen per cent of all Texas stone pendants examined were broken through a perforation. Such breakage may have resulted from the drilling process, or occurred later due to rough usage. As mentioned elsewhere, the small perforations along broken edges seem to have been used for repair.

All stone pendants reported from Coke, Mitchell and Victoria counties have only a single perforation at one end. In the latter county, however, some shell specimens have two perforations.

In localities where stone pendants are numerous, as in Travis County, all varieties listed above are present. The single perforation in one end is more frequent than any of the others.

Sizes of Specimens

The sizes vary widely. This is true not only in remotely separated areas, but often applies in a single locality.

Of 58 specimens from Travis County, 25 yield all dimensions. The length, apparently more diagnostic than the width, ranges from 7/8 inch to 9¾ inches, with an average of 4⅛ inches. The specimens have been divided into the following length groups:

Lengths of Travis County Specimens

Length Groups	Number Specimens	Per Cent
Less than three inches	9	36
Three to six inches	13	52
More than six inches	3	12
Total	25	100

The maximum width, usually near the center of the specimen, ranges in Travis County from ¾ inch to 3½ inches, with an average of 2⅛ inches. The thickness of the same specimens varies from 3/16 inch to ⅞ inch, averaging 2/5 inch.

The dimensions of the three longest specimens are 8¼"x3"x5/16", 9½"x2¾"x5/16" and 9¾"x3½"x¼". These taper gradually from the center to rounded points, and have a single perforation somewhat removed from each end. All have suffered more or less breakage.

In examining these large perforated stones a similarity was noted between their sizes and shapes and those of three so-called blades from the Fall Creek site,[24] Llano County. The "blanks" from Llano County, like the pendants from Travis County, are made of limestone and "roughed out" by percussion, with the edges and ends somewhat thinned. Thinning the edges in this manner would have saved much grinding, and may represent the initial stage in the manufacture of large pendants.

Specimens from other Central Texas counties compare favorably with the averages stated above. The average size, 4"x1⅞", of specimens from East Texas also compare to those in Central Texas. On the average, however, specimens from North,[25] South, Southwest [26, 27] and parts of West Texas[28, 29, 30] seem to be smaller than those in Central Texas.

Few Primary Shapes

The primary shapes do not vary greatly. The predominant form is the oval; a few are triangular, rectangular and square with rounded corners; an occasional one is almost round, in the form of a discoidal; and a few are "reel-shaped" or "butterfly-shaped."

The specimens with only a single perforation include a greater variety of shapes than do those with combinations of two or more holes. The oval with the hole near one end is the most popular shape among the single-perforated specimens. Triangular pendants usually have the hole in the small end, but occasionally it is in the center of the wide end. The few small square pendants usually have the hole in one corner. The rare round specimens more often are perforated in the center; while the rectangular ones have a hole in the center of one end.

Two central perforations occur in specimens that are approximately round, rectangular, reel-shaped, and rarely in oval ones. Two holes near one end and one hole at the other are confined almost entirely to oval specimens.

A form of considerable interest is the so-called reel-, wing- or butterfly-shaped pendant. The writer knows of only six such specimens in Texas. One of these, reported from a grave in Coryell County, has been discussed.

Another specimen of that general form was found by J. E. Hawkins in Limestone County. According to Frank H. Watt,[31] who kindly furnished a photograph and data, it is made of black amphobile schist and was secured at Site No. 40A8-4. It has two central biconically drilled holes, and is broken through the center of one of these. (Plate II, 5).

Wilson[32] reports "three broken gorgets of a very odd shape" from a site located "about four miles southeast of Wylie," near the Collin-Rockwall County line. A sketch restoration, based on about one-fourth of a specimen, shows the original shape about the same as the one from a cave burial in Coryell County. The only apparent difference is that Wilson concludes his specimen probably had four original perforations arranged in two groups; whereas, the one from Coryell County originally contained only two central holes.

The remaining Texas specimen of this general form came from a depth of only 14 inches in a burnt-rock midden, Travis County. It is made of Packsaddle schist, and has two central perforations.

George T. Wright[33] furnishes data on 35 stone pendants, including four reel-shaped slate specimens each with two central perforations, from surface sites near Red River in Choctaw and McCurtain Counties, southeastern Oklahoma. (Plate IV). One of these is much like several of the Texas specimens, while the others are of the more pronounced four-wing form.

There is a noticeable similarity between the shapes of these stone specimens and certain reel-shaped objects of copper from Alabama[34] and elsewhere.

Decoration

Some form of decoration appears on 15 per cent of the stone pendants reported from Texas. By far the greatest part of such

decoration consists of small notches or serrations along the edges. (Plates II, 1-2, III, 2-3; IV, 1, 3a-b).

In some cases the notches are wide, deep and few in numbers; in others they are narrow, shallow and numerous. The number varies from two to 38 on each edge. Usually equal numbers appear on the opposite edges. The symmetry often is such that one must consider the notches as intended solely for decorative effect. The theory that they are tally marks, or represent some record, seems unlikely.

Engraved designs are present on a few specimens. (Plates II, 2, 7; III, 1-2; IV, 1b, 3a-b). These take the form of simple band lines, ladder-like and diamond-shaped elements, rayed circles or so-called sun-symbols; and occasionally a design suggestive of a plumed serpent.

Beauty also was attained in certain cases by perfect symmetry, highly polished surfaces, and the utilization of the natural colors in some stones.[35] (Plates I, 3; II, 3).

The elaborately engraved designs on a specimen reported by Harris[36] from Denton County, Texas, is similar to one on a pendant from the southeastern corner of Oklahoma.

Uses to Which Placed

It may be well to present some of the facts and theories set forth by various writers in an attempt to explain the uses to which these perforated stones might have been placed.

As early as 1820 R. G. Wilson[37] wrote concerning a mound burial in Ohio:

> * * * "On the breast also lay a stone ornament with two perforations, one near each end, through which passed a string by means of which it was suspended around the wearer's neck. On this string, which was made of sinews and very much injured by time, were placed a great many beads." * * *

In 1873 Jones[38] expressed the belief that stones perforated with two holes near the center or with one hole at the end—when thin, with notched edges and decorated with carved lines—were "intended as ornaments and were suspended from the neck or fastened to some conspicuous part of the vestment." He thought, however, that other

specimens more thick and durable, with holes drilled all the way from one side and twice as large on one side as on the other, were used in manufacturing bowstrings. He then quoted Catlin, who thought otherwise:

* * * "Those which I have seen were used * * * for grooving the shafts of their arrows. * * * These grooves are * * * indented by pressure produced while forcing the arrow, softened by steam, through a hole in the tablet, with the incisor of a bear set firmly in a handle and projecting over the rim of the hole, as the arrowshaft is forced downward through the tablet. * * * It would be useless to pass the bowstring through the tablet, for the evenness and the hardness of strings are produced much more easily and effectually by rolling them, as they do between two flat stones whilst saturated with heated glue."

Holmes[39] a few years later wrote:

* * * "As a rule the larger and more important pendants are employed as gorgets, but vast numbers of the smaller specimens are strung with beads at intervals along the string, attached as auxiliary pendants to the larger gorgets, suspended from the nose, ears and wrists, or form tinkling borders to head-dresses and garments." * * *

He quotes Beverly in his "History of Virginia" (p. 196) regarding pendant ornaments:

"These they wear * * * before or behind their neck, * * * or else they lace their garments with them, and adorn their tomahawks and every other thing that they value."

Holmes then names other possible uses for pendants, such as badges of authority, shuttles, armor plates, wrist protectors, sinew-sizers and cord-twisters.

Fowke[40] ten years later summarized the preceding theories and added a few of his own. He stated that some perforated pieces "are supposed to be bracers. It is said that the Miami Indians wore similar plates of stone to protect their wrists from the bowstring." * * *

"Some writers suppose the gorgets to have been shuttles; but this

---

PLATE 4

SPECIMENS FROM CHOCTAW AND MCCURTAIN COUNTIES, OKLAHOMA

1, Notched edges; 2, Incurved or reel-shaped; 3, Incised designs and notched edges.

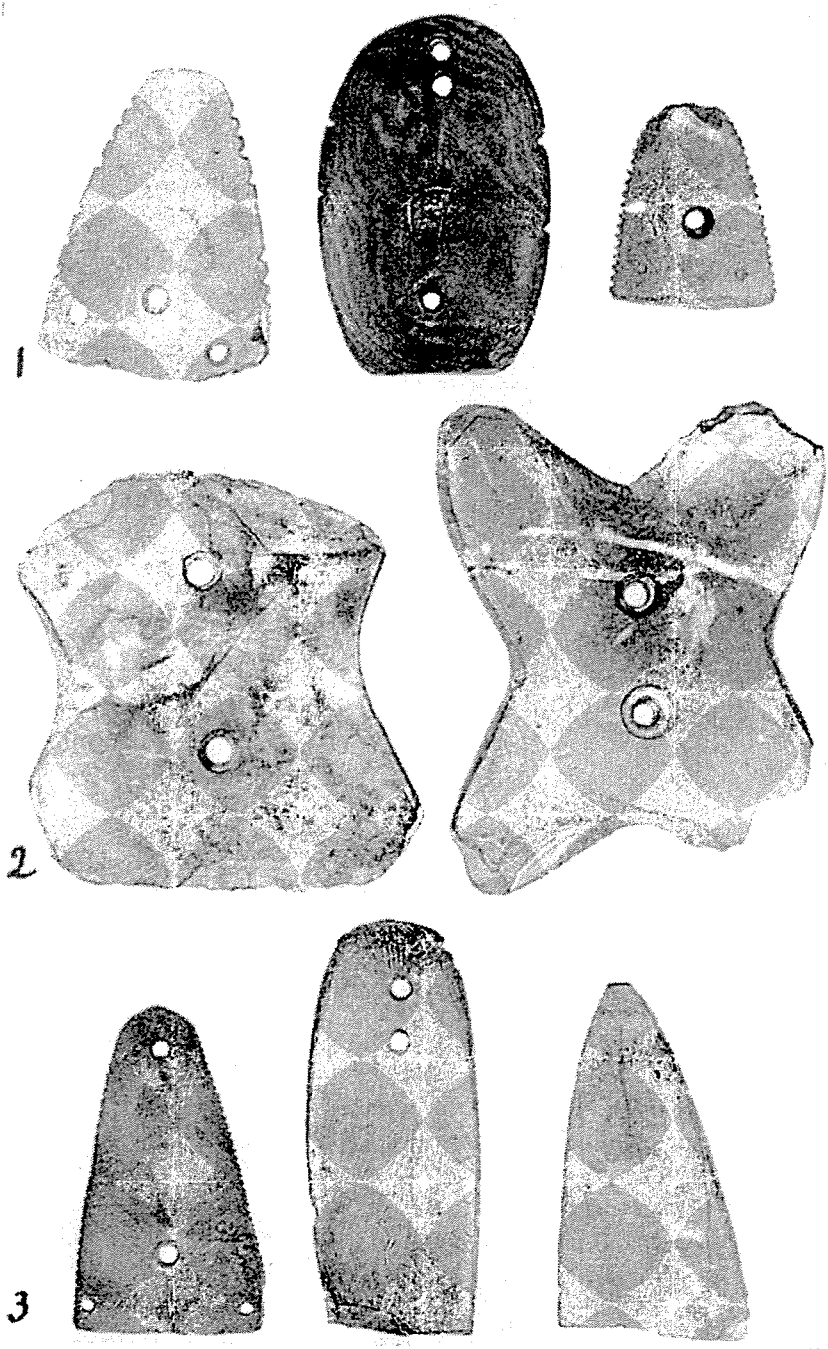


Plate 4

supposition can hardly be entertained. * * * As twine-twisters they would be about as awkward as anything that could be devised. * * * The bracer theory is plausible. * * * If they were to be worn, at the belt or on any part of the dress they could easily have been fastened by a knotted string. * * * If suspended around the neck, in order to make them be flat against the breast they probably had a short cord passed through the perforation and tied above the top of the object, the suspending cord being passed through the loop thus formed."

Mason[41] defines bracer or wrist guard as "a contrivance for protecting the archer's wrist from being galled by his bowstring. A shield of leather or other substance fastened to the wrist of the left hand to prevent injury from the bowstring."

Holmes[42] mentions the use of large "pigment tablets." There is a possibility that some of the circular perforated stones may have been used in like manner. The present writer has seen no perforated stone with evidence of paint on it; but there have been found small imperforated stones, of about the same size and shape, on which appear red paint.[43]

In the Handbook, Holmes[44] in discussing pierced tablets states:

"Those with two or more holes were probably fixed to some part of the costume, or to some article of ceremony. * * * Their distribution is general, and their use must have extended at one time or another to most of the tribes east of the plains and well northward into Canada. * * * It is not unlikely * * * that some of these classes of objects exhibiting marked diversity of form, size and finish had multiple offices, serving on occasion or with different communities as implements, ornaments and symbols." * * *

Moorehead[45] as late as 1917 wrote:

* * * "If these were made and used by the American Indian of today, or of the past 100 years, it would have been far easier and more simple to visit the descendents of such Indians and secure first-hand information as to the use and purpose of these perplexing objects. * * * That some of these objects were in use in historic times no one will deny; that many of them are ancient is also quite true."

In referring to ovate forms with two central holes, or a hole near each end, he states he found several of these on the chests and arms of skeletons. A pendant from Maine had a polished groove between perforations. He thinks the groove was the result of rubbing back and forth of a thong by which the specimen was fastened to some

other object. With further reference to grave finds he quotes the Ohio Archaeological and Historical Society (Vol. VII, p. 134):

"The Storey mound, west of Chillicothe, sheds some light upon the gorget class. On the right wrist of a skeleton was found a fine expanded-center gorget of ribbon slate with two perforations. On the left wrist there was one of the same kind, but not perforated. Also at the left wrist was a concave one with unusually sharp edges."

Webb and Dodd[46] report the finding of a bone "gorget" on the left arm of an adult male in a mound in northwestern Louisiana. Attention is called to the fact that "bow-string protection would be afforded only if the bow were held horizontally, not vertically." They also mention a find by H. J. Lemley of "a double-perforated stone tablet beside the arm of a skeleton in a Ouachita River mound near Malvern, Arkansas."

Purpose of Extra Holes

A possible use of what seem to be "extra" holes in pendants may have been for attachment of objects of various kinds. This is suggested by Harrington:[47]

"Quartz crystals of various sizes were used by the Indians for surmounting ceremonial wands of bone or as pendants, asphalt being applied to one end of the crystal for attachment."

Some years ago Pearce wrote the United States National Museum requesting information concerning the perforations in certain specimens. In reply Graf[48] quoted F. M. Setzler as follows:

"We agree with Pearce that the two holes near the outer edge were made primarily for inserting a thong for suspension. The only explanation our archaeologists have for the larger hole in the center and on the right hand edge is that feathers or some small animal skin might have been suspended from these holes. We have no definite proof for this theory. A careful examination of the edges of perforation might reveal evidence of wear."

In a few cases where there is a small "extra" hole near the edge it shows some evidence of wear.

Pendants on War Bonnets?

One individual states that certain Indians in Oklahoma until a few years ago used stone pendants in the tops of war bonnets. W. E. S. Dickerson, a Choctaw Indian who formerly lived in Oklahoma, says

he knows of no such practice; but that sometimes a shell or small stone pendant might be used as a slide on a cord beneath the chin when a war bonnet is worn.

Pendants As Possible Atlatl Weights

Perforated pendants in certain cases seem to merge into perforated boat-shaped artifacts. Patterson[49] discusses the possible use of boat stones as "gorgets" and adds:

"In addition to their resemblance to certain forms of pierced tablets, boat-stones have been found in graves under conditions which might support this suggestion. * * * According to the reports made by the discoverers, three of these pieces were lying on the chest of the skeleton. * * * All of these specimens are of the perforated type. This may be regarded by some as presumptive evidence that they had been worn after the manner of a gorget, suspended perhaps by a string encircling the neck. But it cannot be taken as conclusive proof." * * *

It is interesting and perhaps significant that three of the Central Texas counties—Travis, Williamson and Bell—with the greatest number of stone pendants are likewise ones reported by Patterson as among the greatest yielders of boat-shaped artifacts.

Webb and Dodd[50] also have found that "Southwestern Arkansas represents a minor culture center for gorgets, as Patterson found it to be for boatstones."

If, as seems from the evidence Patterson presented, many of the boat-shaped artifacts "were used primarily as weight stones bound to atlatls to give the weapon additional weight and efficiency," may not certain of the stone pendants also have been used as atlatl weights? Some would lend themselves well to such attachment. (Plate II, 3, 4, 5, 7).

Pendants Possibly Used in Games

Certain of the large so-called pendants possibly may have been part of the equipment used in playing a game, (Plates III, V), somewhat after the manner of double balls or double billets as reported by Culin:[51]

"The game of double ball throughout the eastern United States and among the Plains tribes is played exclusively by women. * * * In

northern California, however, it is played by men. The implements for the game consist of two balls or similar objects attached to each other by a thong, and a curved stick with which they were thrown. The balls vary in shape and material. * * * Among the Sauk and Foxes * * * the balls are oblong, weighted with sand and frequently both, with the connecting thong, are made of one piece of buckskin. * * *

"A distinct variation is found among the Hupa; where, instead of balls, two small bottle-shaped billets tied together at the top are employed. The Klamath use large billets fastened together by a cord passing through a hole in the middle of each stick. * * *

"The sticks, made of saplings, usually taper to the end and are slightly curved. * * * They vary in length from 23 inches to six feet. One stick is almost invariably used. * * * The bases, two in number, consist of poles (Chippewa) or of two piles of earth (Omaha), and vary in distance from 300 and 400 yards (Omaha) to a mile (Cree) apart. The object of the game is to get the ball over the opponent's base line or to take it to one's home. Bets are made upon the result.

" 'Another * * * is what is called the throwing game. It is played by two large bands, who collect round two opposite poles, and try to throw the object over the opponent's pole. * * * They throw them in the air by means of a staff excellently shaped for the purpose, and catch it again very cleverly'." * * *

Culin also reports a small "stone buzz" from a cliff ruin in Arizona. A few small Texas specimens with two central perforations might have been twirled on a twisted cord to make a buzzing noise.

Summary and Conclusions

Perforated stone "pendants" have been reported from 50 Texas counties. They probably are present in many others. These are scattered over a wide area, ranging from the Gulf of Mexico to the tip of the Panhandle, from the Louisiana border to the El Paso region.

The present known distribution suggests a tendency toward concentration along a comparatively narrow strip, extending from the northeast part of the state southwest to near the mouth of the Pecos River. This strip includes a large part of the burnt-rock mound area of Central Texas, in which these specimens seem to be more

numerous than in any other part of the state. More extensive work in other areas may change the picture.

In the seemingly concentrated area the specimens tend toward larger size and more elaborate workmanship than in other parts of the state.

The stone pendants seem to belong to the middle and late prehistoric periods. Few, if any, appear to be of an earlier period. A few apparently are historic.

Thirteen Texas specimens have been found in graves. Five were on the chest, three on the right wrist, and five were in a cremated burial.

Among recorded Texas finds of shell pendants (not circular gorgets) eight were beneath the back of the head, five on the chest, one near the left wrist, three beside the pelvis, one near the right shoulder and one on the right femur.

It seems that these burial finds, with the possible exception of those on the wrists, may have been entirely for ornamental purposes.

The bracer or wrist-guard theory is deserving of consideration. After reviewing all available evidence on the subject, however, the present writer is inclined to the idea that most of the specimens on or very near the forearm were wrist ornaments, rather than bracers for protection against the bowstring.

There is greater uncertainty regarding the possible uses to which specimens from midden deposits may have been placed. It seems unlikely that the Texas specimens were used in the manufacture of bowstrings, or as sinew-sizers or cord-twisters. Practically all of the perforations are too small for use in grooving arrowshafts.

The use of small pendants on strings with beads, and as auxiliary pendants suspended from holes in larger ones, seems probable. A shell pendant in a South Texas grave was in association with beads; as also was a stone one in Central Texas.

It is possible that some of the stone specimens with two perforations may have been atlatl weights. Their distribution coincides with boat-shaped artifacts thought to have been so used.

Some of the large specimens with two or more perforations may have been attached in pairs, by a thong, and thrown with a stick in

playing a game. Such use might account for the large percentage of breakage and battering of the specimens.

Anthropology Dept.,
University of Texas,
Austin, Texas.

REFERENCES

1. Jones, C. C., *Antiquities of the Southern Indians,* D. Appleton and Co., New York, 1873, pp. 367-370.

2. Holmes, W. H., *Art in Shell of the Ancient Americans,* 2nd Annual Report, Bureau of American Ethnology, 1880-81, Washington, 1883, pp. 255, 256, 264, 265, 266, 267.

3. Holmes, W. H., Articles about Gorgets, Pierced Tablets, Problematical Objects, in *Handbook of American Indians,* Edited by F. W. Hodge, B. A. E. Bull. 30, Pt. I, 1907, p. 496; Pt. II, 1910, pp. 247-248, 267-268, 308.

4. Fowke, Gerard, *Stone Art,* 13th Annual Report, Bureau of American Ethnology, 1891-92, Washington, 1896, pp. 116-120.

5. Moore, C. B., *A Cache of Pendant Ornaments,* Journal of Academy of Natural Sciences of Philadelphia, Vol. XI, 1898.

6. Peabody, Charles, and W. K. Moorehead, *The So-Called "Gorgets,"* Bulletin No. 2, Phillips Academy, Andover, 1906.

7. Moorehead, W. K., *Stone Ornaments of the American Indian,* The Andover Press, 1917, pp. 46-70.

8. Moorehead, W. K., *op. cit.,* Fig. 162.

9. Hodge, F. W., editor, *Handbook of American Indians,* Pt. I, B. A. E. Bull. 30, Washington, 1907; article by W. H. Holmes, p. 496.

PLATE 5

POSSIBLE USE OF STONE PENDANTS FOR PLAYING A GAME

Two perforated stones with a strong thong attached to one end and feathers dangling from other end, may have been thrown by a stick two or more feet in length. Rough usage would have resulted in breakage of specimens.

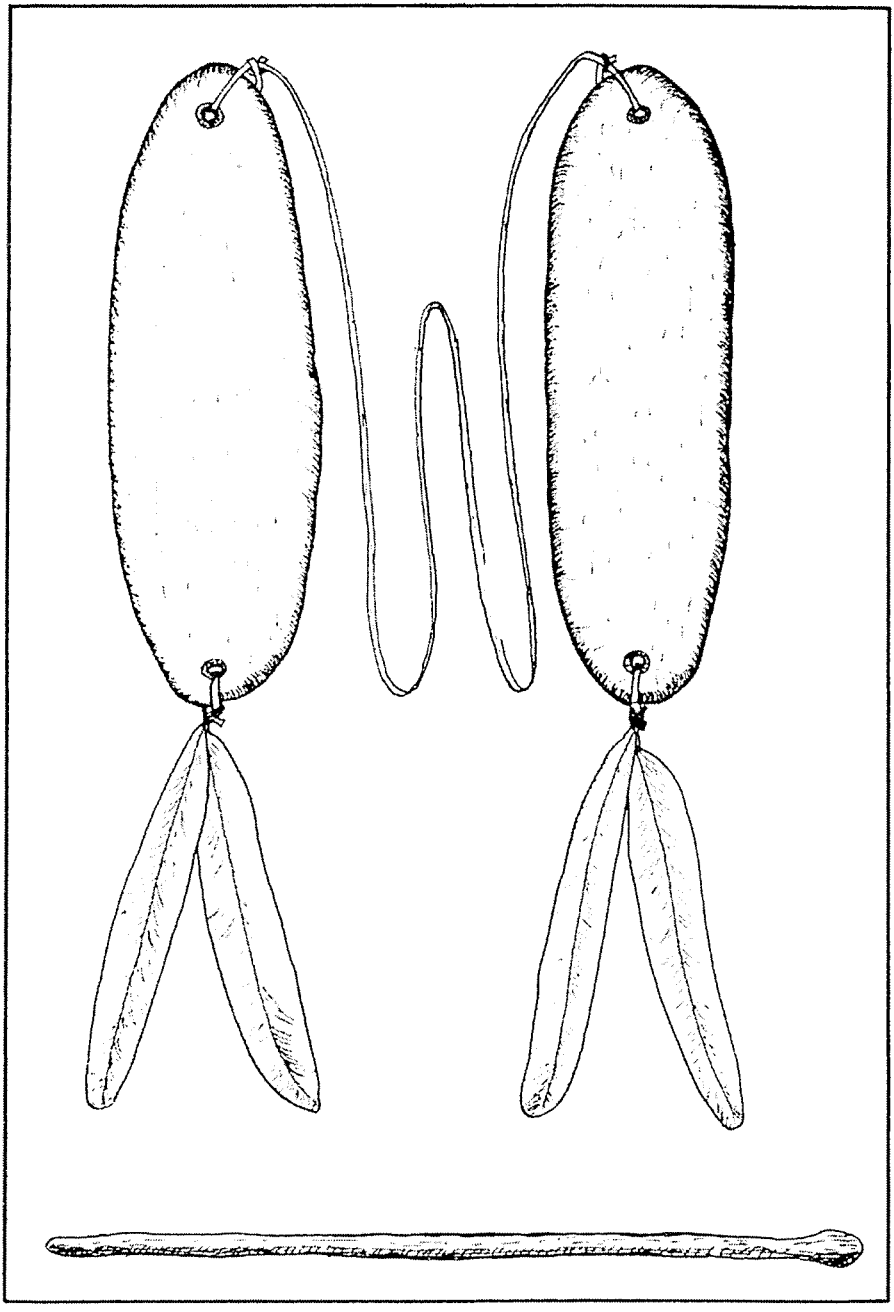


Plate 5

10. Ray, Cyrus N., *Some Unusual Cremated Burials Found Near Colorado, Texas,* Bull. Tex. A. and P. Soc., Vol. 8, 1936, pp. 10, 11-12, Pl. I, Nos. 13-17.

11. Ray, Cyrus N., *Multiple Burials in Stone Cist Mounds of the Abilene Region,* Bull. Tex. A. and P. Soc., Vol. 5, 1933, pp. 20, 32, Pl. 8.

12. Webb, C. H., and Monroe Dodd, *Bone "Gorget" from a Caddoan Mound Burial,* American Antiquity, Vol. 4, No. 3, Jan., 1939, pp. 265-267, Pl. 12.

13. Woolsey, A. M., *Field Notes, Reconnaissance in Eastland and Shackelford Counties,* Anthropology Museum, University of Texas, Austin, June, 1936.

14. Russell, F. B., *Archeology in Bell County,* Central Texas Archeological Society, Vol. 2, Waco, March, 1936, p. 48; and personal communication, January 13, 1941.

15. Wheat, Joe Ben, *Report on Work in the Lubbock Area,* Texas Archaeological News, No. 2, Austin, December, 1940, p. 7.

16. Jackson, A. T., *Field Notes, Oso Site, Nueces County,* Anthropology Museum, Univ. of Tex., 1933, pp. 8-9.

17. Woolsey, A. M., *Field Notes, Mrs. Martin Kelly Cave,* Val Verde County, Anth. Dept., U. of T., 1936, pp. 6, 7, 8, 9.

18. Pearce, J. E. and A. T. Jackson, *A Prehistoric Rock Shelter in Val Verde County, Texas,* Univ. of Tex. Bull. No. 3327, Austin, 1933, pp. 44, 133.

19. Jackson, A. T., *The Fall Creek Sites,* University of Texas Publication No. 3802, Austin, 1938, pp. 83, 112, 115.

20. Bliss, W. L., *Field Notes, Law Bros. Site, Travis County,* Anthropology Museum, Univ. of Texas, 1939, p. 23.

21. Kelley, J. Charles, Personal Communication, June 3, 1941.

22. Kelley, J. Charles, *The Association of Archaeological Materials with Geological Deposits in the Big Bend Region of Texas,* Part I, Bulletin Sul Ross State Teachers College, Vol. XXI, No. 3, Alpine, 1940, pp. 32, 39, 67, 70.

23. Duffen, William A., *Personal Communication,* June 3, 1941.

24. Jackson, A. T., *The Fall Creek Sites,* op. cit., pp. 76-77, Pl. XII.

25. Witte, A. H., *Archaeology of a Section of Upper Red River Drainage,* Bull. Tex. A. and P. Soc., Vol. 7, 1935, p. 50.

26. Smith, V. J., *Archaeological Notes of the Big Bend Region,* Bull. Tex. A. and P. Soc., Vol. 3, 1931, p. 67.

27. Coffin, E. F., *Archaeological Exploration of a Rock Shelter in Brewster County, Texas,* Indian Notes and Monographs No. 48, Museum of American Indian, New York, 1932, p. 57.

28. Studer, Floyd V., *Texas Panhandle Culture Ruin No. 55,* Bull. Texas Archeological and Paleontological Society, Vol. 6, 1934, p. 91.

29. Holden, W. C., *Excavation of Saddle Back Ruin,* Bull. Tex. A. and P. Soc., Vol. 5, 1933, p. 49.

30. Watts, W. C., *Lake Sites of the South Plains of Texas,* Bull. Tex. A. and P. Soc., Vol. 11, 1939, pp. 84-87.

31. Watt, Frank H., *Personal Communication,* June 3, 1941.

32. Wilson, Lester, *Campsite On East Fork Near Wylie,* The Record, Dallas Archaeological Society, Vol. 2, No. 5, Dallas, January, 1941, pp. 23, 25.

33. Wright, George T., *Personal Communication,* November 27, 1940.

34. Webb, William S., *An Archaeological Survey of Wheller Basin on the Tennessee River in Northern Alabama,* B. A. E. Bull. 122, Washington, 1939, pp. 40, 50, 56, Plates 28b and 52b.

35. Jackson, A. T., *Ornaments of East Texas Indians,* Bull. Tex. A. and P. Soc., Vol. 7, 1935, p. 23.

36. Harris, R. K., *Indian Campsites of the Upper Trinity River Drainage,* Bull. Tex. A. and P. Soc., Vol. 8, 1936, p. 133 and Plate 20, No. 11; also personal communication, May 21, 1941.

37. *Archaeologia Americana,* Transactions and Collections of American Antiquarian Society, Vol. I, Worcester, Mass., 1820, p. 182.

38. Jones, C. C., *op. cit.,* pp. 367-370.

39. Holmes, W. H., *Art in Shell, op. cit.,* pp. 255, 256, 264, 265, 266-267.

40. Fowke, Gerard, *op. cit.,* pp. 116-120.

41. Mason, O. T., *North American Bows, Arrows and Quivers,* Annual Report, Smithsonian Institution, 1893, Washington, 1894, pp. 635, 636.

42. Holmes, W. H., *Certain Notched or Scalloped Stone Tablets of the Mound Builders,* American Anthropologist, (NS)., Vol. 8, 1906, pp. 101-108.

43. Jackson, A. T., *Picture-Writing of Texas Indians,* Univ. of Tex. Publication No. 3809, Austin, March, 1938, p. 455.

44. Holmes, W. H., *Handbook of American Indians, op. cit.,* pp. 257-248, 308.

45. Moorehead, W. K., *Stone Ornaments of the American Indians, op. cit.,* pp. 51, 61, 248, 251, 255, 258; quoting Carr, Lucien, Dress and Ornaments of Certain American Indians, American Antiquarian Society, 1897.

46. Webb, C. H., and Monroe Dodd, *op. cit.,* pp. 265, 266.

47. Harrington, J. P., *Exploration of Burton Mound,* 44th Annual Report B. A. E., Washington, 1926-27, pp. 92, 93.

48. Letter, J. E. Graf to J. E. Pearce, October 21, 1932.

49. Patterson, J. T., *Boat-Shaped Artifacts of the Gulf Southwest States,* University of Texas Bulletin No. 3732, Austin, 1937, pp. 61-62, Pl. 10, Fig. 75, Pl. 22, Fig. 143, 144.

50. Webb, C. H., and Monroe Dodd, *op. cit.,* p. 267.

51. Culin, Stewart, *Games of the North American Indians,* 24th Annual Report, B. A. E., 1902-1903, Washington, 1907, pp. 647-648, 650, Figs. 851, 853, 857, 858, 863, 864, 866, 867.

McKENZIE CAVE AND ADJACENT SITES IN PECOS COUNTY

By W. C. Holden

Approximately twenty-two miles east of Fort Stockton, Pecos County, Texas, is Tunis Spring. A current of clear water some eight feet wide and a foot deep flows from beneath a stratum of limestone. The stream runs between eight and ten miles before it sinks into the sands and gravels of Tunis Creek. A stage stand of the Butterfield Trail, built in 1858, was located at the Spring. In 1936 the stage stand was moved and reconstructed by the State Highway Commission on Highway No. 290 one-third of a mile northeast of the original site. The original rock corrals are still intact at the Spring.

Tunis Canyon, in which the Spring is located, varies from two to four miles in width. The bottom of the Canyon which is almost level, save for Tunis Creek, is covered with growth of brushy mesquite. The sides of the Canyon, which have the appearance of mesas, rise some four hundred feet and are covered with a caprock of limestone about twenty feet thick. This caprock, in its perpendicular sides along the edges of the Canyon, contains a number of caves and rock shelters. A number of these caves and rock shelters show signs of human occupation. Panther Bluff, located three miles southwest of the Spring, has one cave and two shelters. The cave whose entrance measured seven feet eight inches wide and five feet three inches high, was filled with debris to a depth of three feet. Its ceiling had considerable smoke incrustations. The cave had been previously excavated by Mr. Woodrow Smith and Mr. Jeff Crump of Fort Stockton. We examined the materials and found them to be similar to those taken from McKenzie Cave, a description of which follows. Of the two shelters in Panther Bluff, one measured twenty-one feet wide, six feet six inches deep, and six

PLATE 6

No. 1. McKenzie Cave. No. 2. Close view of McKenzie Cave. No. 3 and 4. Matting from McKenzie Cave. No. 5. Sandals from the cave. No. 6. Surface artifacts of the cave region.

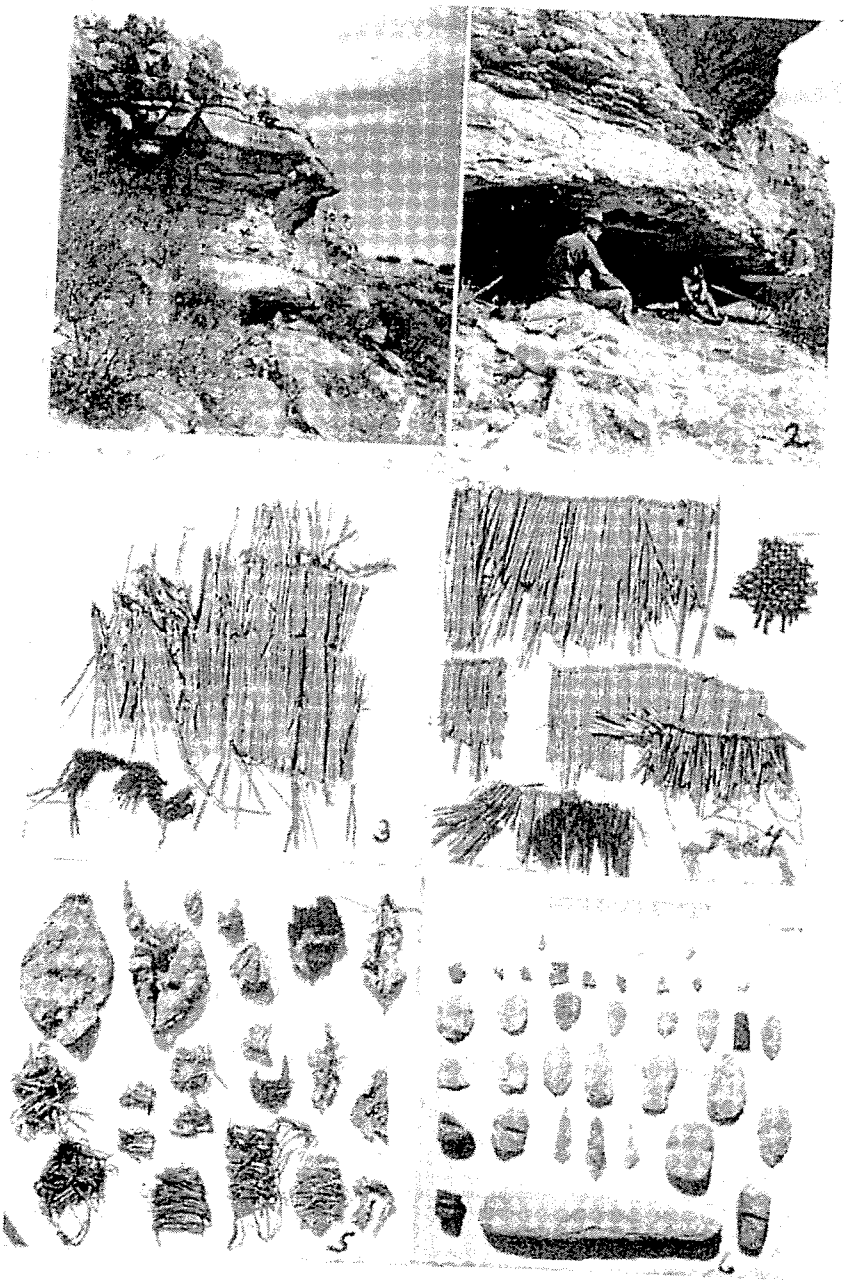


Plate 6

feet three inches high. The other was nineteen feet six inches wide, eighteen feet deep, and eight feet six inches high. The ceilings of both had smoke incrustations, each had a pictograph on its wall, and neither contained any debris.

Approximately six miles east and four miles south of Tunis Spring is McKenzie Cave,[1] located on the ranch of Mrs. Mary Lea McKenzie. It measured at the entrance 38 feet seven inches wide, 23 feet four inches deep, and five feet high. The ceiling is practically level. However, the floor slopes upward toward the back until it is within 18 inches of the ceiling. Between ten and fifteen inches of debris covered the floor. The debris was for the most part pulverized limestone and windblown material mixed with a limited amount of ashes. Most of the artifacts came from the front central part of the cave.

Matting

The large specimen in Plate 6, Fig. 3 is similar to one found by A. T. Jackson in Val Verde County Rock Shelter[2] and classified by him as Type III. It seems to have measured originally 58 cm by 62 cm. It came from a small dark cave about five by seven feet located two miles southwest of McKenzie Cave. It is made of triangular culms threaded together at intervals of 17 to 13 cm with cords. The culms, having a width of 5 mm, are of tule grass which still grows in the vicinity. The four cords which hold the mat together vary as to diameter, material, and hardness of twist. The top cord is 5 mm in diameter, made of *agave lechuguilla*, and is of loose twist. The second one from the top is 4 mm in diameter, made of *agave lechuguilla*, and is of compact twist. The third one is 2 mm, apparently of a grass fiber, and of hard twist. The fourth, or bottom, cord is 3 mm, and is of Spanish dagger.

The small specimen in Plate 6, Figure 3, from a small cave two miles north of Tunis Spring in the Eight Ranch, is of the same material as the large specimen, only the triangular grass blades

1. This cave was reported to us by Wilson Smith of Fort Stockton. An expedition consisting of Dr. C. J. Wagner, W. G. McMillan, W. M. Pearce, Jr., E. J. Lowery, Porter Montgomery, Wilson Smith, Mr. and Mrs. C. W. Edwards, Mrs. W. C. Holden and the writer, set out to explore the Tunis Canyon area on February 27, 1941. Work was done in the caves of Panther Bluff and in McKenzie Cave. Considerable excavation had already been done in McKenzie Cave by C. R. McKenzie and his wife, Billye. We are indebted to Mr. McKenzie for permission to photograph his materials. The photographs were made by W. G. McMillan.

2. **A Prehistoric Rock Shelter in Val Verde County**, University of Texas Bulletin, No. 3327, p. 106, and Plate XXIII, (a).

have been pounded flat. The ends have been twisted, turned back, and woven together with two alternate cords of firmly twisted *agave lechuguilla.* A similar specimen not shown, came from the same small cave as the large specimen in Plate 6, Figure 3.

A third specimen, shown in the lower right corner of Plate 6, Figure 4, came from an unexcavated cave three miles northeast of McKenzie Cave. It differs from the two specimens described immediately above in that the selvedge is formed by the flattened grass blades being twisted into a cord along the edge. The four specimens on the left of Plate 6, Figure 4, came from McKenzie Cave, and are similar to the large specimen in Plate 6, Figure 3, only these specimens are thicker and more closely woven. The cords near the edges are about 1 cm from the edge, and the ends of the culms are cut off evenly. In as much as the edges to the large specimen in Plate 6, Figure 3 are not existent, it may be that its edge was like these four. Although these specimens are commonly referred to as matting, a loop of cordage attached to the edge of one of them suggests that they might have been used as hangings, or as the back of a cradle.

The back of a cradle board from a cave in the Huecos Mountains 30 miles from El Paso is of similar material and construction. The cradle board is shown in *Picturesque Southwest,* Vol. I, No. 1, p. 24. The frame of a cradle was found by George C. Martin in a cave on the lower Pecos, and is shown in *Big Bend Basket Maker Papers* No. 3, Witte Museum, p. 44, Plate XLIV, Figure 7. It is probable that this frame, like the one from the Huecos Cave, was covered with the matting in question. Incidentally, these cradle boards, together with the presence of similar types of matting may represent an affinity between the lower Pecos and the Huecos cultures.

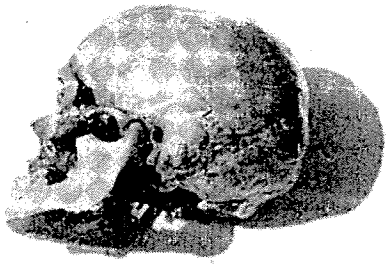
The piece of checker board, or square weave matting in upper right of Plate 6, Figure 4, is similar to types reported by George C. Martin from caves on the lower Pecos and shown in *Big Bend Basket Maker Papers,* No. 3, p. 60, Plate XLI, Figure 5, and p. 61, Plate XXI, Figure 3.

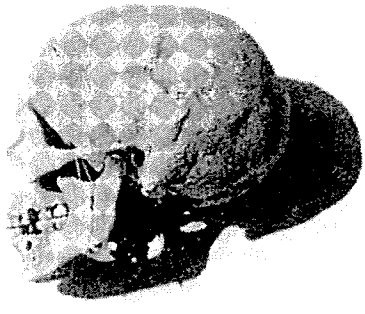
Prickly Pear Leaves

Seven prickly pear leaves came from McKenzie Cave. Two have

PLATE 7

No. 1. Fire sticks, quids and wooden artifacts from McKenzie Cave. Nos. 2 and 3. Two skulls from burials in the region.





2 3

Plate 7

been carefully split on the two sides and bottom, leaving the parts attached at the top with a hinge like connection about 7 cm long. Five other leaves were split on one side only, the split side being stitched together with a slit piece of Spanish dagger leaf. One of these was stuffed with shredded cedar bark. The leaves are shown in Plate 6, Figure 5, top.

Quids

Numerous quids resulting from the chewing of young and tender fibrous stalks, which perhaps were sotol, were found in McKenzie Cave. Similar quids have been reported from Murrah Cave on the lower Pecos, from Pearce and Jackson's Rock Shelter in Val Verde County, and from Jackson's caves in Culberson County. The specimens are shown at the bottom of Plate 7, Figure 1.

Sandals

Ten fragments of different sandals came from McKenzie Cave. Prototypes of all of them have been reported from other sections of the Big Bend area. The specimens in the middle left and lower left of Plate 6, Figure 5 are similar to those described by Victor J. Smith, *Texas Archaeological and Paleontological Society Bulletin*, Vol. V, as Type I, Round toe, and shown in Plate 13, No. 30, p. 65. The same type of sandal is also described by A. T. Jackson from Caldwell Cave No. 1 in Culberson County, *Texas Archaeological and Paleontological Society Bulletin*, Vol. IX, pp. 154-179. The specimen third from the left, bottom row, Plate 6, Figure 5, is similar to a type described by Martin from the lower Pecos Caves in *Big Bend Basket Maker Papers*, No. 3, pp. 71, 72, 73. Two specimens in the middle upper of Plate 6, Figure 5, are like two sandals from Murrah Cave and shown in *Texas Archaeological and Paleontological Society Bulletin*, Vol. IX, p. 63.

One of the ten specimens is of unsplit Spanish dagger (Yucca trecullana Carr). Six are of split Spanish dagger. Three are of either yucca (locally known as soap weed) or of bear grass. Two of the sandals have complete tie-strings of split Spanish dagger, and one has a tie-string of split yucca.

Flint

Only two flint artifacts have been found in McKenzie Cave or the other caves in the immediate vicinity. Unfortunately neither speci-

men is shown in Plate 6, Figure 6. Both are knives. One is of white chert, 8.3 c.m. long and 3.5 c.m. wide, and is leaf shaped. The other is of grey chert, 9.9 c.m. long and 4.5 c.m. wide with a thickness of 7 mm, and has a pear shape.

The other specimens shown in Plate 6, Figure 6 are from surface sites in the McKenzie Cave area. They may or may not have an association with the cave cultures.

Pottery

The eight pot sherds shown in the second row from the top of Plate 6, Figure 6 came from a surface site on Tunis Creek some three miles northwest of McKenzie Cave. Five of the sherds are from the same pot, apparently of a thick Plains ware. Another, the fourth from the left, is thin ware, without a slip, but polished on the outside. The third sherd from the left is a Pueblo black on white ware, probably a trade item. The seventh from the left is also of Pueblo origin, and is both painted and incised. As in the case of the flint mentioned above, there is no association between any of these sherds and the adjacent cave cultures.

Fire Sticks

Two fire, or hearth sticks, and one fire drill, shown in the center of Plate 7, Figure 1, are like those reported by Smith from Hard Rock Shelter near Alpine, by Jackson from Val Verde County and Culberson County, and by the writer from Murrah Cave.

Shafts

One stick with a tenon-like end, measuring 11.4 c.m. long and 5 mm wide with a fork on the other end, came from McKenzie Cave. It is shown in Plate 7, Figure 1, third item from the left, top row. A gum-like substance on the tenon end indicates that another shaft or other object had been bound to the shaft. Jackson shows four such sticks in Figure 28, p. 122 of his report on a Prehistoric Rock Shelter in Val Verde County. Coffin reported similar sticks from Brewster County.

Two shafts, measuring 24.6 and 52 cm in length respectively, and 1.2 c.m. in diameter, apparently of button willow are shown in Plate 7, Figure 1.

PLATE 8

Nos. 1 and 2. Specimens of knots and cordage from McKenzie Cave.

Plate 8

One shaft fragment of a reed, locally known as tule measures 9 mm in diameter and 11.1 cm long. One end has been burned, so that the original length and use of the shaft cannot be determined. Tule grass still grows along Tunis Creek.

Burials

Two burials were revealed by erosion on Tunis Creek approximately three miles north of McKenzie Cave. The skulls are shown in Plate 7, Figures 2 and 3. The skeletons were approximately of the same height, the femurs measuring 44 cm. There was nothing to indicate a relationship of the burials with the caves.

Cordage and Knots

Eighty-nine specimens of cordage and knots came from McKenzie Cave. Materials used consist of Agave Lechuguilla, Spanish dagger, yucca, sotol, algoe, and bear grass. Some of the specimens are made from the twisted fiber, and some are of split leaves. The specimens are similar in materials, and construction to cordage and knots reported by Jackson, Smith, Coffin, and Martin from caves in the area extending from the Pecos on the east to El Paso on the west. No attempt is made here to analyze or describe in detail the McKenzie cave specimens. They are shown in Plate 8.

Conclusions

The evidence from McKenzie Cave and other nearby sites indicates that the culture is typically Big Bend Cave Dweller. Nothing was found which would cause one to believe that McKenzie Cave was occupied in historic times. There was considerable evidence of wind erosion on the ceiling of the cave. Considering the amount and rate of erosion, we arrived at a rough estimate that it had been four hundred years since the cave was last occupied. This would place occupation within the time range of Jackson's Culberson County caves. Jackson, basing his conclusion upon the occurrence of pottery of known horizon, placed the occupation of his sites at between 1300 and 1600.

Texas Technological College,
Lubbock, Texas.

A GREENSTONE HEAD FROM TRAVIS COUNTY, TEXAS

By Carl Chelf

In 1939 while searching for campsites in the Colorado river valley in Travis County, Texas, the writer found a small greenstone head similar to some of those found in southern Mexico. Had this object been brought to the museum, no importance would have been attached to its finding because one could be relatively sure that some tourist had obtained it in Mexico. However, the archaeology of the camp will show that its occurrence is hardly more rare than other objects that have been found in similar sites.

For a time it appeared as if this site would be flooded by impounded water of Marshall Ford dam before it could be excavated, but fortunately, the Department of Anthropology of The University of Texas, in cooperation with the Work Progress Administration, was able to work the area thoroughly. An additional greenstone object was found during the course of excavation. The complete results of their work is to be published soon.

The campsite contains two burnt-rock mounds composed of fist-sized pebbles of Cretaceous limestone, occasional bone, flint, and other typical refuse. These mounds as described by Pearce[1] and Sayles[2] cover the entire Edwards Plateau of Texas. Evidence points to several phases and early and late stages of occupancy. Essentially all phases and stages of the burnt-rock mound cultures are characterized by the lack of pottery, the occurrence of large projectile points, and non-existence of keel-back scrapers.

However, a few burnt-rock mounds, by virtue of their proximity to permanent water, probably were occupied later by a group using

1. J. E. Pearce and A. T. Jackson, Univ. of Texas Bull. 3327.
2. E. B. Sayles, Medallion Papers No. XVII, 1935.

PLATE 9

Artifacts From Greenstone Head Site

No. 1. Triangular projectile point made of flake.
No. 2. Notched triangular point made of flake.
No. 3. Typical projectile from Burnt-Rock mound area.
No. 4. Stemmed projectile made of flake.
No. 5. Greenstone head.
No. 6. Large projectile.
No. 7. Broken bevelled knife.
No. 8. Side view of scraper.
No. 9. Large projectile.

1.

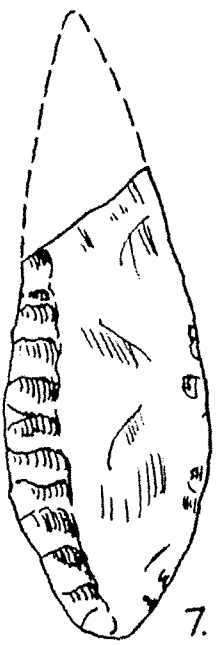
2.

3.

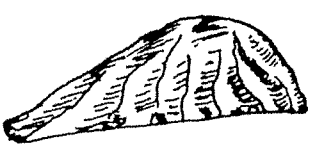
4.

5.

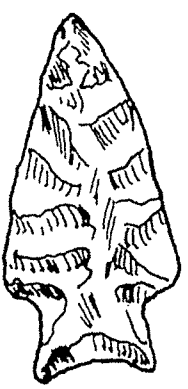
6.



7.



8.



9.

Plate 9

pottery. The area covered by the pottery using groups has been defined by Sayles[3] as Wichita. This region, larger than the mound area itself, extends over a large belt roughly two hundred miles wide across Texas from the Caddoan speaking region to the Rio Grande and probably into Mexico.

Whether a hiatus of magnitude exists between the upper burnt-rock mound stages and the Wichita is not known from present data, but dateable pottery has been found in these sites.[4] Patination is considered to be of importance to some, and, as such, a hiatus could be postulated on such grounds. Wichita groups often reworked flints of burnt-rock mound cultures. The reworked pieces frequently show that much alteration had taken place before the artifact was retouched. No studies have been made on the rate of patination of Edwards flints in different regions of Texas so this cannot be seriously considered as proof of a definite break between non-pottery and pottery using groups. The most obvious differences are reflected in the entirely different complex of artifacts.

The Wichita is characterized by bevelled, double-pointed knives, small triangular and stemmed projectiles, a thin buff pottery, occasional sherds of typical Caddoan area wares, and probably Texas Coast pottery. Obsidian chips, but rarely artifacts, are found. This material was certainly obtained from the westernmost portion of Texas or New Mexico. A few marine shells from the Pacific Coast have also been found, but they are rare. It is with this assemblage of material traits that the greenstone head is believed to belong rather than to the non-pottery burnt-rock mounds at this site. This is assumed to be true, but the material has been badly mixed down to plow depth. The Texas Memorial Museum collection from this site is represented by surface finds alone.

The material of which the greenstone head is made is a dark green porphyry. The occasional phenocrysts are lighter than the fine groundmass. It is not a native Texas stone. According to Dr. George Vaillant[5] and Dr. J. Alden Mason,[6] the material resembles porphyries used in the states of Puebla and Vera Cruz. They are also of the opinion that the appearance of the specimen suggests a southern Mexican origin, possibly Guerrero. Dr. Vaillant points

3. Loc. cit.
4. Dr. Cyrus N. Ray, communication of April 26, 1939.
5. Dr. George Vaillant, communication to Mason, July 11, 1939.
6. Dr. J. Alden Mason, communication June 10, 1939.

out the resemblance to a poor or preliminary stage in the making of a tiger-face mask. Both agree that it is a piece which does not speak readily for itself. Their opinions support the contention that it is definitely from Mexico. The specimen is not fraudulent, and is surely not of recent origin.

The low relief of the face is hardly recognizable in ordinary light. The eyes and mouth are left as raised prominences similar to pecked-pebble heads from New Mexico and Chihuahua. Of interest are the rather prominent ridges left on each side of the face, covering the cheek and jaw areas. If these were intended to represent the cheeks alone, it appears that they would have extended only over the cheek areas. Another feature is a shallow conical hole made by a drill in the forehead region. This might possibly have been a later attempt to drill the head for suspension, but it was never completed.

This object is one of several showing a Mexican origin or influence which have been found in Texas in recent years, but little attention has been given to any of them.

Texas Memorial Museum,
Austin, Texas.

PETROGLYPHS OF THE ABILENE DISTRICT

By FORREST KIRKLAND

In addition to the deeply buried campsites, stone lined cist burials, primitive remains, oval mortar holes, extensive quarries, Indian shelters, and innumerable surface campsites, the Abilene region in Texas also contains several interesting groups of Indian petroglyphs. Through the persistent research of Dr. Cyrus N. Ray[1] and others, it has been demonstrated that several cultures of the region, the Abilene and the Clear Fork in particular, date back to about the time of Folsom man in America—perhaps to late Pleistocene time.[2]

In view of these facts it seems worthwhile to carefully examine the petroglyphs of the region for indications of age, and if possible to uncover evidence that might link them with these very old cultures.

Champion Creek Petroglyphs

The first petroglyphs examined in this region are on Champion Creek in Nolan County located three miles east of the Mitchell County line. The group consists of about a dozen simple designs including the picture of a man and a turtle (Plate 10, No. 1). The outlines apparently were rubbed into the top surface of the sandstone which outcrops level with the ground on the south side of the creek. The grooves are about one-eight of an inch in width and, in most cases, very shallow. One unusual design was found on a similar sandstone about half a mile down the creek from the main group. It seems to be a conventionalized man formed by a series of pits pecked into the stone (Plate 10, No. 1, d). The figure is eighteen inches high. It does not appear to be very old.

In the same rocks on which the petroglyphs were carved are many deep mortar holes, chiefly of the boat shaped variety. But since there are many large groups of similar mortar holes cut in the bedrocks of sites in the district containing no petroglyphs, the association seems to be accidental. Very good evidence was found that the rocks into which the mortars were cut had weathered down an inch or even more since the mortars were made.[3] This, of course, would have destroyed any lightly cut petroglyphs made at the time

1. Ray, 1930.
2. Bryan, 1938; Ray and Bryan, 1938.
3. Ray, 1930, Plate 13.

of the mortars. It seems evident then that, although there is no evidence of white contact, these petroglyphs are quite recent.

The Brownsfield Petroglyphs

The site which was next examined is a small shelter on the V. M. Brownsfield ranch in Nolan County about five miles northeast of Nolan. Here the petroglyphs were lightly scratched into the smooth surface of the limestone in the back of the shelter; and, unfortunately, they have since been almost completely obliterated by names, dates, and scratches made on the rocks by recent vandals. It was found necessary to consult photographs[4] of the designs made before they had been mutilated, in order to clearly distinguish the Indian designs from the recent markings*. However, an accurate copy was obtained and the pictures, consisting of four slender, square-shouldered men about eight inches high, and a few indistinct designs, proved to be exceptionally interesting (Plate 10, No. 2).

Square-Shouldered Men Like Basket-Maker Pictures

The same scratchy technique is found at several sites in South Texas; but pictures of square-shouldered men like these, resembling the true Basket-Maker pictures in Arizona[5] and the Val Verde Dry Shelter, or Texas Basket-Maker pictures in Val Verde County,[6] have not been reported from any other petroglyph site in Texas. The similarity between these petroglyphs and the typical anthropomorphic man of the Val Verde Dry Shelter Culture is remarkable in view of the fact that the one is scratched into the rock while the other is painted on it, and that 200 miles separate the sites.

Points of Similarity to Val Verde Dry Shelter Pictures

Let us list the points of similarity:

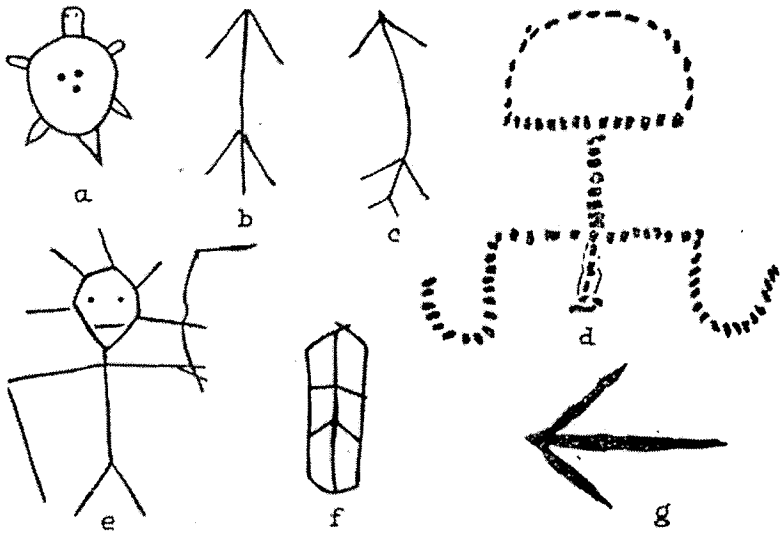
1. The four human figures among the Brownsfield petroglyphs

*Note: At the Brownsfield site there are several strata of charcoal. The deeper one is separated by a thick sterile rock deposit from the shallower deposits. Perhaps the older stratum may date with the pictures or it may not. C. N. R.

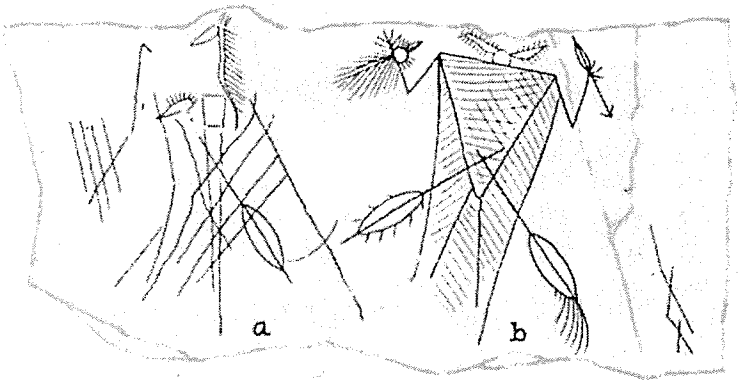
4. Ray 1939, Plate 53.
5. Kidder and Guernsey, 1919, pp. 197-199.
6. Kirkland, 1939, Plates 11 to 17.

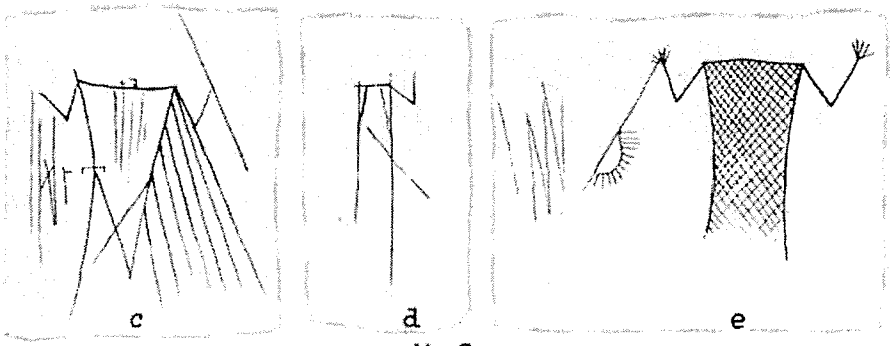
PLATE 10

No. 1. These are the principal designs at the Champion Creek site.
No. 2. These are the scratched designs in the Brownsfield shelter. There are also, seven red, negative hand prints on the back wall of the shelter.



No. 1





No. 2

Plate 10

are slender and broad-shouldered like the typical Val Verde Dry Shelter man found only in Val Verde County.

2. Both have upraised hands; but the arms of the Brownsfield man are bent at a sharp angle while those of the Dry Shelter men are either straight or curved upward.

3. The head-dress on Brownsfield man "b" (Plate 10, No. 2, b) is quite like the head-dress on certain Dry Shelter men.

4. On the right wrist of the same Brownsfield man is an ornament almost identical with ornaments usually worn on the right wrist of the typical Dry Shelter men.

5. The left hand of this man holds an arrow quite like the one or more arrows usually held in the left hand of the Dry Shelter men. Also, Brownsfield man "c" holds a line in his left hand, probably representing an arrow. The Dry Shelter men frequently hold similar lines.

6. Crossed in front of Brownsfield man "b" are two staffs, and to the left of them is another, all of which are almost identical to staffs held by the Dry Shelter men. Brownsfield man "e" holds a similar staff in his right hand. All of these staffs, however, point downward while the Dry Shelter staffs almost always point upward.

7. To the left of Brownsfield man "b" are a slender triangle, probably all that remains of another square-shouldered figure, and two fringed objects not unlike many fringed objects among the Dry Shelter pictures.

8. While we were copying the petroglyphs, one of the party, W. C. Fields, discovered a coiled basket[7] and seven cut straws in association with a burial in the Brownsfield shelter.[8] Since material of this kind is common in the Dry Shelters of Val Verde County and has never been found at another site in North-Central Texas, the similarity of the pictures is emphasized.

Although the similarity between the Brownsfield petroglyphs and the Val Verde Dry Shelter pictures seems too great to be explained

---

7. Ray, 1939, pp. 245-246, Plate 54.
8. This shelter was partially excavated by E. B. Sayles but not reported on. He stated in a letter to the writer that he found nothing in the shelter that resembled Texas Cave Dweller material.

away as accidental, it must be admitted that important differences exist which make it difficult to believe that the petroglyphs were actually made by Val Verde Cave Dwellers. Chief of these is the fact that the Val Verde Cave Dwellers are not known to have ever made petroglyphs, although there are more than fifty sites of their pictographs in Val Verde County. The detail of the robes on the Brownsfield figures is unlike any found in the Dry Shelter pictures. And also, the seven red negative hand prints in the Brownsfield shelter are a point of difference, since the Dry Shelter people never made hand prints of any kind. These, however, may not have been made by the Indians responsible for the petroglyphs.

The limited material at this site hardly justifies more than a suggestion that there may be some relationship between this shelter and the dry shelters in Val Verde County. But until more examples of the Brownsfield petroglyphs are found this relationship will probably remain a mystery.

The Fort Chadbourne Petroglyphs

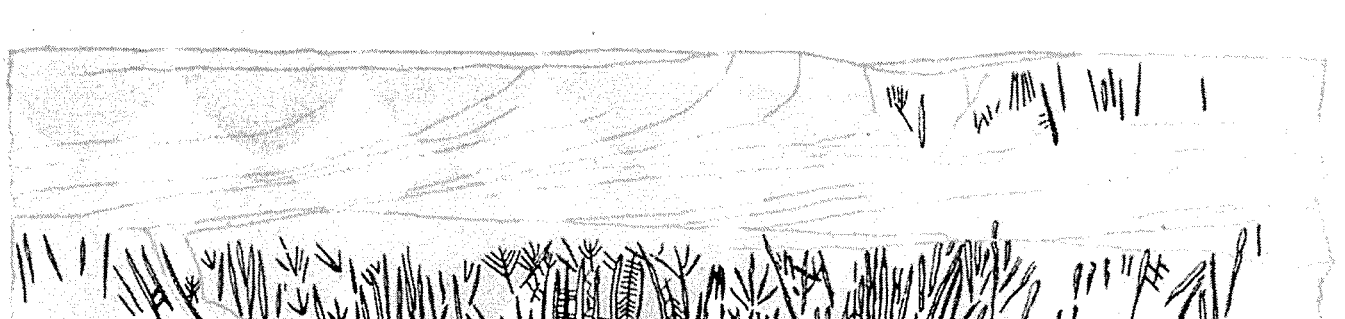
Still another type of petroglyphs in North-Central Texas was reported by E. B. Sayles[9] in the 1930 Annual Bulletin of the Texas Archeological and Paleontological Society. At that time Sayles found two sites of this culture, one in Taylor County and another in Coke County; but only the larger site in Coke County was described in the report. This site is on the sandstone walls of a cave on the bank of a creek near the site of old Fort Chadbourne. In the fall of 1940 a third and more extensive site containing this same type of petroglyphs was discovered about two miles west of the town of Fort Chadbourne by Dr. Cyrus N. Ray. In April, 1941, the writer and his wife accompanied by Dr. Ray, examined and made accurate copies of the petroglyphs there (Plate 11; Plate 12, No. 1). Most of the pictures at the site are under shallow shelters near the top of a small mesa; three small designs are on boulders at the foot of the hill.

9. Sayles, 1930.

PLATE 11

These are the principal designs west of Fort Chadbourne. No. 1 represents 13 feet of the shelter wall. Note that the designs are almost weathered away on the right end which is slightly exposed to blowing rain.

Plate 11



No. 1

No. 2

No. 3

The Designs Resemble Abrading Marks

The designs, resembling abrading marks, are deeply rubbed into the standstone walls of the shelters, in some cases, to a depth of about one inch. Most of the grooves are about three-fourths of an inch wide and exhibit a round bottom; a few are V shaped. They are closely spaced and most of them are perpendicular to the floor of the shelter. A few branch out from larger grooves like limbs from a tree. Three or four were cut across the perpendicular grooves at right angles. Shallow zig-zag lines were cut between a few of the larger grooves. Only one small circle and a very few curves were found among the many straight lines.

Whether these petroglyphs resulted from the sharpening of tools on the shelter walls or were made for some other purpose cannot be definitely determined. It is certain, however, that some of the grooves were added solely for the sake of design, which clearly distinguishes these petroglyphs from so called abrading marks, and gives them a distinctive character easily distinguished from other types.

Evidence of Age

Most of the designs in the cave near old Fort Chadbourne have been well protected from the elements and although they look old, they show very little weathering[10]; however, the best protected designs at the site west of Fort Chadbourne are considerably weathered. About half of the designs are exposed to blowing rains and are almost entirely weathered away although they must have been an inch deep originally. The shallow lines added for decoration, if they ever existed, are completely gone. A few fragments of the cliff containing the designs have split off and fallen down the talus.

A third site containing Fort Chadbourne type petroglyphs is located a few miles south of Merkel in Taylor County. This is the Taylor County site discovered by Sayles. Here the petroglyphs are located on the back wall of a small shelter near the top of a large mesa. They consist of only a few short grooves crossed in one place by a horizontal line, but lacking the shallow decoration lines found at the other sites (Plate 12, No. 2). Although they are well protected from the elements, the lines appear to be old and weathered.

10. Sayles, 1930, Plate 4.

The cave near old Fort Chadbourne was completely excavated by E. B. Sayles in 1930, but nothing indicating extreme age was reported. The Taylor County shelter was also excavated by Sayles but nothing was found that sheds light on the age of the petroglyphs.[11]

Ancient Camps Surround the Sites

The site west of Fort Chadbourne has little or no midden in the shelters; however, there is an extensive surface camp around and on top of the mesa. This camp has yielded various kinds of Clear Fork artifacts[12] as well as one fragment of a channeled point found on the north side of the same mountain. Clear Fork material has also been found on a surface camp on the hill above the cave near old Fort Chadbourne. And Folsom and Yuma points as well as Clear Fork artifacts have been found on a camp at the base of the mesa just below the shelter in Taylor County.

But no way has yet been found to connect the petroglyphs with the artifacts made by the same Indians and lost on the adjoining camps. Whether the Fort Chadbourne petroglyphs are the work of the Clear Fork people as has been suggested, or a much later culture, remains to be demonstrated.

Petroglyphs by Late Indians

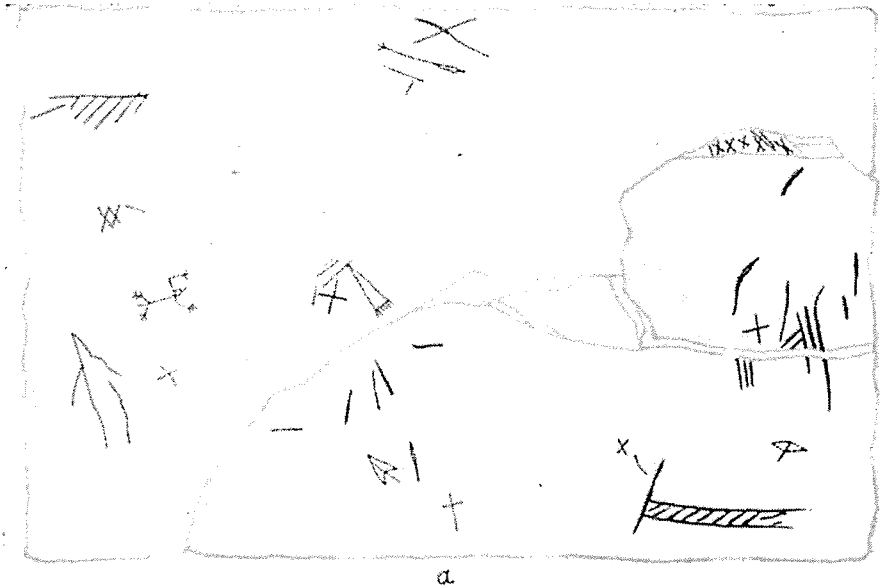
There are, however, a few designs on the ceiling of the deepest shelter at the site west of Fort Chadbourne which definitely are not of the Fort Chadbourne type. They consist of three human figures, numerous cross marks, and various other simple elements, lightly scratched or rubbed into the surface of the rock (Plate 12, No. 1, a and b). They are unquestionably the work of Indians, but appear almost as recent as certain names and initials on the same rock. They

11. Letter from E. B. Sayles.
12. The writer is indebted to Dr. Cyrus N. Ray for information about material from the surface camps.

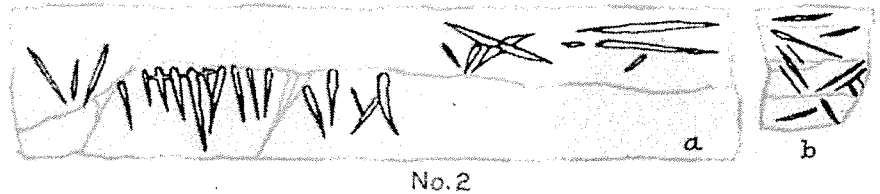
PLATE 12

No. 1. These are designs at the site west of Fort Chadbourne. "a" and "b" are on the ceiling of the largest shelter and, except for a few deep grooves, are not Fort Chadbourne type petroglyphs. "d" is on a rock which fell from the cliff down the steep talus. "c," "e," and "g" are on boulders at the foot of the mountain.

No. 2. These are the designs in the shelter in western Taylor County.



No. 1



No. 2

Plate 12

resemble other simple carved and painted pictures in various parts of the state and are probably the work of roving bands of Plains Indians in early historic time.*

It is interesting to study the various types of Indian pictures in different parts of the state and, when possible, to determine their relationship and age sequence. And they should be described and illustrated in scientific literature; but the chances of arriving at an accurate age or proving a definite connection with a particular type of artifact is indeed very remote, except perhaps, at a very few sites in the State.

501 Rio Grande National Building,
Dallas, Texas

References Cited

Bryan, Kirk

1938. Deep Sites Near Abilene, Texas. Texas Archeological and Paleontological Society Bulletin, Volume 10.

Kidder, Alfred Vinsen, and Guernsey, Samuel J.

1919. Archeological Explorations in Northeastern Arizona, Bureau of American Ethnology, Bulletin 65.

Kirkland, Forrest

1939. Indian Pictures in the Dry Shelters of Val Verde County, Texas. Texas Archeological and Paleontological Society Bulletin, Volume 11.

Ray, Cyrus N.

1930. Report on Recent Archeological Researches in the Abilene Section. Texas Archeological and Paleontological Society Bulletin, Volume 2.

---

*Editorial Note: There is an extensive covered site of the Clear Fork Culture which is now eroding from gravel and red silt in a large valley floor between the mountains immediately to the north of this site. There is a Clear Fork site on the North slope of the mountain which contains the petroglyphs, in which I found a part of a Folsom blade. On the shelf at the west side of the mountain is a campsite which probably was occupied by more recent Indians but no signs occur there of historic occupation. In the general region of these petroglyph sites, Clear Fork gouges, dart heads, spokeshaves, gravers, side scrapers, disks and other components of that Culture erode from the gravels and dark red silts of deep gullies. More graver points have been found in such eroded campsites than in any other part of the Abilene region, and this is also true of Folsom and Yuma blades.—Cyrus N. Ray.

Ray, Cyrus N.

1939. Some Unusual Abilene Region Burials. Texas Archeological and Paleontological Society Bulletin, Volume 11.

Ray, Cyrus N., and Bryan, Kirk

1938. Folsomoid Point Found in Alluvium Beside A Mammoth's Bones. Science, Volume 88.

Sayles, E. B.

1930. A Rock Shelter in Coke County. Texas Archeological and Paleontological Society Bulletin, Volume 2.

INFANT BURIAL IN CARRYING BASKET

By E. B. Sayles

While making a survey of Texas, in 1932-33 for Gila Pueblo, several sites were investigated in the Rustler Hill Region, about 40 miles northwest of Toyah. In one of these an infant burial was found, which is now described with the permission of the director of Gila Pueblo.

The site is a typical sink-hole shelter, formed by water carrying away the gypsum strata which underlie the surface limestone.[1] The latter, being more resistant, forms a dome; the ceiling eventually falls, which leaves a cave with an overhanging encircling rim.

These sites were generally occupied by prehistoric man, the camp debris being preserved where moisture had not touched it, although much of the human debris of every site investigated by this writer had been burned. This was true of this site.

The principal part of the sink-hole occupied was that directly beneath the opening, where hearth stones were abundant. This was reached from the surface by a slope, where drainage into the cave had built up a talus covering the bed rock which formed the principal living area, and which was about 20 feet below the outside ground level. On each side of this living area the overhanging rim provided protection; opposite to the entrance slope was an extension of the sink-hole, semi-dark, ending in a small sink into which the surface water disappeared, after draining along each side of the main part of the shelter.

This semi-dark extension of the cave was on a general level about 15 feet lower than the living area, which was limited by the sheer drop in the bed rock to the lower part of the cave. Debris had accumulated mainly in the lower level and had formed a talus extending from the living area to the lower space.

The site had had a great deal of occupation as evidenced by sotol-pits on the outside, round mortar holes in the exposed limestone of the rim adjoining the cave; also by numerous pictographs covering

1. Similar sites in the same area have been investigated and described by Jackson, A. T., 1937, pp. 146-192.

parts of the walls of the shelter, but particularly by the accumulation of refuse in the cave itself. This extended from beneath the overhanging rim, where it was protected from moisture, a width of about 60 feet, and to a like distance into the darker part of the cave.

The deepest part of this refuse was where it joined the living area; that is, along the face of the bed rock, where it dipped to the lower part of the cave. Here the trash was 7 to 8 feet deep, and from here it sloped, becoming thinner, until it joined the guano which covered the floor of the darker part of the cave.

The basket had been buried near the face of the bed rock, where it dipped into the lower part of the cave. The antelope skin covering the basket was at a depth of 4 feet, 6 inches below the surface.

PLATE 13

INFANT BURIAL IN CARRYING BASKET

1. Sink Hole Shelter, to right of car; diameter of opening about 60 feet.

2. Twined Carrying Basket containing infant burial with objects shown in this Plate 13 and Plate 14. The twined basket was supported by four yucca stalks, tied with yucca leaves to an oval frame, formed by a bent twig. Twine consists of two-strand yucca fiber cords; the encircling elements are twisted about the upright ones and are looped onto the frame. The basket is fastened to the yucca stalks by some of the elements being looped around them.

The head band consists of two broad yucca leaves, tied by yucca fiber cords to the framework. Maximum diameter of oval frame, 56 cm.

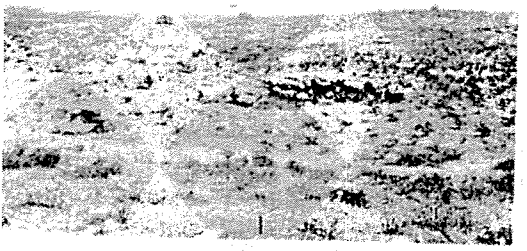
3. Desiccated body of still-born infant; short brown hair. Length 35 cm.

The infant lay on the pad of down covering the squirrel skin Pl. 14, No. 3, and was wrapped in the rabbit skin blanket, Pl. 13, No. 4. With it were the dog, Pl. 14, No. 9, and fox, Pl. 14, No. 10, skins, the string of olivella shells, Pl. 14, No. 2, hank of human hair, Pl. 14, No. 7, two "prayer" sticks, Pl. 14, No. 5, cotton yarn, Pl. 14, No. 8, and bull-roarer, Pl. 14, No. 4, which had been broken, the two parts laying side by side.

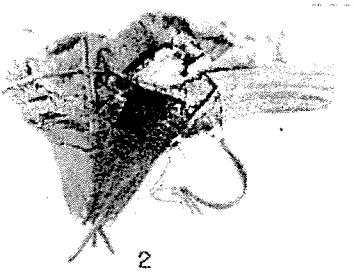
All of these were wrapped in the twined mat, Plate 13, No. 5, which was tied in a roll with the hair cord, Pl. 14, No. 6, and placed in the carrying basket. This bundle and the basket were then covered by the antelope skin, Pl. 14, No. 1, and over it were several pieces of ocotillo, *Fouquiera splendens* (Engelm.), stalks, crossed upon one another, and covered with grass.

4. Rabbit Skin Blanket: Strips of rabbit skin twisted on yucca fiber cord and loosely held together by yucca fiber cordage in a simple one over, one under twining. Cordage of two fiber strands. Approximate width, 80 cm.

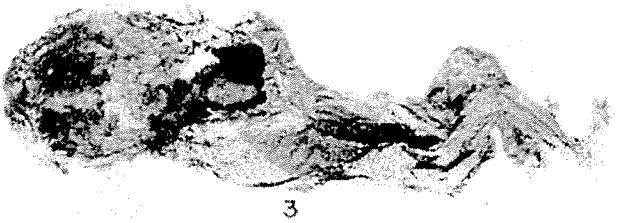
5. Mat: Of bunch grass, *Nolina texana* (Watson), leaves held together by yucca fiber cord in a simple one over and under fashion; two outside warps interlocked. Width, 85 cm.



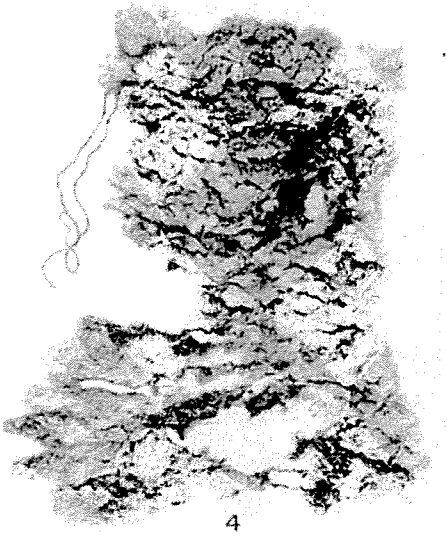
1



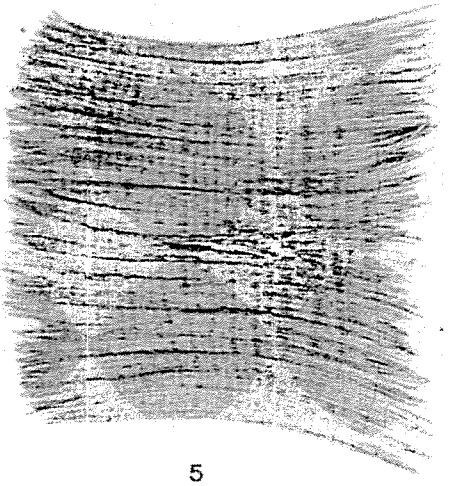
2



3



4



5

Plate 13

The basket rested upright in an excavation made for it through several very compact strata. The topmost one was of rotted fiber, followed by dust and stone, then a thicker deposit of rotted fiber, underlain by one of loose, burnt fiber and stone; then rotted fiber resting on the guano. The overlying deposits were quite different. At the surface of the midden was about a foot of loose sticks with but few artifacts. Beneath this was a single deposit of rather irregular layers of fiber, ash, dust and burnt stone, containing potsherds identified with El Paso Polychrome and associated wares.[2] The underlying deposits, in which the excavation for the burial had been made, contained no pottery.

The cultural remains have been analyzed as Hueco Cave Dweller,[3] a period of the Texas Cave Dweller, in which pottery was present, probably intrusive, in the latest stage, but which lacked pottery in earlier stages. Other than this difference in the presence of pottery in the last stage, trait differences have not been established.

There is every indication that there were earlier stages of the Hueco Cave Dweller than those defined with pottery. Howard has found, in the Guadalupe Mountains to the north, certain extinct fauna associated with artifacts in deposits underlying what appear to be typical Basket Maker II artifacts.[4] At another site identified with this culture, the writer found the radius and mandible of Tetrameryx.[5] The Conkling Cave,[6] with various extinct species in association with man, is also in the same region. There is sufficient evidence that man was in the area identified with the Hueco Cave Dweller at a fairly early time, as measured by American archaeology. There is no evidence as to how early the Hueco Cave Dweller may have been, but we can assign an estimated date of about 1100-1300 (?) A. D. to the pottery that overlies this burial. This date probably also represents the last stage of the culture.

The culture, as now known, is comparable to that of other Texas Cave Dwellers in many respects, differing mainly in the presence of pottery in the last stage, varied sandal forms, and particularly

---

2. Stallings, W. S., Jr., 1931.
3. Sayles, E. B., 1935, p. 66; Table 6.
4. Howard, E. B., 1932, pp. 7-19.
5. This site is known as the "Ceremonial Cave," about 20 miles northeast of El Paso. It has been investigated by the Cosgroves, Peabody Museum, and by Roberts, F. H. H., Jr., 1929, pp. 1-14; also described, briefly, by Alves, E. E., 1930, pp. 64-68.
6. Conkling, R. P., 1932, pp. 7-19.

in the absence of many traits which characterize other periods of Texas Cave Dwellers. It would, however, appear to belong to that pattern rather than to the more highly specialized and geographically restricted Basket Maker Culture of the Southwest, which seems limited to the Four Corners area, while the Texas pattern has been found at least as far north as the Panhandle of Oklahoma, south into Chihuahua and west well into New Mexico.[7]

While the objects found with this burial are interesting in indicating a burial custom, represented by rather well-preserved specimens, see Plates 13 and 14, several things may be pointed out:

First of all, the custom represented is not exactly that of other Texas Cave Dwellers, in which an infant is buried in a cave in a

7. For descriptions of Texas Cave Dweller and Basket Maker Cultures, see references below.

PLATE 14

INFANT BURIAL IN CARRYING BASKET

1. Antelope Skin: Cut lengthwise and squared off at lower end; legs and head removed. A slit, 38 cm. in length, midway along the back, had been sewn together with yucca fiber cord. Length, 85 cm.
2. Ten *olivella* shells strung on a fine, two-strand yucca fiber cord.
3. Skin: Squirrel (?) skin covered with a mat of fine bird down. Length, 27 cm.
4. Bull-roarer (?): Thin piece of wood slightly curved, pointed at one end, squared at the other, with five perforations; all edges bevelled; rich brown color. Length, 42 cm.
5. "Prayer" Sticks: Bird bones with tufts of iridescent duck (?) feathers; the larger end of each bone is incised with a series of notches and two parallel transverse lines on the outer surface only; smaller ends are bevelled. Length, 19 cm.
6. Twine: Coarse, reddish brown hair; bison (?); 8 single-strand cords, each approximately 2 mm. in diameter, twisted together forming a cord about 12 mm. in diameter.
7. Hank of human (?) hair; dark brown; cut evenly at one end. Length, 35 cm.
8. Cotton Yarn: Thirty, unevenly spun threads, varying from .05 to 2 mm. in diameter, tied in the middle with a yucca fiber cord and twisted so as to form a loose rope-like yarn about 5 m. in length. The loose ends of the threads were twisted to form two cords and knotted.
9. White and Brown Dog Skin: Held in a fold by three leather thongs knotted at each end and placed through slits made in the skin. Each thong about 10 cm. in length and spaced equally from top to bottom of the skin and about 20 cm. from the fold; lower part of skin cut squarely.
Raw side of skin shows red pigment. Length, 71 cm.
10. Fox Skin: Carcass had been removed through a short cut along the belly and by splitting hind legs and tail; all feet removed, the skin forming a natural pouch. Length 88 cm.

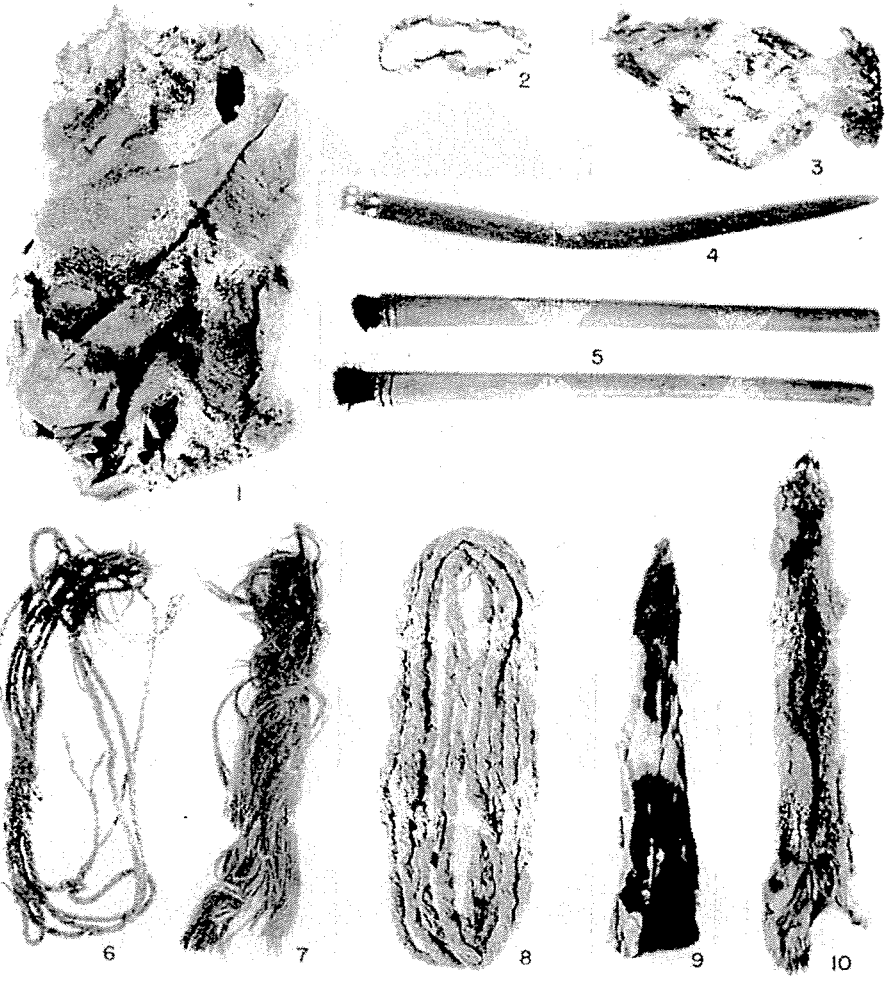


Plate 14

bundle, but without a basket container.[8] The motive is probably the same, but the particular custom found here is more suggestive of that in the Basket Maker-Pueblo area, to the west, where child burial is frequently made in a cradle.[9]

Other western connections are suggested in the presence of the olivella shells (from the Gulf of California, or Pacific), probably in the cotton, the "prayer" sticks, the bull-roarer, and the carrying basket. The latter is known to have been used both by the Apache and Pima during historical times.[10]

Dog remains are common as bones but other remains of this domesticated animal from prehistoric times are not common.[11]

The rabbit fur blanket and the twined mat are typical of the Texas Cave Dweller.

The hank of human hair seems evidence of the rather widespread custom of cutting off the hair as a sign of mourning. Further evidence of this sacrifice seems to be indicated by all the objects, as they unquestionably represented a great deal of wealth.

Gila Pueblo, Globe, Arizona.

REFERENCES

Alves, E. E., 1930. *Shelter Caves of the El Paso District,* Texas Archeological and Paleontological Society, Vol. II, pp. 64-68. Abilene.

Amsden, C. A., 1938. *The Ancient Basketmakers,* The Masterkey, Vol. XII, No. 6, pp. 205-214. Southwest Museum, Los Angeles.

1939. *Ibid,* Vol. XIII, No. 1, pp. 18-25.

Conkling, R. P., 1932. *Conkling Cavern: The Discoveries in the Bone Cave at Bishop's Cap, New Mexico,* West Texas Historical and Scientific Society, Publication No. 4, pp. 7-19 (Sul Ross State Teachers College, Bulletin 44). Alpine.

Guernsey, S. J., 1931. *Explorations in Northeastern Arizona,* Papers, American Archaeology and Ethnology, Peabody Museum, Harvard University, Vol. XII, No. 1. Cambridge.

8. The writer has found evidence of infant burials in several caves correlated with the Pecos Cave Dweller; this custom has also been reported by other investigators working in the same area.
9. Haury, E. W., 1934, pp. 68-72.
10. Russell, F., 1908, pp. 140-143.
11. Guernsey, S. J., 1931, Pl. 52, E, illustrates a pouch made from a dog skin; Basket Maker II Culture.

Guernsey, S. J., and Kidder, A. V., 1921. *Basket-Maker Caves of Northeastern Arizona,* Papers, American Archaeology and Ethnology, Peabody Museum, Harvard University, Vol. VIII, No. 2. Cambridge.

Haury, E. W., 1934. *The Canyon Creek Ruin and the Cliff Dwellings of the Sierra Ancha,* Medallion Papers, No. XIV, Gila Pueblo. Globe.

Holden, W. C., 1937. *Excavation of Murrah Cave,* Texas Archeological and Paleontological Society, Vol. IX, pp. 48-73. Abilene.

Howard, E. B., 1932. *Caves Along the Slopes of the Guadalupe Mountains,* Texas Archeological and Paleontological Society, Vol. IV, pp. 7-19. Abilene.

Jackson, A. T., 1937. *Exploration of Certain Sites in Culberson County, Texas,* Texas Archeological and Paleontological Society, Vol. IX, pp. 146-192. Abilene.

Martin, G. C., 1933. *Archaeological Exploration of the Shumla Caves,* Big Bend Basket Maker Papers No. 3, Southwest Texas Archaeological Society, Witte Memorial Museum, Bulletin 3. San Antonio.

Martin, G. C., and Woolford, S., 1932. *Painted Pebbles of the Texas Big Bend.* Texas Archeological and Paleontological Society, Vol. IV, pp. 20-24. Abilene.

Mera, H. P., 1938. *Reconnaissance and Excavation in Southeastern New Mexico,* Memoirs of the American Anthropological Association, No. 51. Menasha.

Nusbaum, J. L., 1922. *A Basket-Maker Cave in Kane County, Utah,* Indian Notes and Monographs, Museum of the American Indian, Heye Foundation. New York.

Pearce, J. E., and Jackson, A. T., 1933. *A Prehistoric Rock Shelter in Val Verde County, Texas,* University of Texas Bulletin No. 3327, Anthropological Papers, Vol. I, No. 3. Austin.

Roberts, F. H. H., Jr., 1929. *Recent Archaeological Developments in the Vicinity of El Paso, Texas,* Smithsonian Miscellaneous Collections, Vol. 81, No. 7. Washington.

Russell, F., 1908. *The Pima Indians,* Bureau of American Ethnology, Twenty-sixth Annual Report. Washington.

Sayles, E. B., 1935. *An Archaeological Survey of Texas,* Medallion Papers, No. XVII, Gila Pueblo. Globe.

Setzler, F. M., 1935. *A Prehistoric Cave Culture in Southwestern Texas,* American Anthropologist (N. S.), Vol. 37, No. 1, pp. 104-110. Menasha.

Smith, V. J., 1932. *The Relation of the Southwestern Basket Maker to the Dry Shelter Culture of the Big Bend,* Texas Archeological and Paleontological Society, Vol. IV, pp. 55-62. Abilene.

1933. *Sandals of the Big Bend Culture with Additional Notes Concerning Basket Maker Evidences,* Texas Archeological and Paleontological Society, Vol. V, pp. 57-65. Abilene.

1934. *Hord Rock Shelter,* Texas Archeological and Paleontological Society, Vol. VI, pp. 97-106. Abilene.

1938. *Carved Rock Shelter,* Texas Archeological and Paleontological Society, Vol. X, pp. 222-233. Abilene.

Stallings, W. S., Jr., 1931. *El Paso Polychrome,* The Laboratory of Anthropology, Archaeological Survey, Technical Series, Bulletin 3. Santa Fe.

POTTERY TYPES FROM THE BELCHER MOUND SITE

By C. H. Webb and Monroe Dodd, Jr.

Our report[1] of last year concerning house types among the Caddo Indians featured the description of five house floors from the Belcher mound site in Caddo Parish, Louisiana. Four of these were immediately superimposed on separate levels of the stratified Mound B and, as mentioned in the previous report, a study of the sherds from the four levels showed distinct differences in the potteries. This evidence of pottery sequence, in addition to a correlation of types among the whole vessels from the burial pits and house floors, forms the basis of this report on pottery from the Belcher site.

The existing classifications of pottery and other culture traits in the historic Caddo area are admittedly incomplete, occasioned by the paucity of careful excavations and complete area studies. Moore's[2] extensive collections from the Red and Ouachita River valleys, instructive in affording a broad survey of regional artifact types, give little help in differentiation of these types. The same objection obtains for Harrington's[3] study in Southwest Arkansas, since he groups everything in the area as Caddo, although subtypes of the Caddo material—and probably some non-Caddo—are evident in the report. Walker's[4] report of the Natchitoches site, useful in linking the engraved wares with the historic Caddo, was minimized by the destruction of much of the site before he arrived, leaving little material for study. Ford's[5] tentative classification of Caddo pottery types of Louisiana is based chiefly on surface collections and, admittedly, must await the results of numerous excavations before it can be stabilized. Jackson[6] considered the pottery of East Texas, including the areas of the historic Caddo and related Asinai, as well as prehistoric sites, to be fairly uniform, with some significant differences related geographically to the four principal river basins.

Goldschmidt[7] suggested a chronological sequence of Caddo types in East Texas, chiefly on the basis of intrusive burial pits. Multiple pottery placements and the presence of engraved wares characterized the more recent burials. Lemley and Dickinson's[8] report of the

Crenshaw site is important in definitely establishing a pre-Caddo (Cole's Creek) culture, and subsequently[9] they pointed out the indications in Southwest Arkansas of an intrusion of engraved Caddo wares into an indigenous widespread incised-ware culture. Swanton[10] indicates historic evidence for a post-DeSoto migration of a Caddo people down Red River Valley from Southwest Arkansas coming into an area already well populated with Caddo tribes. Current excavations in East Texas and Oklahoma may throw further light on culture sequences and relationships in this area.

Since our previous report, the four-foot fill separating house floors V and VI, immediately superimposed on the plateau north of Mound B, has been almost completely removed. Six burials below floor V have yielded 62 whole vessels and four other vessels from floor VI have been reconstructed. The addition of this material to the vessels from Mound B gives a total of 163 whole vessels from burials and house floors for our study. Table 2 shows the origin of these vessels. Table 3 gives the summary of 5100 sherds from the four levels of Mound B, in addition to which our pottery typing is enhanced by numerous sherds from floors V and VI and from the surface for a half-mile downstream. It may be mentioned that the separation of the pottery-bearing floor levels of Mound B by 2 to 3 feet of almost sterile sand fill facilitated the sherd collection, and as each floor was carefully troweled, we believe that comparatively few sherds were missed.

There may be some objection to a grouping of house floor sherds and burial vessels for classification, since some tribes made special funerary wares. At the Belcher site, vessel types from burials without exception have sherd representation from the floor collections and from the surface of the village site downstream. Furthermore, many of the vessels from burial pits showed marks of usage, including old breaks from the lips or necks and soot on the culinary wares, indicating that burial placements were chosen from previously made and used pottery. The relative frequency of ornate and unusual forms among the burial placements indicates selectivity in the choice of these vessels, but there is no particular evidence of a specialized funerary ware.

To date, no European trade objects have been found, although the cultivated surface layer yields comparatively recent objects. Ap-

parently the site was deserted before contact with Natchitoches, (1717) or other trading centers, was established.

Type 1—Belcher Engraved

Caddo pottery apparently reached its peak in the development of the engraved wares, with variegated vessel shapes, polished surfaces and complex curvilinear designs engraved after firing, with pigments impressed into the lines. At the Belcher site, this type flourished during the last two phases of occupation.

The paste is predominantly clay with occasional shell or tufa, tempered, fine textured, usually having black or brown core and a smooth surface slip, more frequently black or mahogany, although buff to reddish brown surfaces appear. Differential firing is frequent. Inner surfaces are smooth, outer surfaces smooth and often polished. Fracture patterns indicate coil technique. Hardness ranges from 2 to 2.5.

Reference to Table 1 shows that a number of decoration techniques and elements were used, engraving, pigment impression and spurred lines being the more frequent. Decoration patterns are varied, usually featuring curvilinear designs, with scrolls, interlocking scrolls, concentric circles, semicircles in festoons and arches, spirals and meanders all represented. Discs, ovals and bands often appear in negative relief, outlined by lines, arcs or circles. These patterns may appear in fields or units and are most frequently repeated 4 times around the vessel, although division of the vessel circumference into 3, 5 and 2 units occurs in this order of frequency.

Table 1.

Frequency of decoration techniques in the 13 subtypes of engraved Belcher pottery.*

Engraved lines	13	subtypes
White or red pigment in lines	11	"
Spurred lines	11	"
Narrow hachured bands	7	"
Lip notching	3	"
Engraved punctates	3	"
4 Nodes on rim or shoulder	3	"
Trailed lines on base	1	"
Opposed suspension holes	1	"

*Compound vessels not considered here as a separate subtype.

Subtype a: Shallow bowls (Plate 15, No. 1), 10 to 28 cm. diameter, with flat bases (all bases at this site are circular), angulated shoulders and flaring rims. Four nodes project from the shoulder, outlined by two to four diagonal lines, with the intervening shoulder space bisected by an interrupted horizontal or slightly diagonal line. The shoulder angle between the nodes is notched. A horizontal plain or spurred line and a parallel row of triangular punctates encircle the rim. White pigment appears in the lines. Paste is nearly always black or chocolate throughout and is fine textured, with clay temper in all except one vessel, which is shell tempered.

Subtype b: Flat bowls (Plate 15, No. 2), 11 to 26 cm. diameter, with convex bases, incurving narrow rims and rounded lips from which four nodes project upward. A narrow band of decoration on the rim is divided into four fields by vertical arcs below the nodes, the arcs enclosing an oval in which appear interlocking arcs. Each larger field contains flattened S figures, sometimes conventionalized into a zig-zag, in negative relief, outlined above and below by engraved arcs forming small discs. Pigment in lines is white.

Subtype c: Shallow basins (Plate 15, No. 4), 11 to 26.5 cm. wide, bases usually convex, rims taller than previous forms and almost vertical. Decoration band on outer rim, with horizontal lines (plain, spurred or narrow hachured bands) combined with vertical arcs to produce flattened horizontal-L or fish-hook figures. Vertical arcs divide the decoration band into 2 or 4 segments. Red pigment in lines.

Subtype d: Slightly deeper bowls (Plate 15, No. 3), 12.5 to 21 cm. diameter, with convex and almost hemispherical base, strongly insloping rims and rounded lips. Vessel walls thin, averaging 3.5 mm. Four of the twelve vessels have trailed curvilinear designs of concentric circles, spirals or interlocking scrolls over the base, in addition to the rim decoration. The rims have a band of decoration units, 2 to 4 around the vessel, with a figure similar to the horizontal-S of *subtype b*, outlined by reticulated fields, closely placed lines or upright arcs. The flat-S figure sometimes is conjoined in a series of 2 or 3, at times having a geniculate appearance. It is possible that all of the horizontal-L and S figures are flattened conventionalizations of the interlocking scroll prevalent in the engraved wares of *Type 1*. Red pigment in lines of 2 vessels, white in 1.

Subtype e: Shallow bowls with high vertical rims and direct or slightly everted lips. Color buff or brown, paste slightly coarser than previous four subtypes, and no shell tempering is seen. Decorated with curvilinear lines, often cross-hatched bands or spurred lines, forming semicircles, circles and scrolls. Diagonal rim notching on one sherd. Lines do not contain pigment. *Subtype e* is the bowl type for the fourth or deepest occupation level and no whole vessels were found.

Subtype f: Semiglobular bowls with widely flaring rims (inverted helmet, Plate 15, No. 5), 9.5 to 15 cm. wide at lip. Bases convex, lips thinned and, in four instances, notched. Body and rim decorated over outer surface, the former having interlocking scrolls outlined by meanders, the rims having semicircles or rounded chevrons, either as concentric festoons from the lip or arches from the shoulder. One vessel has concentric circles instead of scrolls on the body. White pigment in lines.

Subtype g: Small bowls (Plate 15, No. 7), with insloping wide shoulders and flaring narrow rims. Three vessels have 4 equidistant nodes projecting upward from the lip. Decoration on outer shoulder area of concentric arches formed by spurred lines and punctated bands, or of inter-locking scrolls encircling the shoulder. One vessel has two parallel horizontal lines across the shoulder, with tent-like triangular projections from the lines. Either white or red pigment. Shell tempering, an addition to the clay, appears in 5 of 9 vessels, tufa in 2.

Subtype h: Conical bowls with flat base, straight side walls and rounded lips. Decoration on 5 separate fields covering the entire outer wall, of interlocking scrolls outlined by plain or spurred lines, the background filled with small circles. Only 1 whole vessel and a few sherds of this type were found.

Subtype i: Vase forms (Plate 15, No. 6), with modified globular bodies and high vertical rims, the total height 13.5 to 16.5 cm. One vessel has a yellow core revealed by engraved lines through the red slip (black in areas due to irregular firing). Rims are decorated

PLATE 15

Type 1 Belcher Engraved vessels. Nos. 1 to 4 are open bowl forms, *Subtypes a, b, d* and *c*, respectively. Nos. 5 and 7 are small bowls, *Subtypes f* and *g*. No. 6 is a vase form, *Subtype i*. Note pigment in engraved lines of the designs.

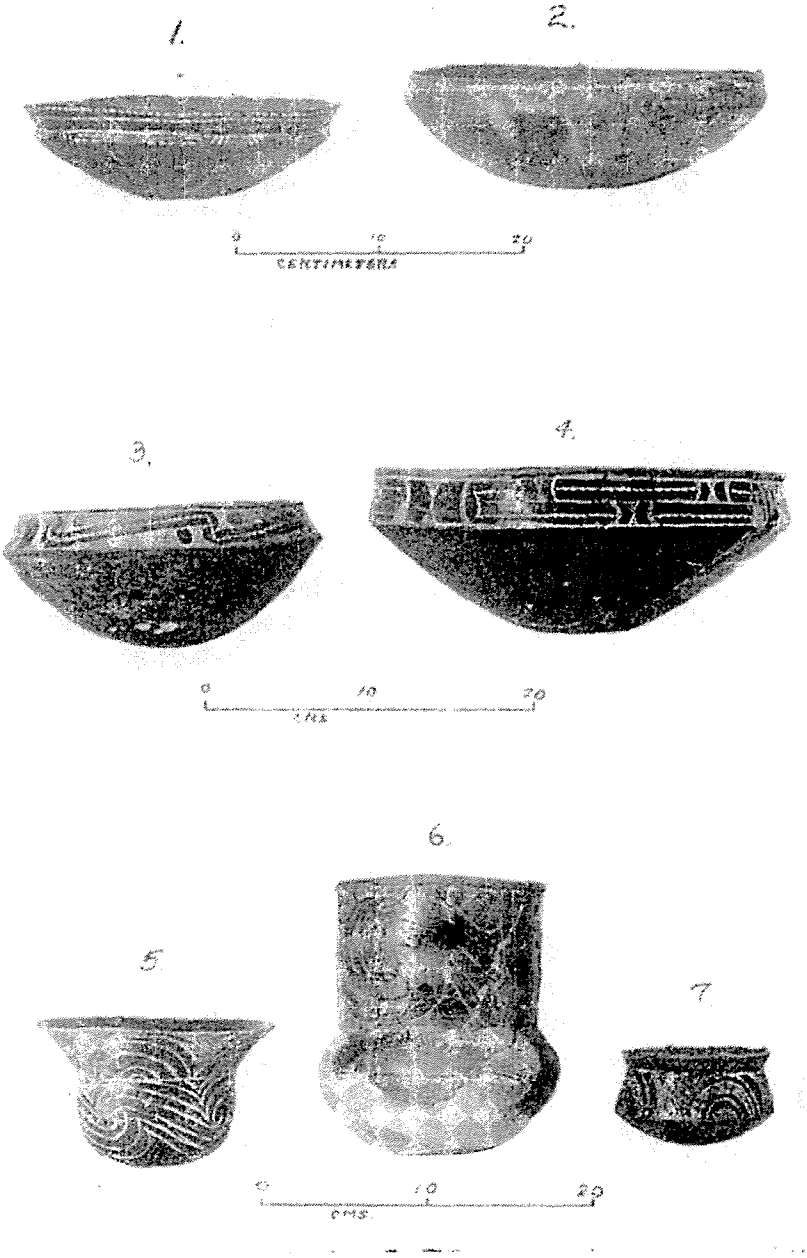


Plate 15

with interlocking scrolls formed by plain and spurred lines and outlined by fields of engraved circles containing negative discs. 2 to 4 suspension holes are present on each side of the rim near the lip. One vessel (from 4th floor burial) is thicker, made of coarser paste, and has parallel lines encircling the rim, with a scroll pattern on the upper body. The other two vessels have undecorated bodies.

Subtype j: Water bottles (Plate 16, No. 4) 14 to 20 cm. high, with almost globular bodies, small flat base, cylindrical neck and everted narrow rim. Surface brown to black; red or white pigment used in lines. The design, four times repeated, consists of concentric circles formed by alternately continuous and interrupted lines and surrounding a disc with projecting triangles, evidently the sun symbol. All of these vessels are clay tempered.

Subtype k: Water bottles (Plate 16, No. 1) 15 to 23 cm. high, with flattened bodies, cylindrical necks curving outward near the lip and flat bases. Surface is mahogany to black in color and highly polished. One bottle of this type is shell tempered, all others clay. Decoration consists of meanders, scrolls or festoons of semicircles, using plain or spurred lines with red pigment insertions. Two or three parallel lines encircle the shoulder area.

Subtype l: Water bottles (Plate 16, No. 2) with globular bodies, small flat bases and bulging or biconical necks with flaring rims. Decoration in four separate fields, of three discs in a vertical row, separated and surrounded by fields containing concentric arcs, semicircles, interlocking scrolls or interlocking narrow bands. One highly ornate vessel has stippled discs, hachured fields and spurred line elements. The decoration includes the neck in this vessel. Another bottle of this type (Plate 16, No. 3) has tripod support. It is shell tempered, all others clay.

Subtype m: Effigy vessels (Plate 16, Nos. 5, 6, 7), including a land terrapin and two bird bowl effigies. The terrapin has bands on each side with design elements like those on rims of *Subtype c.* One bird bowl of shell tempered black ware has white pigment impressed into the three lines which encircle the body. The head is conventionalized. The smaller bird effigy has a hollow head containing small pellets which rattle when shaken.

Subtype n: Compound vessels (Plate 16, Nos. 9, 10), in one instance combining a bowl of *Subtype a,* atop a globular body; in another instance a pot form made of yellow paste with a red slip through which the design is engraved. The rim suggests a bowl of *Subtype d,* seated on a globular body which has a scroll design. Four suspension holes are opposed near the shoulder area.

Type 2—Foster Trailed-incised

Apparently coeval with the engraved wares at Belcher is a group of several vessel forms in which trailed and heavily incised decorations appear consistently. Moore[11] illustrates a number of vessels of this type from the Foster site on Red River in Southwest Arkansas, and examples appear in numerous other collections from Red River and Ouachita River sites.

The paste is similar to that of the engraved wares, clay tempered with occasional tufa or shell; fine to medium fine textured and usually firm. Hardness 2 to 2.5. Cores are usually brown to black, occasionally buff; surface buff to brown with frequent differential firing. Surfaces are smooth but seldom polished, with considerable erosion in some of the small cup forms.

Decoration, usually over the entire outer surface, is produced by firm, deep, U-shaped incisions and shallower, wider trailed lines. Vase forms have secondary decoration of the tall rims with more lightly incised lines and, in one instance, punctates. Fingernail punctates occur on the lip of one vessel and others have shallow lip notching. Small teat-like nodes in groups of 3 project from the center of concentric circle designs on some vessels.

Subtype a: Vases (Plate 17, No. 2) 7 to 14 cm. high, with semiglobular bodies, flat circular bases, and tall outcurving rims ending in unthickened lips. The bodies have concentric circle and semicircle designs formed by deep U-shaped grooves, closely placed. The central discs in four instances have teat-like nodes. Designs are repeated 3 times on most vessels, 4 times on one. The rims bear incised concentric arches, interlocking scrolls or horizontal bands of diagonally incised lines. Punctated triangles appear on one rim.

Subtype b: Conical bowls, 13 cm. wide, whose entire outer wall is decorated with interlocking scrolls flanked by parallel meanders, all formed by trailed lines. Transversely notched lip; flat circular

bottom on the outer surface of which appear three concentric trailed circles.

Subtype c: Modified globular pots and cups (Plate 17, No. 3) 9 to 12 cm. wide, with narrow flaring rims and flat bases. The paste is often soft and eroded badly. Decoration of vertical grooves from rim to base, trailed or heavily incised, U-shaped and closely placed to give a ribbed effect. Fingernail punctated arcs are present on the outer rim surface of one vessel.

Subtype d: Modified jar and bottle forms (Plate 17, No. 1), 10 to 15 cm. high, two of which are elevated on flat cylindrical pedestals. Pear-shaped bodies are decorated with incised or trailed lines forming interlocking scrolls, parallel arcs or fishhook-like parallel scrolls or volutes outlined by meanders. A field of punctates surrounds the shoulder areas. Necks and pedestals have parallel encircling lines. A globular vessel has trailed concentric circles, a punctated field around the shoulder and a short ridged neck resembling a double pulley.

In addition to these subtypes, it is to be noted that both the engraved vessels of *Type 1* and the stamped vessels of *Type 3* have instances of trailed and incised secondary designs.

Type 3—Belcher Stamped

A group of globular bowls (Plate 17, No. 5) found with the engraved and trailed wares in the late period burial pits and house floors, has a characteristic stamped design on neck, body or both.

The paste is shell tempered, fine textured, hardness 2 to 3 with a tendency to flake because of shell tempering. The core is gray to mottled black, the surface predominantly brown, with areas of buff, orange or black due to differential firing. Surface finish smooth, sometimes moderately polished. Although found in burial pits, these vessels were frequently coated with soot.

Decoration on the body wall includes courant spirals (10 instances), concentric circles (4 instances) and concentric diamonds (1 instance), the designs repeated 4 or 5 times. Spirals are formed by a band enclosed between trailed lines and roughened by dentate rocker stamping, or by parallel light trailing. Concentric circles and diamonds are formed by trailed lines. A neck band between

trailed lines is roughened by stamping as described above or by vertical rows of punctates, possibly made with a dentate stamp.

The vessels are 12.5 to 20 cm. in diameter, with walls only 2 to 4 mm. thick. Bases are convex. A narrow flaring rim with thin lip surmounts the decorated neck. A compound vessel (Plate 16, No. 8) combines three cups, each with stamped neck band and different body design produced by trailing or roughened bands.

Moore illustrates vessels with stamped designs of this type from the Friday place on Red River in Arkansas[12] and from Old River Landing on the lower Arkansas River.[13]

Type 4—Belcher Plain

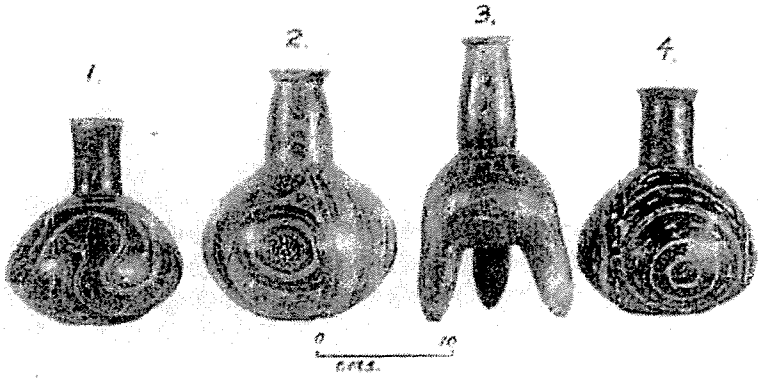
Undecorated vessels are comparatively few in number at this site, only 10 whole vessels and less than half of the sherds (Table 3) being plain. Although some variations occur, these plain vessels and sherds can be divided into two general types, one predominating on the last two occupation levels of Mound B, the other on the two deepest levels. While undecorated portions of decorated vessels account for some of the characteristic sherds of each type, enough rim sherds and entire vessels are present, showing the same differences, to warrant separation of the two.

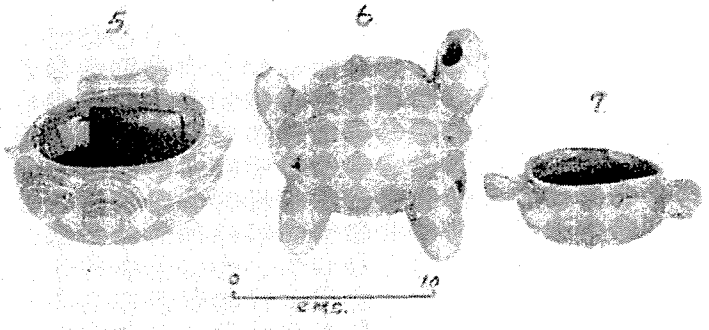
Type 4 Plain, associated with the engraved, trailed and ridged wares of floor levels 1 and 2, is thinner, firmer and has smoother surfaces than the plain sherds of the deeper levels. Coiling technique was used; the paste is usually fine and homogeneous, clay and occasionally shell tempered with minor percentage of tufa or sand. Some of the shell tempered sherds have a vacuolated appearance from leaching of the shell (similar to *Type 6*). The core is most often black in color, sometimes buff to brown; the surface is less often black, many sherds with black core having buff, orange or tan surfaces. Colored slips (yellow, orange or green) are sometimes seen. Both surfaces are smoothed, the outer sometimes moderately polished. Erosion has changed some of the black surfaces

---

PLATE 16

Type 1 Belcher Engraved vessels. Nos. 1 to 4 are bottle forms, *Subtypes l, k* and *j*, respectively. Nos. 5, 6 and 7, bird and terrapin effigy forms, *Subtype m.* No. 8, compound form, three conjoined cups of *Type 8 Stamped.* Nos. 9 and 10, compound forms, *Type 1 n.*





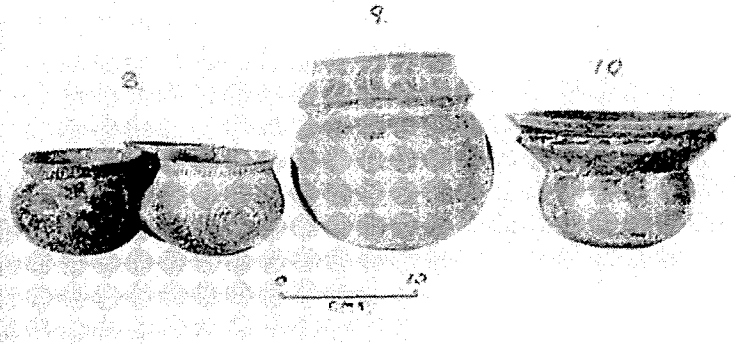


Plate 16

to a dingy chocolate color. Vessel shapes are uncertain, except for the three subtypes described below.

Subtype a: Black or chocolate colored sherds, with homogeneous clay tempered core, probably are derived from the undecorated portions of *Type 1 a* flat bowls. They represent about one-third of *Type 4* sherds on floor 1, the last occupation level.

Subtype b: Three entire vessels, one each from house floors II and VI and a second level burial, have the shape of *Type 1 f* (inverted helmet shape). They are thin walled (3 to 4 mm.) with convex bases, semiglobular bodies and straight flaring rims, 10 to 14 cm. wide at the lip. One has shallow transverse notching of the lip, otherwise they are undecorated. The paste is homogeneous, dark, clay tempered; the surfaces smooth but not polished. A few sherds of this type were found on levels 1 and 2.

Subtype c: Large, heavily fired ollas or jars (Plate 17, No. 6) appear almost exclusively in the last two occupation levels. Sherds from the second level are thin for the vessel size, 5 to 6 mm., showing black cores and a firm light-colored coat or slip on each surface. These sherds are firm with hardness of 2 to 2.5, but not overfired. Three entire vessels found broken on Floor I, and numerous other sherds from this level, are thicker, 5 to 10 mm. The vessels are globular but often deformed in the lower segment, probably because of the vessel weight before firing. Diameters 35 to 40 cm., heights 30 to 40 cm. The undecorated body is surmounted by a comparatively small vertical neck which has a cambered or slightly flaring rim. The neck may be plain or have a few irregularly incised horizontal lines.

The paste is clay or clay and tufa tempered, with slightly coarse dark gray to black core. Hardness ranges from 2 to 4. The surface slip is yellow, buff, green, orange or light brown, showing differential firing. Inner surfaces are more frequently yellow or green in color. The exterior is roughened by high firing temperature which produced puffiness of the paste and this same high firing makes the sherds quite hard, so that they emit a metallic sound when struck. Some of *Type 4 c* sherds are similar to *Type 8* plain, except for the overfiring.

Type 5—Belcher Ridged

The predominant type of culinary ware at this site, on all except

the oldest stratum, is the ovoid urn with ridged side walls. The vessels (Plate 17, No. 7) are 16.5 to 33 cm. high, ovoid, with flat bases. Rims flare outward, are usually narrow and rolled or cambered on first floor vessels, often wider on 2nd and 3rd floor sherds. Walls may be only 3 to 4 mm. thick.

The paste is coiled; clay and shell are about equally represented and tufa appears occasionally. The core is brown to black in most instances, the surface buff to black with differential firing, and often coated with soot. Hardness ranges from 2 to 3.

The outer surface is roughened by narrow vertical ridges, running from rim to base, spaced from 3 mm. to 1 cm. apart. These are apparently produced by marking with a notched instrument or by pushing up the clay on each side of troughs made with a round-tipped instrument. Ford[14] thought the ridges may have been made by pinching or brushing between the fingers, and called this type *Finger Brushed*, but generally the ridges are too closely placed for fingers and fine regular vertical striations in the troughs indicate a firmer molding tool with surface irregularities. The outer rim surface may have rough vertical, diagonal or horizontal incised lines. One small tufa tempered vessel whose side wall is partially ridged, has triangular flanges on the rim to give a squared orifice, with small strap handles on two sides. This is the only vessel from this site which has handles.

Type 6—Belcher Brushed

Entire vessels of brushed ware are lacking, but numerous sherds (Plate 18, Nos. 1, 2, 3) were found on the three upper levels, only one on the fourth (Table 3). The brushed and ridged wares show many similarities and possibly the ridged ware, found on many sites in this area, is a local derivation of the more ubiquitous brushed ware. The reverse may be true in this area, or they may have developed simultaneously.

The paste is shell, clay, tufa and grit tempered, and leaching of the shell produces vacuoles. Texture is medium to coarse; the core is usually black, occasionally buff or gray; the surface varies from gray to black. Hardness 2 to 4, usually 2 to 2.5. Coil or strip technique was used. The inner surface is smooth, the outer roughened by brushing. The lines vary from fine, closely placed brush-

ing to bolder marks approaching the incised. Random marking occurs, although regular vertical or horizontal fields predominate. Several sherds have oval nodes, with a suggestion of a row of nodes separating brushed fields. Rims may be direct and unmodified, or rims similar to *Type 5 Ridged* ware may be found. Sherd forms suggest urns, pots and vases. Thickness 4 to 9 mm.

Type 7—Smithport Incised-Punctate

This constitutes the predominant type (Plate 18, Nos. 4 to 17) of pottery made by the first inhabitants of Mound B, persisting on the third level and fading out in the upper levels (Table 3).

The sherd fractures suggest coil or strip technique. The paste is predominantly clay tempered with occasional tufa or grit. Shell tempering is absent. The texture is usually coarse, as compared with the later wares, the hardness 2 to 3. The core is gray or buff to mottled brown or black, the surface usually buff or gray. The inner surface is smooth, showing tool marks; the outer surface occasionally smooth but often rough, eroded or crumbling.

The decoration consists predominantly of straight line incisions, usually triangular lines made with a pointed tool, rarely trailed or U-shaped, and occasionally "overhanging." Punctates were made with the fingernail or a blunt-tipped instrument held at an angle. The lines may be vertical, diagonal or horizontal (not curvilinear), on rim or body. Alternating fields or herringbone patterns occur (Plate 18, Nos. 8 and 9), sometimes separated by a row of punctates (Plate 18, No. 13). Rims are usually notched, transversely or diagonally, in contrast to the later pottery in which lip notching is comparatively infrequent.

Several vessels show fingernail punctation (Plate 18, Nos. 14 and 15), typical of Ford's[15] *Wilkinson type* fingernail punctate. Sherd forms for *Type* 7 suggest open bowls of medium height with direct rims or vase forms with flaring rims. Sherd thickness 5 to 9 mm., average 6 to 7 mm.

Type 8—Smithport Plain

The undecorated sherds from the deepest level (premound) have much the same paste characteristics as *Type 7*. Clay tempering predominates, with some tufa and grit. The texture is moderately

coarse, with numerous small lumps of clay temper. The core is gray or buff to brown, rarely black; the surface is more frequently gray or buff—some sherds have a light colored outer surface, moderately smoothed, with a dark brown, mottled inner surface. Erosion occurs frequently and many sherds are small because of the crumbly quality of the paste.

Thickness ranges from 5 to 10 mm., the usual sherd being 6 to 8 mm. thick. With exception of *Subtype a,* vessel shapes and sizes are uncertain.

Subtype a: Three water bottles (Plate 17, No. 4) from the level 4 burials, with several bottle sherds from Floors II, III and IV, have paste characteristics as described above, clay tempered and medium textured. The core is tan to brown, the surface gray or light red with brown or black areas. The surface is smooth but unpolished. The walls are thicker (6 to 8 mm.) than other bottles in the polished and engraved series.

Decoration is entirely lacking on two vessels and confined to 4 irregular lines around the shoulder of the third. The bottles are 17 to 18 cm. high, with pear-shaped bodies, flat bases, slightly tapering necks and unmodified lips.

Subtype b: A dozen sherds from the two deeper levels have paste characteristics as described above, but have a bright red soft wash on the outer surface, with a duller red on the inner. The sherds suggest a straight walled vase or pot and possibly a bottle form. Thickness 7 to 8 mm.

Provenience of Pottery

Table 2 shows the origin of the 163 whole vessels, the majority of which (135) came from the later burials. For the sake of brevity we have combined the burials from the first and second levels of Mound B, the six burials which started at or just beneath House Floor V and the single burial accidentally discovered in the

---

PLATE 17

Nos. 1 to 3, *Type 2 Foster Trailed-Incised.* No. 4, bottle of *Type 8 a, Smithport Plain.* No. 5, *Type 3, Belcher Stamped.* Note stamp roughening of band around neck as well as the spiral. No. 6, *Type 4 b, Belcher Plain* olla. Note comparative size of vessel. No. 7, *Type 5, Belcher Ridged.*

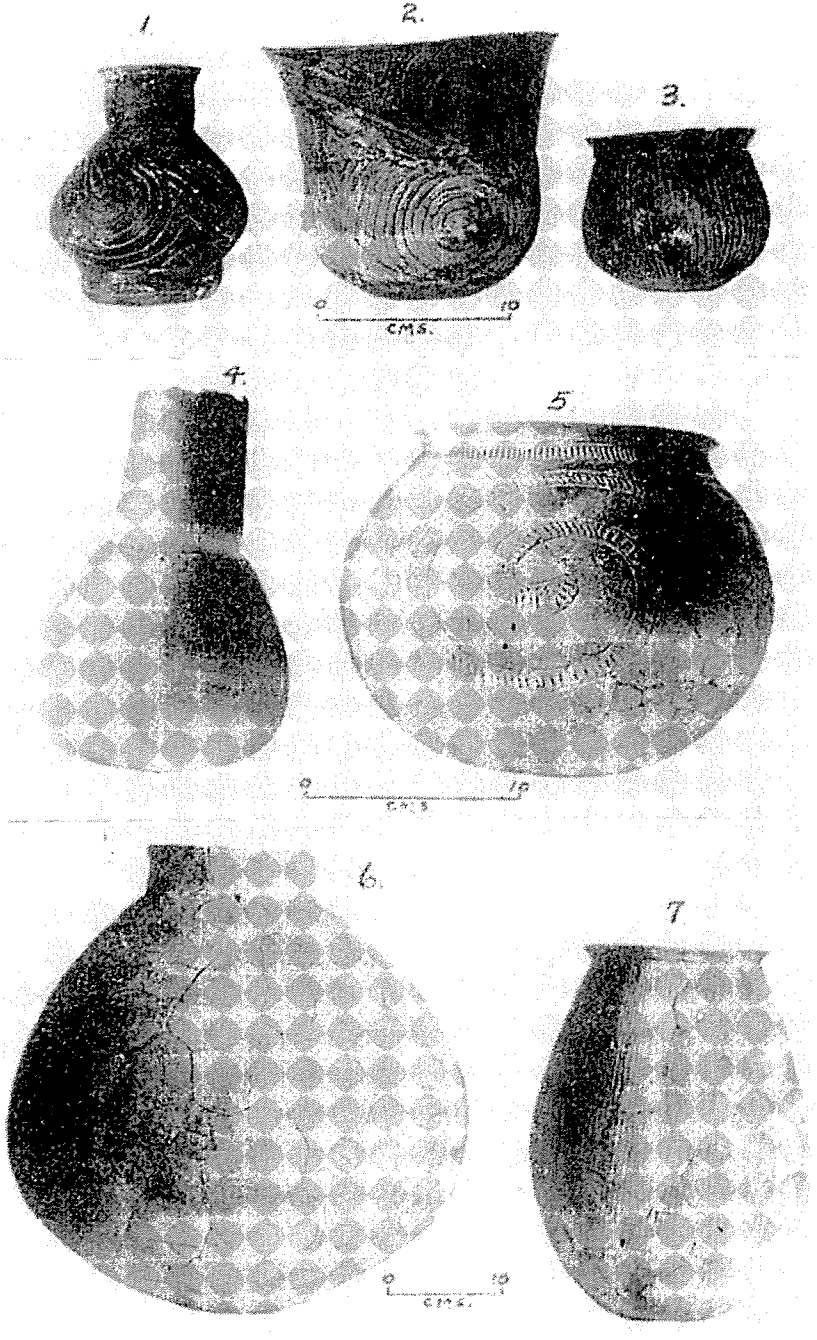


Plate 17

Table 3—Sherd Count, Mound B

	1st Level		2nd Level		3rd Level		4th Level		Total	
	No.	Pct.	No.	Pct.	No.	Pct.	No.	Pct.	No.	Pct.
Type 1 a, Engraved	117	4.1	17	2.67	1	0.08	1	0.3	136	2.7
Type 1 b, Engraved	4	0.13	1	0.16	2	0.16	0	0.	7	0.1
Type 1 c, Engraved	60	2.1	35	5.54	63	5.0	0	0.	158	3.1
Type 1 d, Engraved	57	2.0	6	1.0	6	0.5	1	0.3	70	1.4
Type 1 e, Engraved	8	0.27	0	0.	6	0.5	12	3.5	26	0.5
Type 1 f to n, Engraved	93	3.2	53	8.33	10	0.8	5	1.4	161	3.1
Ttl. Engraved	339	11.80	112	17.70	88	7.04	19	5.5	558	10.9
Type 2, Trailed	127	4.4	26	4.0	12	0.96	0	0.	165	3.2
Type 3, Stamped	5	0.17	2	0.3	32	2.5	0	0.	39	0.8
Type 4, Belcher Plain	1073	37.5	270	42.4	140	11.2	11	3.2	1494	29.3
Type 5, Ridged	841	29.3	94	14.9	248	19.8	4	1.1	1187	23.3
Type 6, Brushed	268	9.3	23	3.6	35	2.8	1	0.3	327	6.4
Type 7, Incised	17	0.6	19	3.0	287	23.0	148	43.2	471	9.2
Type 8, Smithport Plain	169	5.9	84	13.2	397	31.8	155	45.2	805	15.8
Wilkinson Punctate	1	0.03	1	0.1	8	0.6	5	1.5	15	0.3
Unclassified	30	1.0	5	0.8	4	0.3	0	0.	39	0.8
Totals	2870	100.0	636	100.0	1251	100.0	343	100.0	5100	100.0

Table 2—Whole Pottery Vessels

	House Floor I	House Floor II	House Floor VI	1st and 2nd Level Burials	4th Level Burials	Totals
Belcher Engraved						
Type 1 a		2		22		24
Type 1 b				4		4
Type 1 c	1	1	1	5		8
Type 1 d	1	1		11		13
Type 1 f				6		6
Type 1 g		1		8		9
Type 1 h				1		1
Type 1 i		1		1	1	3
Type 1 j		2	1	12		15
Type 1 k				6		6
Type 1 l				5		5
Type 1 m				3		3
Type 1 n				2		2
Ttl. Type 1	2	8	2	86	1	99
Foster Trailed-Incised						
Type 2 a				9		9
Type 2 b				1		1
Type 2 c		1		3		4
Type 2 d	1			3		4
Ttl. Type 2	1	1		16		18
Belcher Stamped						
Type 3				15		15
Belcher Plain						
Type 4 b		1	1	1		3
Type 4 c	3					3
Ttl. Type 4	3	1	1	1		6
Belcher Ridged						
Type 5	1	2	1	13		17
Smithport Plain						
Type 8				1		1
Type 8 a (bottles)					3	3
Unclassified				3	1	4
Totals	7	12	4	135	5	163

superficial part of Mound A, as the pottery from all of these seems quite uniform. These burials illustrate the custom among the latter Caddos of abundant funerary placements, a total of 135 vessels—in addition to other ornaments and artifacts—accompanying 17 burials. Two of these burials had no pottery accompanying them, several with infants had only one or two vessels, while four pits contained 14, 16, 21 and 33 pottery vessels.

In contrast, the two deep pits, originating between the 3rd and 4th levels of Mound B and containing 4 and 5 skeletons, had a total of only 5 vessels, all placed above the heads. The vessels in the top level pits were placed all around and on top of the bodies.

The premound surface (Level 4) shows a marked predominance of *Type 7* and *8* sherds, with complete absence of *Types 2, 3* and *4 c*. *Type 1* Engraved is represented only by the water bottle and the open bowl, chiefly *Type 1 e*.

On level 3, although the incised-punctate wares persist, all other types except the large olla appear suddenly. Brushed sherds are infrequent, but *Type 5 Ridged* is almost as numerous as the earlier incised type. The thick-walled, undecorated water bottle of *Type 8 a* disappears above the 3rd level, being replaced by the thinner, polished and highly ornamented bottles of *Type 1 Engraved*. All subtypes of the engraved wares are not represented on the 3rd level, but many are present, as well as the trailed and stamped.

As levels 2 and 1 are reached, the incised-punctate wares of *Type 7* fade out. The ridged culinary vessel, *Type 5*, becomes the most abundant, of the decorated sherds with *Type 6 Brushed* increasingly frequent. The engraved wares are second in frequency on the surface layer. Surface collections from a number of sites in this area indicate that engraved sherds and *Type 5 Ridged* sherds follow similar frequency distributions, although at some sites another type of ridged ware is frequent, having broader notched vertical ridges with brushing between the ridges.

The engraved subtypes which are more frequent at Belcher—the open bowls (*Type 1 a, c* and *d*) and the water bottles, especially *Type 1 j* with concentric circle design and sun symbol, are also the most frequent examples of engraved ware in surface collections from this entire area.

Discussion

As indicated in Table 4, various sites in the Red River Valley of Northwest Louisiana show varying proportions of engraved-ridged and incised-punctate wares. Smithport is in DeSoto Parish and Wilkinson in Natchitoches Parish 40 and 50 miles south of Shreveport; Indian Hill and Pease Place are hillside sites, Vanceville and Werner are mound sites in Bossier Parish, across Red River from Shreveport.

Table 4

Surface Collections of Decorated Sherds

		Engraved		Ridged		Incised		Punctate	
	Total	No.	Pct.	No.	Pct.	No.	Pct.	No.	Pct.
Smithport	414	23	5.5	18	4.3	190	46	120	29.0
Wilkinson	268	12	4.4	14	5.2	138	51	88	33.0
Indian Hill	630	19	3.0	183	29.0	317	50	70	11.0
Pease Place	142	10	7.0	50	35.0	67	47	9	6.3
Vanceville	138	13	9.4	43	31.0	18	13	11	8.0
Werner	38	10	26.0	19	50.0	5	13	1	2.6

Although it would be premature to outline definite cultural affinities for the several types of Belcher pottery, some similarities are evident and suggest future study. The engraved, pigment-inserted, polished vessels of *Type 1*, with effigy forms and a certain amount of shell tempered ware, suggest close relationship to the Middle Mississippi horizon. Some similarities to the Moundville pottery of Alabama are evident. In the Red and Ouachita River valleys of this region, vessels of this general type are frequent. The engraved vessels of the Natchitoches site 4, and from Keno and Glendora in the Ouachita basin (2) are similar in paste, general conception and decoration, although not identical. Similar vessels are also illustrated by Harrington (3), from the Southwest Arkansas area, and by Jackson (6), from East Texas.

Vessels which are identical in form and decoration to a number of the subtypes of *Belcher Engraved* were found by Moore[2] at the McClure, Friday and Foster mound sites along the Red River in

PLATE 18

Nos. 1 to 3, *Type 6 Belcher Brushed* sherds. Nos. 4 to 17, *Type 7 Smithport Incised* and punctated sherds. No. 14 is *Wilkinson type* of fingernail punctate.

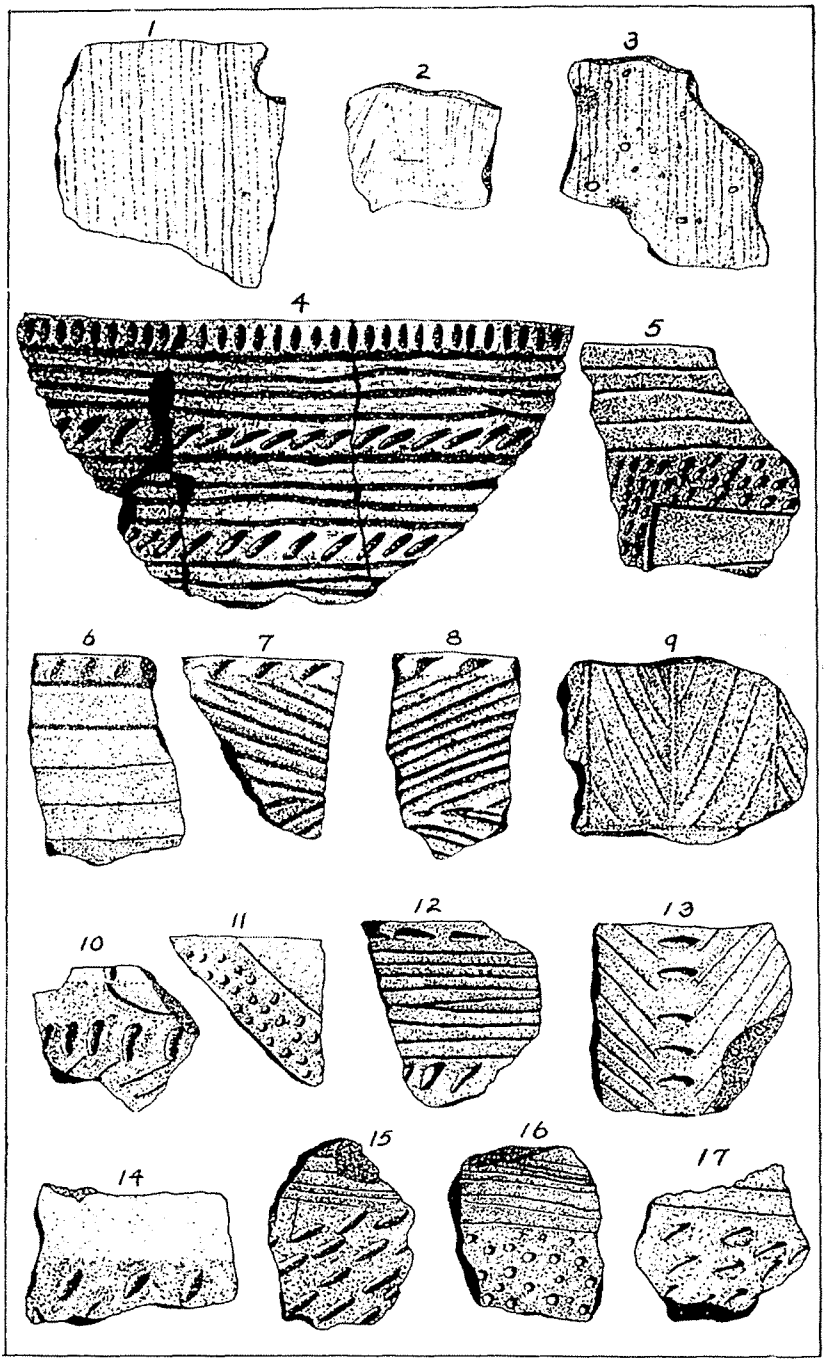


Plate 18

Southern Arkansas, and other artifact types indicate cultural identity of these four sites.

It is interesting to speculate on the origin of several decorative elements in *Type 1 Engraved* wares. The interlocking scroll with its variants is probably the most frequent design motif in this type. Its use seems to be rather widespread on both Southeast and Southwest pottery (Mesa Verde for example), also in Mexican pottery. The spurred line which appears so often on *Belcher Engraved* and engraved wares from other Caddo sites does not appear elsewhere in the Southweast or Mississippi Valley area, so far as I can ascertain, but does appear early in the Southwest (Mesa Verde, Mimbres) and again in Central Mexico (Toltec). One is struck, on visiting the National Museum in Mexico City, by the similarities in form, design motifs and elements between the potteries of Central Mexico and the Caddo area of Louisiana and Arkansas. For example, the angulated-shouldered bowl of *Subtype 1 a* at Belcher, unique in the United States area, is frequently duplicated in the Mexican potteries, even having the same four nodes projecting from the shoulder angle. Efforts to demonstrate definite evidence of a direct link between the two areas have so far been futile, but future study may do so.

Type 2 Trailed-incised and *Type 3 Stamped*, also found in one or more of the above mentioned three sites on Red River, suggest a carry-over of certain decorative features of the Mid-Louisiana Marksville pottery. The deep U-shaped vertical and concentric circle incised decorations of *Type 2* may be compared with the *Marksville Incised* (Figs. 35-36) of Ford and Willey's[15] report of the Crooks site. Similarly, the alteration of roughened bands and smooth fields, and the roughening of bands by rocker stamping with a dentate stamp, indicate a trait inheritance from *Marksville Stamped*[16] (Figs. 28-34, Crooks report) by *Belcher Stamped*. Vessel shapes, tempering and other paste characteristics are entirely dissimilar.

The large olla of *Type 4 c* is an interesting late development at this site, apparently representing the result of experimentation with higher firing temperatures. A few sherds of this type and of *Type 1* bowls found on level 2 of Mound B show the effect of this high firing temperature which made them lighter yet firmer, producing the metallic ring when struck. Puffiness and cracking of the slip

resulted and in some instances grotesque twisting of the vessel occurred. On the top level many more of these sherds were found, and at least three large ollas of several gallons capacity were successfully made. The shape suggests that they were used for grain storage. Similarly fired vessels, sometimes cracked in the process, having been found near the Spiro site in Oklahoma.[18]

Type 6 Belcher Brushed shows some similarities to the *Anna Brushed*[15] of the Mississippi Valley and to *Plaquemine Brushed*[19] of South Louisiana, but differs in being thinner, shell tempered instead of clay tempered and having thickened or rolled rims.

The straight line incised-punctate wares of *Type 7*, found in large quantities on most sites in this area, but particularly on large hillside sites like Smithport, Wilkinson, Indian Hill and Pease Place between Shreveport and Natchitoches, seem to bear some relation to certain components of the widespread Coles Creek horizon described by Ford.[17] Many of these sites afford a minor percentage of sherds listed as marker types for Coles Creek—overhanging parallel lines encircling the necks of beakers, a line of triangular punctates below the overhanging lines, grooving of the upper surface of flattened lips and characteristic arrangement of punctated fields. *Type 7 Incised* may prove to have several subtypes and shows certain similarities to *Manchac Point Incised, Hardy Incised* and *Rhonebart Punctated* of South Louisiana[19] which also seem to be derived from Coles Creek and to extend to historic levels.

The plain water bottles of *Type 8 a* seem to accompany the earlier indigenous pottery of this area, often found in burials on sites where incised-punctate wares predominate, as at Smithport Landing and Allen place in Natchitoches Parish. This is in keeping with their occurrence in the burials originating from the deeper levels of Mound B at Belcher, where *Type 7 Incised* wares were prevalent.

Conclusions

The Belcher site appears to be a comparatively late but not historic Caddo site, whose Mound B shows four occupation levels. The pre-mound inhabitants, who built a rectangular house structure, made pottery on which incised straight lines and punctations were the prevalent decorations, with a smaller amount of engraved wares. After construction of the first small mound, there was a cultural

invasion suggested by the increasing amount of engraved, ridged and brushed pottery wares. In the last two habitation periods of this mound, the invasion was complete, as indicated by the construction of circular lodges, profuse offerings with burials and the pottery types in place of the incised-punctate wates. A similar intrusion of a later culture into a widespread indigenous incised-punctate culture is suggested for the Red River Valley in this entire area.

We wish to express our indebtedness to Dr. Jas. B. Griffin, Ceramics Repository, Ann Arbor, Michigan, and to the entire staff of the Department of Archaeology at Louisiana State University for their kind assistance and numerous suggestions in the course of preparing this report.

The Children's Clinic
Shreveport, Louisiana.

BIBLIOGRAPHY

1. Webb, C. H., and Dodd, M., *House Types Among the Caddo Indians,* Bull. Texas Archeological and Paleontological Soc., Vol. 12, 1940.

2. Moore, C. B., *Some Aboriginal Sites on Red River,* Jl. Acad. Natural Sciences, Philadelphia, 1912.

Idem, *Antiquities of the Ouachita Valley,* Jl. Acad. Natural Sciences, Philadelphia, 1909.

3. Harrington, M. R., *Certain Caddo Sites in Arkansas,* Indian Notes and Monographs, The Heye Foundation, New York, N. Y., 1920.

4. Walker, W. M., *A Caddo Burial Site at Natchitoches, Louisiana,* Smithsonian Miscellaneous Collections, Vol. 94, No. 14, 1935.

5. Ford, J. A., *Analysis of Indian Village Site Collections from Louisiana and Mississippi,* Department of Conservation, Louisiana Geological Survey, New Orleans, La., 1936.

6. Jackson, A. T., *Types of East Texas Pottery,* Bull. Texas Archaeological and Paleontological Society, Vol. 6, 1934.

7. Goldschmidt, W. R., *A Report On the Archaeology of Titus County,* Bull. Texas Archeol. and Paleontol. Soc., Vol. 7, 1935.

8. Lemley, H. J., *Discoveries Indicating a Pre-Caddo Culture On*

Red River in Arkansas, Bull. Texas Archeol. and Paleontol. Soc., Vol. 8, 1936.

9. Dickinson, S. D., and Lemley, H. J., *Evidences of the Marksville and Coles Creek Complexes at the Kirkham Place, Clark County, Arkansas,* Bull. Texas Archeol. and Paleontological Soc., Vol. 11, 1939, p. 188.

10. Swanton, John R., *Personal Communication,* 1939.

11. Moore, C. B., *Some Aboriginal Sites On Red River,* Jl. Acad. Natural Sciences, Philadelphia, 1912, pp. 591-619.

12. Idem, p. 590.

13. Moore, C. B., *Certain Mounds of Arkansas and of Mississippi,* Jl. Acad. Natural Sciences, Philadelphia, 1908, p. 521.

14. Ford, J. A., *vide supra,* 1936, p. 84.

15. Ford, J. A., and Willey, Gordon, *Crooks Site, A Marksville Period Burial Mound in La Salle Parish, Louisiana,* Dept. of Conservation, Louisiana Geological Survey, New Orleans, La., 1940, p. 50.

16. *Idem.* pp. 65-72 and 75-78.

17. Ford, J. A., *vide supra,* 1936, pp. 174-190.

18. Cobb, Rodney, *Personal Communication,* 1941.

19. Louisiana State University Archaeological Surveys, unpublished data.

CERTAIN VESSELS FROM THE CLEMENTS PLACE, AN HISTORIC CADDO SITE

By S. D. Dickinson

Hundreds of vessels belonging to the complex which Harrington called Caddo[1] have been taken from graves in southwest Arkansas, but none, insofar as I know, have ever been found in association with European trade material. Even along the Caddo Trace, that at certain points can be located with a fair degree of accuracy,[2] not one site has ever been identified as historic. In view of known contacts between European and Caddoes during the seventeenth and eighteenth centuries this seems strange.

Certainly, the highly polished and elaborately engraved ware belongs to the last horizon in this area. At both the Crenshaw[3] and Kirkham[4] sites it occurred above Coles Creek material; and in the Arkansas River Valley it is sometimes associated with an historic ceramic complex characterized by painting, modeling, and champleve.[5] Moreover, somewhat similar pottery has been recovered from historic sites in adjacent states.

At the Fish Hatchery site near Natchitoches, Louisiana, Walker observed material, apparently belonging to the Natchitoches tribe, which though related, differed somewhat from southwest Arkansas pottery. The latter exhibits greater variety in form and decoration, which as Walker explains, would be expected, "if we are here dealing with the Grand Caddo tribe, the leader of the confederation of which the Natchitoches and the Ouachita were more outlying members." He adds that further work in eastern Texas will probably reveal additional subtypes of the Caddo complex.[6]

About fifty years ago Mr. Will Scott of Atlanta, Texas, accidentally found an aboriginal cemetery on his farm between Black Bayou and Murray Branch, two and one-half miles west of Atlanta, in the northeast part of Cass County. From the burial ground he obtained a large collection of artifacts, which he sold and gave to various people. His sister, Mrs. C. A. Smith, received six of the finest pieces of pottery and also a shell pendant and a bead. On the death of Mrs. Smith, these specimens were inherited by her daughter,

Mrs. J. B. Hesterly, of Prescott, Arkansas, who in turn gave them to me.

In June and July, 1932, the Anthropology Department of the University of Texas excavated what remained of this site which was then known as the Clements Brothers place. According to Mr. A. T. Jackson, who was in charge of the excavation, twenty-two graves were discovered. Although they had been badly disturbed by previous diggers, parts of skeletons and some funerary offerings still remained. One burial was flexed; the others were extended on the back. In five of the graves there were blue glass trade beads in association with pottery.[7]

Although no study has been made of these beads to determine their origin and period, and thereby date the pottery, it seems highly probable that they belong to the eighteenth century when European traders were especially active in this section of the Red River Valley. In the contract which Juan Piseros made with Athanase de Mezieres at Natchitoches, February 3, 1770, the former agreed to supply the Village of the Great Caddo with "Sixty pounds of small glass beads, sky blue, white and black," among other things.[8] Inasmuch as the Clements place was not a great distance from the Cadodachos settlements which Bolton locates in the vicinity of Texarkana,[9] one would expect the pottery to be representative of the historic ware of the Great Caddo.

In describing the ware from the Clements place, Jackson says:

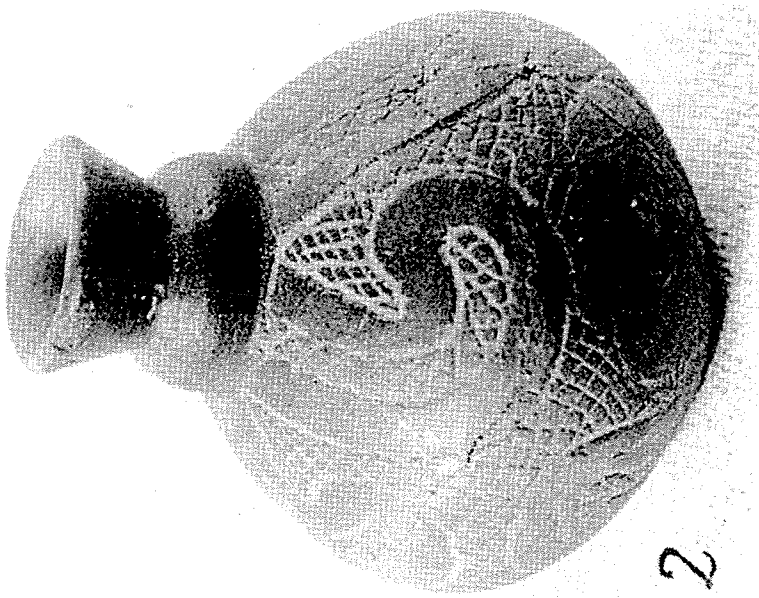
"The prevailing types of pottery from this historic site greatly resemble those from prehistoric burials in Cass, Upshur, Harrison, Titus and Morris Counties. A few vessels have rounded bottoms and delicately incised lines like those from R. L. Jaggers farm, Franklin County, where a cremated burial—but no evidence of European contact—was found. Apparenty red slips were not common here. No whole specimens bearing such slips were present; and only a few sherds showed evidence of slips. Very few bottles were found here; but their position, at or near the head, was the same as in most prehistoric sites of the region. A small, crude bowl illus-

---

PLATE 19

No. 1. An Engraved water bottle having a pattern in which the scroll motif predominates.

No. 2. A diminutive bottle having an engraved design based on the scroll.



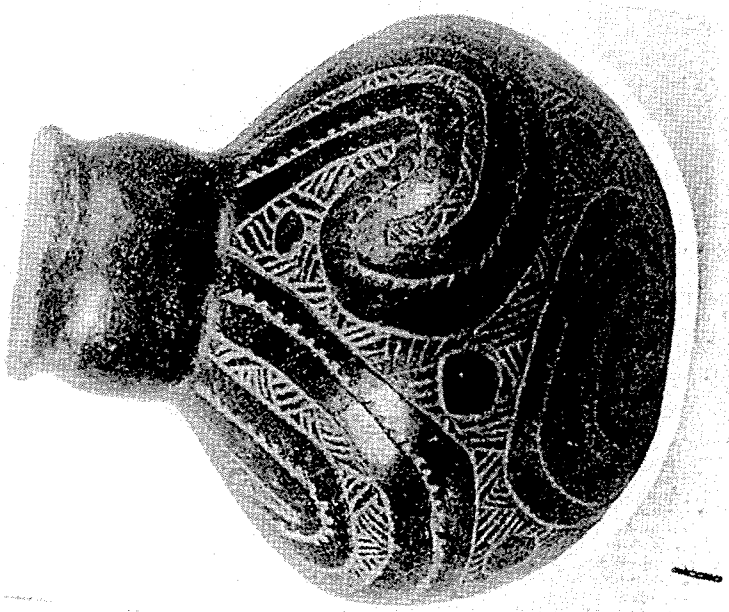


Plate 19

trates the method of forming a vessel from a single lump of clay, rather than by the usual coil method."

"The designs include sun symbols, interlocking scrolls, one swastika, raised lines, fingernail imprints and incised triangular designs. The workmanship shows a fair degree of excellence. Certain designs show a marked similarity to some from Louisiana and Arkansas, as pictured by Moore."[10]

Obviously, my collection from the Clements place cannot be considered typical of all the pottery from this region, because Mr. Scott, who Judge Harry J. Lemley and I interviewed several years ago, said that his sister had chosen the finest pieces from among those he found; and the high degree of workmanship shown by the specimens themselves attest to the truth of his statement. Nevertheless, they are closely related to the pieces which the University of Texas excavated. Likewise, they have a number of features in common with pottery found in the valleys of the Red and Ouachita rivers of Arkansas and Louisiana.

Though it is now the fashion in some archaeological circles to minimize the scientific value of a beautiful specimen, the fine piece is still important in cultural studies. It may be atypical, but it represents a note in the gamut of human activity. And among primitives, where art was not divorced from industry, beautiful examples of craftsmanship, whether common or rare, were the highest form of human expression.

A detailed description of my Clements collection is presented in this paper to point out specific similarities to pottery from Caddo sites in Arkansas where no evidence of contact with whites have been found; and to show that the principles of historic Caddo decoration, unchanged from the pre-Columbian period, fulfilled all that a good designer would ask.

The bottle illustrated in Plate 19, No. 1, is made of compact paste, Benzo Brown[11] in color, and is tempered with sand. Its hardness is 4. It is 13.3 cm. high and has a maximum body diameter of 12 cm. The color of the highly polished exterior surface is Clove Brown.[12] The short bulbous neck, rounded body walls and small flat base are rather common features of bottles from Caddo sites in the Red River area.[13] Similar forms occur along the Ouachita

River from Glendora Plantation,[14] Louisiana, to the Ouachita Mountains in Arkansas; and are also occasionally found in the Lower Arkansas Valley.[15]

Its engraved decoration, which had been rubbed with red ochre, is likewise common. Four spirals, placed equidistantly about the base of the neck form a swastika when viewed from above. Below and balancing these spirals which are arranged on a vertical axis is a continuous pattern of four volutes placed on a horizontal axis. Movement in the upper scrolls is to the left; that of the lower to the right. All are bisected longitudinally by a dentated line. Interspaces are filled with hatched lines arranged in groups at an angle to each other, and with discs placed near the inflection of the volutes.

In the design on this bottle one sees the basic principles* followed by Caddo potters in decorating their highly polished ware. From the standpoint of pure design it is an excellent example of unity and balance obtained by compact arrangement and complete integration of motifs. As on almost all Caddo bottles, the decoration is confined to the body with which the plain neck and base surfaces pleasantly contrast. Such restriction eliminates any possibility of flamboyancy, and at the same time emphasizes the largest surface. To give movement to the static vessel shape, the potter chose an asymmetric motif,[16] the scroll, to dominate the design. The pattern, however, was evenly divided according to horizontal and vertical axes, and as a result, there is movement in opposite directions, further intensified by the volutes and spirals which go to the right and to the left. Moreover, movement in two directions coordinates all surfaces, both plain and decorated. On looking at the design, one's eyes follow the upper scrolls to the neck and the lower continuous volutes to the base. As a minor motif, the hatched lines in the background echo the diversification of movement. And the discs, acting as accents for the change in curvature of the motifs, also serve as intermediaries between foreground and background.

*Caddo pottery includes two general types: Caddo Domestic and Caddo Burnished. The former is heavy, smoothed but not often polished, and has incised and applique decorations. The latter is thinner, much better made, and is usually highly polished. It has engraved, applique, or well executed incised patterns.

PLATE 20

No. 1. Pot having an angular design done in applique.
No. 2. A small bowl having an all-over pattern in applique.

2

1

Plate 20

A variation of this design occurs on the small engraved bottle shown in Plate 19, No. 2. It has, however, five spirals radiating from the base of the neck and a similar number of connected volutes below them. Design elements grouped in twos, threes and fours are common among the Caddo,[17] but a grouping of five is unusual. The upper motifs go to the right and the lower to the left. The background is crosshatched and does not have discs.

The neck of this bottle is shaped somewhat like an hour-glass. A more bulbous form is a common feature of bottles from Red River. The small base is concave—an unusual feature in southwestern Arkansas. Vessel dimensions are: height, 9.2 cm.; maximum body diameter, 8.2 cm.; basal diameter, 2.4 cm.; oral diameter, 3.2 cm. Its hardness is 3.5; and its color is Deep Mouse Gray.[18] There is no slip. A somewhat similar diminutive bottle from Lafayette County, Arkansas, is in the collection of U. S. Judge Harry J. Lemley of Hope, Arkansas.

The eccentric bottle illustrated in Plate 21, No. 1, is a very rare form in Arkansas. Judge Lemley has two of this shape from the Arkansas River Valley. They were found in Perry and Yell counties. Both vessels are of yellow ware and are engraved.[19] Bottles having a pointed body are occasionally found in the Middle Mississippi complex,[20] but they are not analogous inasmuch as the body curves upward in crescent fashion.

The color of the paste core of this bottle is Deep Mouse Gray.[21] Its highly polished exterior surface is Fuscous-Black. [22] The paste is compact and is tempered with sand. Dimensions are: height, 11. cm.; basal diameter, 3.1 cm.; body length (from point to point), 18.3 cm.; maximum body width, 10.2 cm.; oral diameter, 1.4 cm. Its hardness is 4.

In keeping with the greatest dimension of the vessel, the decoration is arranged according to the horizontal axis. Movement along the horizonal plane begins at the concave base, around which a series of concentric circles are engraved, and progresses laterally and upward to the plain conical-shaped neck. Four connected scrolls going to the left occupy the greatest space in the pattern. These are bisected by hatched bands. In contrast to the basal circle and scrolls, parallel lines engraved around the two ends of the body convey the idea of upward movement. Intervening curvilinear lines,

however, act as intermediary elements between them and the scrolls. Small plain hexagons and short bars fill the remaining spaces between the principal motifs.

The engraving is rather deep and more roughly done than much of the carving found on Arkansas Caddo ware. As usual, red ochre had been rubbed into the design. Though filling intaglio designs with pigment could easily have been developed anywhere, the practice vaguely suggests the technique used in cloisonne ware of Teotihuacan.

The graceful jar figured in Plate 21, No. 2, is shaped somewhat like a much larger vessel from a mound on the Webster Medley place, near Bayou Macon in Chicot County, Arkansas.[23] The latter specimen, now owned by Judge Lemley, has an incised design of scrolls, and is of buff colored porous paste characteristic of the historic horizon in southeast Arkansas.

Measurements of the Clements jar are: height, 14.6 cm.; basal diameter, 4.5 cm.; maximum body diameter, 5.6 cm.; and oral diameter, 3.9 cm. The color of the paste core is Dark Mouse Gray,[24] and that of the exterior surface, Fuscous-Black.[25] The paste is silicious and compact. Its hardness is 4.

Like other vessels already described, the jar has an engraved design which was once rubbed with red paint. Two interlocking scrolls with the usual discs dominate the pattern. Above and below there are horizontal lines encircling the vessel. Though the movement is lateral, division of wall space into panels of varying width creates horizontal rhythm well suited to this shape.

The vessel illustrated in Plate 21, No. 3, is unlike any Arkansas Caddo form which I have seen. If it did not have the small flaring neck it would resemble the so-called neckless bottles found in the Upper Ouachita Valley.[26]

The dimensions of this specimen are: height, 16.8 cm.; basal diameter, 6.2 cm.; maximum body diameter, 8.3 cm.; and oral diameter, 4. cm. Vessel hardness is 4. The paste core is colored Iron Gray;[27] and the predominating color of the exterior surface,

PLATE 21

No. 1. Eccentric form with engraved scroll design.
No. 2. Jar with an engraved pattern of two interlocking scrolls.
No. 3. Vessel having engraved and applique decoration.

Plate 21

which is clouded, is Drab.[28] The texture of the paste is lumpy. Temper could not be determined. The jar was smoothed but not polished.

Four vertical appliqued bands divide the body into an equal number of zones. Each zone is divided vertically by a panel of engraved crosshatching and two engraved, vertical dentated lines. Both the rim and the appliqued bands are notched, a trait sometimes found on Caddo pottery from Arkansas. An Asinai bottle having incised vertical panels and triangles, from Henderson County, Texas, is illustrated by Jackson.[29]

The dimensions of the vessel shown in Plate 20, No. 1, are: height, 23.8 cm.; basal diameter, 5.9 cm.; maximum body diameter, 24.5 cm. It is tempered with sand. The paste core is Dark Mouse Gray;[30] and the mottled exterior surface is Orange-Cinnamon[31] and Black.[32] Hardness is 4.

Although the pot or urn shape is common in southwest Arkansas, rarely is such a well made vessel found. Evidently the Arkansas specimens were used in cooking, but this piece is too well done to have been a part of a woman's culinary equipment.

Decoration on the body is done in bands of applique, placed in angular fashion. Six zones, outlined by angles with the apex to the left are filled with concentric angles, the apices of which point to the right, and parallel lines. This arrangement creates an impression of opposing movements along the horizontal axis, but the eyes of any one looking at the vessel are led by the diagonal lines upward to the rim where there are three horizontal rows of incisions made with a spatulate-shaped tool.

The small bowl in Plate 20, No. 2, is rather similar in composition and treatment. Its dimensions are: height, 6.9 cm.; basal diameter, 5. cm.; maximum body diameter, 8.8 cm.; oral diameter, 7.5 cm. The color of the paste core is Dark Mouse Gray[33] and that of the outer surface, Wood Brown.[34] Sand was used for tempering. Vessel hardness is 4.

The applique decoration covering the entire exterior is divided by vertical lines into four panels, which in turn are bisected diagonally. Each section of the panels is filled with bands.

Applique decoration, as previously stated, is sometimes found on

Arkansas engraved ware, but it is much more common on culinary vessels. This technique seems to have been much less popular among the potters along the Ouachita than among those living in Red River Valley. However, in southwest Arkansas, applique en masse, as on the two pieces just described, is not common.

In ornamenting their vessels the potters at the Clements Site and elsewhere in the region occupied by the Great Caddoes tended to:

1. Contrast plain with decorated surfaces.

2. Use asymmetric or dynamic motifs.

3. Arrange the motifs in opposition to one another.

4. Integrate the motifs.

5. Balance the entire pattern according to the symmetrical form of the vessel.

6. Subordinate decoration to vessel function.

Similarities between the historic Clements pottery and vessels from graves in southwestern Arkansas, where no objects of European manufacture have been found, point toward an uninterrupted ceramic industry among the Upper Caddoes until the eighteenth century.

University Station, Box 63
Fayetteville, Arkansas.

BIBLIOGRAPHY

1. Harrington, M. R., "*Certain Caddo Sites in Arkansas,*" Indian Notes and Monographs, Heye Foundation (1920).

2. Rowland, Mrs. Dunbar, "*Life, Letters and Papers of William Dunbar,*" Mississippi Historical Society Press (1930), 248.

3. Lemley, H. J., "*Discoveries Indicating A Pre-Caddo Culture On Red River in Arkansas*"; Dickinson, S. D., "*Ceramic Relationships of the Pre-Caddo Pottery From the Crenshaw Site,*" Bulletin, Texas Archeological and Paleontological Society, VIII (1936), 25-68.

4. Dickinson, S. D., and Lemley, H. J., "*Evidences of the Marksville and Coles Creek Complexes at the Kirkham Place, Clark County,*

Arkansas," Bulletin, Texas Archeological and Paleontological Socity, XI (1939), 139-189.

5. Dickinson, S. D., and Dellinger, S. C., "*A Survey of the Historic Earthenware of the Lower Arkansas River Valley,*" Bulletin, Texas Archeological and Paleontological Society, XII (1940), 76-96.

6. Walker, W. M., "*A Caddo Burial Site at Natchitoches, Louisiana,*" Smithsonian Miscellaneous Collections, XCIV (1935), 14.

7. Jackson, A. T., Personal Correspondence (June, 1941).

8. Bolton, H. E., "*Athanase De Mezieres and the Louisiana-Texas Frontier,*" Arthur H. Clark Co., 1 (1914), 143-144.

9. Bolton, H. E., "*Texas in the Eighteenth Century,*" University of California Publications in History, 111 (1915), 2.

10. Jackson, A. T., "*Types of East Texas Pottery,*" Bulletin, Texas Archeological and Paleontological Society, VI (1934), 53-54.

11. Ridgway, R., "*Color Standards and Color Nomenclature,*" (1912), Pl. XLVI.

12. Ridgway, *op. cit.,* Pl. XL.

13. Moore, C. B., "*Some Aboriginal Sites On Red River,*" Journal, Philadelphia Academy of Natural Sciences, XIV (1912), figs. 58, 59.

14. Moore, C. B., "*Antiquities of the Ouachita Valley,*" Journal, Philadelphia Academy of Natural Sciences, XIV (1909), 27-80.

15. Dickinson, S. D., and Dellinger, S. C., "*A Survey of the Historic Earthenware of the Lower Arkansas River Valley,*" Bulletin, Texas Archeological and Paleontological Society, XII (1940), 80.

16. Douglas, F. H., and D'Harnoncourt, R., "*Indian Art of the United States,*" Museum of Modern Art (1941), 13.

17. Pearce, J. E., "*The Archaeology of East Texas,*" American Anthropologist, XXXIV (1932), 683-684.

18. Ridgway, *op. cit.,* Pl. 11.

19. Lemley, H. J., Personal Correspondence (August, 1941).

20. Moore, C. B., "*Antiquities of the St. Francis, White, and Black Rivers, Arkansas,*" Journal, Philadelphia Academy of Natural Sciences, XIV (1910), fig. 17.

21. Ridgway, *loc. cit.*

22. Ridgway, *op. cit.*, Pl. XLVI.

23. Lemley, H. J., and Dickinson, S. D., "*Archaeological Investigations On Bayou Macon in Arkansas,*" Bulletin, Texas Archeological and Paleontological Society, IX (1937), Pl. 3, Fig. 4.

24. Ridgway, *op. cit.*, Pl. LI.

25. Ridgway, *op. cit.*, Pl. XLVI.

26. Harrington, *op. cit.*, Pl. XCII.

27. Ridgway, *op. cit.*, Pl. LI.

28. Ridgway, *op. cit.*, Pl. XIVI.

29. Jackson, *op. cit.*, Pl. 6, Fig. 23.

30. Ridgway, *op. cit.*, Pl. LI.

31. Ridgway, *op. cit.*, Pl. XXIX.

32. Ridgway, *op. cit.*, Pl. LIII.

33. Ridgway, *op. cit.*, Pl. LI.

34. Ridgway, *op. cit.*, Pl. XL.

SOME UNUSUAL BASKETRY AND BAGS FROM THE BIG BEND CAVES

By Victor J. Smith

The study of culture traits in the analysis of what seems to be a distinct group of primitive people such as has been observed in the area of the Trans-Pecos in Texas must be made from a multitude of angles before the obscure picture clears. Among such angles of study that of basketry techniques must be ranged as an important element which should shed considerable light upon the whole problem. The art of basketmaking assumes an important place in archaeological studies because of its relation to both early and present aboriginal peoples.

The reconstruction of the culture picture in many archaeological areas has been frequently limited to the examination of stone, bone, clay, and impressions of artifacts and construction upon mud or baked materials. The Greater Big Bend of Texas,* however has shared with a few other fortunate areas in that deposits are available for interpretation which contain culture evidence preserved for considerable periods of time in deposits of dry ash and dust, sometimes further protected by rock falls and usually within shallow rock shelters or overhanging cliffs. At one site fragile specimens were, to my surprise, unearthed well out in the open area in front of a small shelter, normally exposed to rainfall. At this time a heavy shower falling almost vertically indicated that the cliff overhead protected the talus slope for at least thirty feet in front of the bluff. Under the conditions described fragments of basketry and bags tell the story of these utensils as used by the Indian groups.

Concerning the basketry of the Big Bend there has been much discussion and some material published indicating interesting and valuable information related to the variety of techniques employed. It is at once evident that the wide variety of use and the weaving

*The term Greater Big Bend is here used to distinguish from the small "bend" including only Brewster and parts of adjoining counties. The West Texas Cave Dweller lived in an area roughly defined on the West by the El Paso Caves; on the East by the Pecos Valley; and South into Mexico where Mr. Walter Taylor is now working. There are indications that there was an even greater spread of this culture than has been indicated here. There are, of course, acceptable divisions of the area suggested such as Pecos River, Davis Mountains, etc., each having characteristics of its own but reasonably continuing the basic culture traits of the Cave People.

and sewing skills displayed deserve careful analysis and permanent record.

A general description of the widely distributed split stitch type of basket, which has been found generally throughout the area, thinning out to the East, West, and North and extending an unknown distance into Old Mexico, and which seems to be a basic utensil for all of the Greater Big Bend Cave Dweller groups, is a basin-shaped container averaging about 7" in depth and 14" in diameter. The largest ones to my knowledge are about 9" deep by 21" in diameter. The work surface is on the inner concave side of the basket and the coils are sewed in a counter-clockwise direction to the left of the worker. Stitches for this type are non-interlocking and the coiling is formed from a bundle of grasses or coarser desert plants. Coiling is usually 5 to the inch and stitches 4 to the inch. For the sake of brevity and quick comparison, the general description of this and other basketry herein described has been thrown into chart form.

Variation From Split Stitch Basketry

The small split stitch basket shown in Plate 22, No. 1, contains assembly technique basically similar to the larger artifacts but also indicates evidences of a distinct and interesting departure from the usual form of split stitch basket in that the size is much smaller, the stitches coarser, the work surface is outside, and the introduction of an interrupted black band near the rim on the inner side adds an element of decoration. For such a small utensil it is quite natural that the start should be on the bottom (good side) since the neater finish would then turn up the outside exposed areas of the basket. It will be noted that the start of the coil compares with the standard split stitch basket but that, once the rim is turned the worker continues the coils but is necessarily working clockwise rather than counter-clockwise and on the convex (near) surface rather than on the concave (far inside) surface. Work continues in both cases to the left of the worker. In the bottom of this small basket a slightly raised inner rim occurs just before the edge is turned. This sug-

PLATE 22

No. 1. Small split-stitch basket. Note the interrupted black ring near the inner top edge of the utensil, also raised ring around bottom. For the exterior of this basket see the 1935 issue of this Bulletin.

No. 2. Plain twined basket with red cordage decorations. Note interrupted lines.

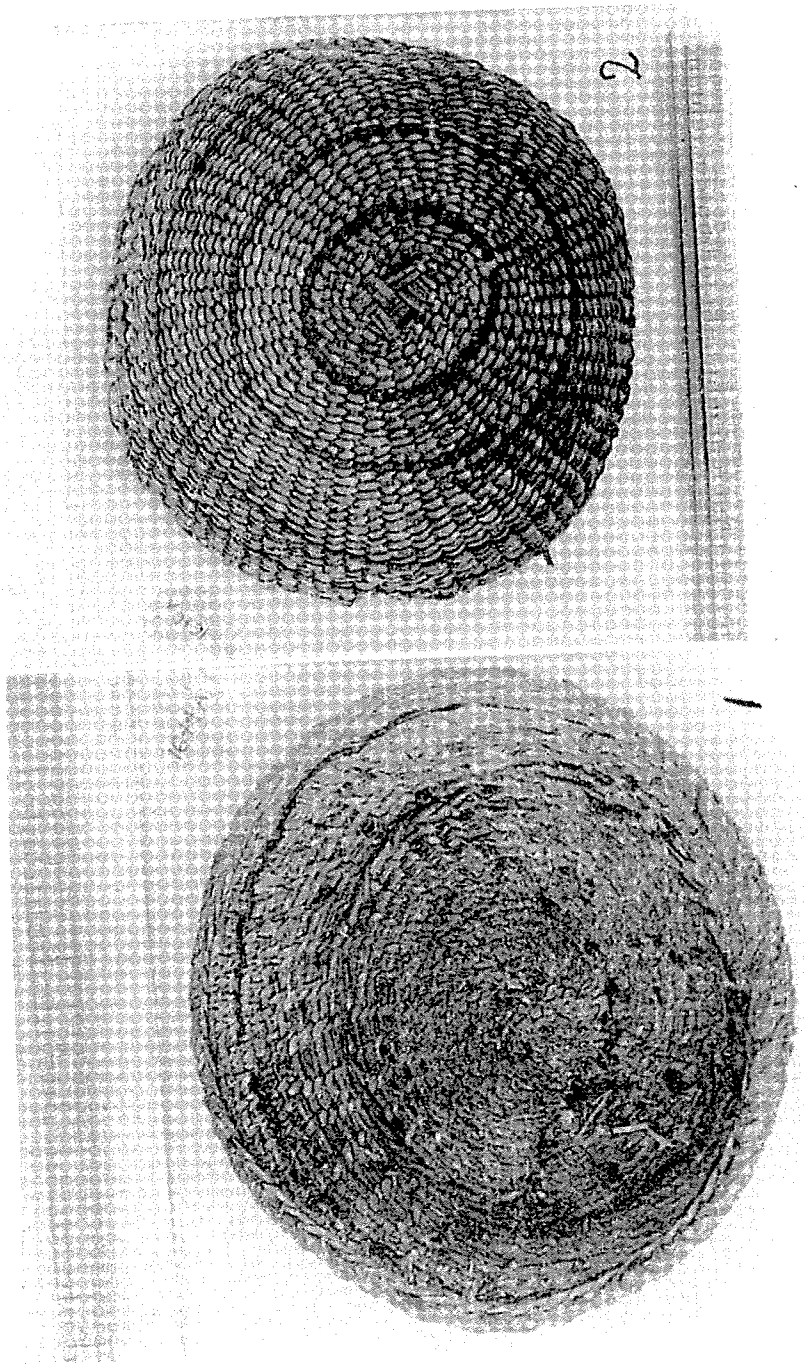


Plate 22

CHARACTERISTICS OF THE GREATER BIG BEND BASKETRY

Type	Stitch		Location and Position of the Surface Worked	Direction of Work	Foundation or Warp	Mouth Up or Down During Work	Decoration	Possible Affinities Within 800 Miles
	Type	Character						
1. Coiled								
a. Wide and frequent distribution. Basin shape.	Split	Non-interlocking	Inside Concave	To left, counter-clockwise	Bundle grasses or small twigs	Up	None	Northwest
b. Similar to a, more plentiful in lower Pecos Valley	Interlocking*				Bundle	Up	None	Northwest
c. Do	Non-interlocking*				Bundle	Up	None	Northwest
d. Rare, skull-cap shape	Split	Non-interlocking	Bottom and outside, convex	Base: to left, counterclockwise Rim: to left, clockwise	Bundle	Start, down; finish, up	Black stripe, inner rim	Northwest
e. Globular bag	Loop	Netting technique Cordage No.	Outside convex	Start: counter-clockwise to left Top: clockwise to left	Without foundation	Up	Red cordage bands interrupted	West and Northwest
2. Twined								
a. Oval	Plain twining		Bottom, then outside, convex	Start: to right, clockwise Finish: to right, counterclockwise	Flat stick		Red twined cordage (interrupted); others occasional skip-stitch	Northwest
b. Sifter	Plain twining		Outside, convex	Start: to right, clockwise Finish: to right, counterclockwise	Yucca leaves or grasses		None	Northwest
c. "Bottle" shape	Plain twining		Outside, convex	To right: clockwise; then counter-clockwise to right	Modified cross warp, grasses	Up	None but well shaped	West and Northwest
d. Conical	Wrapped twining plain	"Cross warp twined" non-interlocking	Outside, convex		T-rods or lattude, vertical crossed by horizontal (outside) members	Up	None	Northwest
e.	Twill twined*				Yucca leaf		None	Northwest
3. Plain Plaited								
a. Square or "Cube-shaped" and round types	(None twilled)		Outside	Horizontal and vertical	Checker, agave leaf	Up	None	North East West
b. Square or cube-shaped	(None twilled)		Outside	Diagonal checker position	Diagonal, agave leaf	Up	None	North East West

*Also reported by Coffin or Setzler, or Pearce and Jackson.

*Reported by Coffin.

*Also reported by Setzler, and Pearce and Jackson.

gests, if not an accidental selection of extra-coarse weaver, that some game might be connected to the use of the object such as children frequently use in rolling shot or marbles in place upon a partly depressed background. At any rate, the raised circle of coiling is rather too uniform to suggest accident and occurs but once fully around, indicating intention rather than accident.

Twined Basketry

Plain Twined

The small plain twined bowl- or cap-shaped basket illustrated in Plate 23, No. 2, is the only one of its type known to the author. It is further described in the tabulations of the chart, becomes more interesting in view of the use of No. 3 (8) red cord twined decorations. Four rows of these red cords are woven in at intervals of 1¼ inches. Each red band is interrupted in a fashion to exclude any thought other than definite intention.

In calling attention to the twined work of Lovelock Cave it is not to be assumed that direct relationships are claimed, but rather mentioned in order to suggest a variety of widely separated parallels from which is excluded any definite conclusions as to kinship or migrations. The parallel of plain twining, stick warp, and the use of red cordage in basketry, however, is interesting and suggests again the usual "this topic bears further study." While twining was practically unknown to Southwestern Basketmaker, in the Big Bend, Setzler (7) identified additional twining in the Pecos River area.

Cross Warp Twined

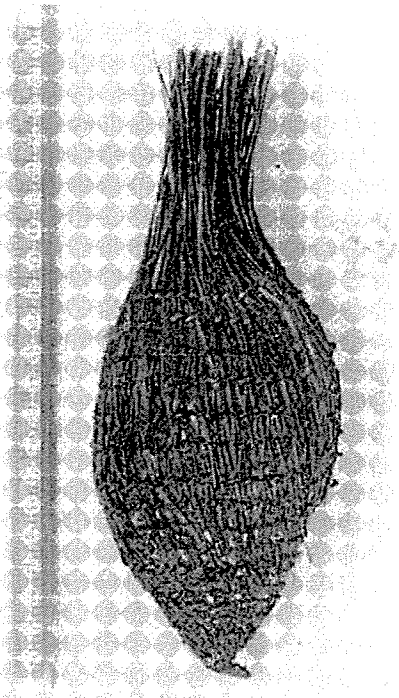
The container illustrated in Plate 23, No. 1, is of unusual modified cross warp assembly of spokes with a plain twined spiral weave of half-inch pitch woven from the outside in a counter-clockwise direction. The shape again suggests that the worker held the basket with the bottom up to start in a clockwise direction to the right until about half the basket was completed, then turning the object over, worked on the near (convex) side in a counter-clockwise direction

---

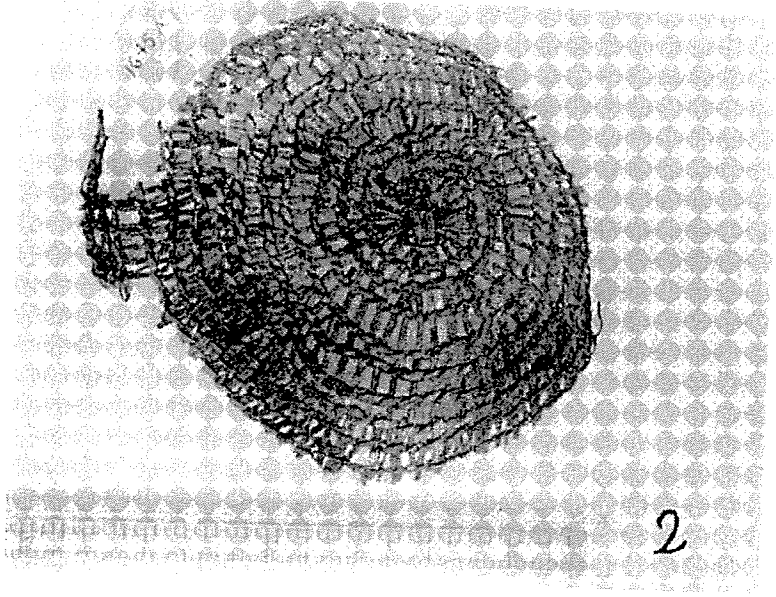
PLATE 23

No. 1. Modified cross warp with plain twining. For an illustration of the lattice twined or T-type of basketry see the 1935 issue of this Bulletin.

No. 2. Plain twined sifter type basket.



1



2

Plate 23

to the right until the article reached the stage of completeness indicated by the cut referred to. The size of this container is 3½ inches in diameter by 10½ inches high. The maximum number of warp units is 107 which is increased or decreased by adding or dropping the number of warp elements by using a bent warp to make two added spokes.

Twined Lid Sifter

This article (Plate 23, No. 2), which appears to be either a sifter or basket lid rather than a storage or carrying utensil, is 2 inches high by 8 inches in diameter. The weaving starts with 23 spokes, which is increased to 99 at the rim by dropping in additional single unbent units as the diameter increased. The initial twining is spirally in a clockwise coil of one-fourth inch pitch to the right. As the object became larger we again assume that the article was turned and worked from the outside convex surface, resulting in a counterclockwise direction to the right of the worker. The Heye Foundation report (1) for Brewster County indicated the finding of sifters with 1/16 inch and ⅛ inch mesh. This mesh averages less than ⅛ inch if used for sifting purposes.

Cross Warp, Wrapped Twining

This interesting type was excavated by the writer from a dry shelter near Alpine (three specimens). It has been unknown, however, in West Texas generally but was reported by F. M. Setzler from caves along the lower Pecos to the East. Harrington (2) also mentions this type of basketry technique in his description of the Gypsum Cave deposits but is not positive of the associations due to the presence of rodent nests. This type of basketry in Texas was evidently used for the construction of some sort of cone-shaped container. Horizontal rods are on the outer convex surface and the vertical rods are bound to each other by non-interlocking twining.

Mr. L. S. Cressman in a personal letter throws some interesting light upon this unusual technique:

> No. 103, the Dead Cow Cave specimen is interesting. It is of course wrapped twining and as a device or process is used today in much of the basketry of the Puget Sound region in Washington. It also occurs in the Plateau but chiefly as a decorative device to apply an overlay element upon the twined foundation. This decorative use occurs in our Oregon caves and in the lowest level of Lovelock Cave. I exam-

ined a specimen at the Heye Foundation last fall. The Klamath also use it to apply porcupine quill overlay on their women's hats and perhaps some baskets. Mason figures it as a functional, like yours, etc., that is twining and not decorative, device for Ute water jars. This last I have not seen nor have I run across the reference anywhere else. This apparent widespread use of the technique in a roughly continuous area, and its use in part as a definite twining device only, raises some interesting questions. It is unfortunate that the Gypsum Cave specimen is not referable to any stratigraphic horizon.

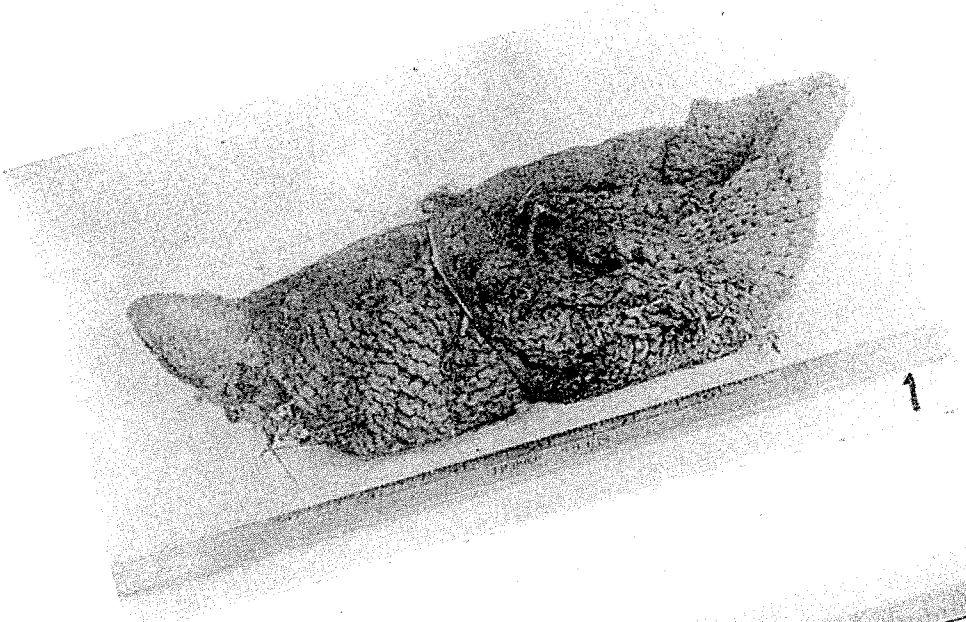
A cut illustrating one of the Dead Cow Cave finds will be found in Bulletin No. 7 of the Texas Archeological and Paleontological Society, 1935, accompanying my short article on the split stitch basket.

Coiled Bag

The coil and loop assembly bag, without foundation, illustrated in Plate 24, No. 1, because of the nature of the find and contents attracts more interest than most of the materials herein listed. This bag was discovered in the extreme far end of a rock shelter of moderate size. With the single exception of a small circular area of about 20" the entire floor of the shelter was solid rock. Evidence on the talus and pictographs near, however, indicated the usual use for such shelters by the Big Bend Indians. Excavation of the pocket yielded a single specimen only, a folded bag, wrapped and tied in a shape suggesting a lady's hand purse. The tie was coarse cordage; untwisted yucca cord with square knot (9). It was evident that from the weight of the object that the contents were of some heavy materials, wrapped and hidden away. The object, however, was taken to the Museum at Alpine, photographed, and opened after preliminary cleaning. The contents, somewhat disappointing, but nevertheless interesting in that it indicated what type of tools were valued and used, appeared to be a tool kit composed of 13 blades or knives and two pebbles of coarse texture with little shaping to suggest use other than abrasive. The flaked work (Plate 24, No. 2), was coarsely chipped from poor materials and is not unlike the rather poor grade of work sparsely found in other dry rock shelters. With attention focused upon the bag itself, however, more pleasing results accrue. Once cleaned and protected by preservatives, the bag

PLATE 24

No. 1. Bag tied with rough cordage in bundle form.
No. 2. Contents of bag, evidently a tool kit of crude workmanship. The two upper left pebbles are small porous stones.



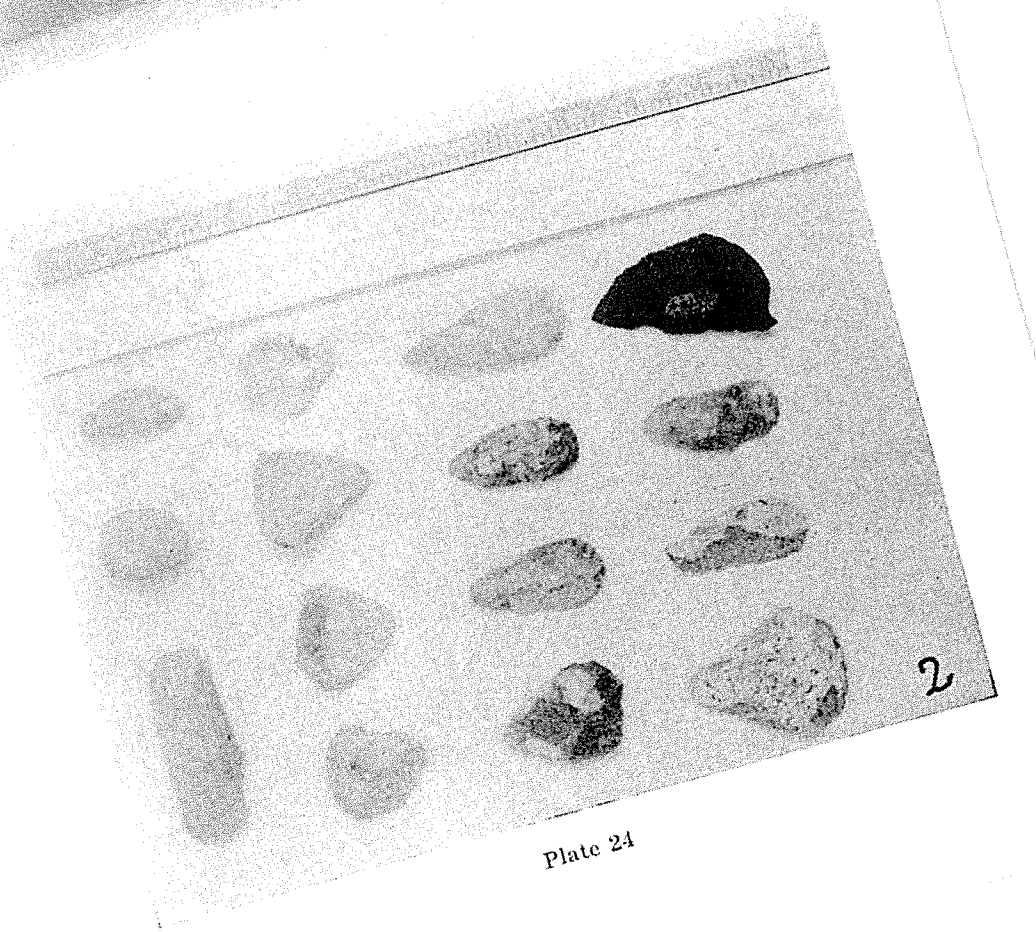


Plate 24

assumed a globular shape 8" in diameter and 6¾" high. There are eight coils and five stitches per inch. Fiber string of uniform twisted No. 2 cord (9) was used throughout. The bottom of the bag was woven counter-clockwise to the left of the worker on the outside surface with the upper part also to the left but clockwise on the convex side. The top opening was worn and it was difficult to determine the exact type of finishing, it was 3½" in diameter. A small hole (Plate 25, No. 1), stuffed with shreds of fiber for mending reminds us that Coffin (1) found similar repairs at Eagle Canyon in the Big Bend. A satisfactory attempt at decoration was the inclusion of three coils of red cord near the large diameter of the bag. Red cordage fragments form 4 per cent of the total twisted string collected by the writer in West Texas (9).

The Heye Foundation Expedition also reported a "cap" woven in 10 coils and 6 loops per inch with a second article of 5 coils and 7 loops per inch. The shape of the bag illustrated here suggests the cap shape reported is a similar form of incomplete bag. Kidder and Guernsey report (4) from their Arizona Cliff House studies a weave technique of almost identical type with coils ranging from 4 to 9 per inch and loops 5 and 6 per inch. They identify this assembly of cordage as used for making bags, leggins, cap, and sandals.

Netting

Two pieces of open mesh work in circular, cone-shaped form (Plate 25, No. 2), suggest other uses for the identical weave technique used in the closed bag assembly, the only difference being the increased coarseness of the mesh to ¼ inch and ¾ inch respectively. Pearce and Jackson (6) found that this type of mesh was most interestingly used to enclose a stone mano. They reported six other bags of similar type with mesh size range ½ inch and 1 inch.

Checker Basket

With quantities of checker matting extending throughout West Texas, it is strange to observe that limited use was made of this easily assembled type of container. Nevertheless, barring some larger bags, the specimen illustrated (Plate 26), is the only such article observed by the writer in the form of a small container. This cube-shaped basket is four inches square by four and one-half inches high. The top selvedge is formed over a No. 4 twisted cord

(9). The cord handle itself is the usual counterclockwise twist of cord which is tied around the selvedge cord at one end by a figure eight knot. On the other side a loop is inserted to the third warp element and the handle cord is tied to this loop. The plaited elements are 1½ to the inch. According to F. G. Speck, the checker basket suggests a strong Eastern influence. A similar basket was found at Bee Canyon by the Heye Foundation (1) which measured 4½x4½x5 inches save that the plaiting was diagonal rather than checker weave.

Conclusion

The student interested in other types of basketry from West Texas should consult Coffin (1) and Pearce and Jackson (6) for additional illustrations. Several museums have unusual assortments of basketry from the area which have not been described and tabulated from the standpoint of weave direction and other techniques. Future studies should be concerned with indications of motor habit as a possible criterion indicating group differences. With such accumulated studies in a wide variety of topics the puzzle of the West Texas Cave People will reach a more satisfactory solution.

While no such early date as has been assigned to Basketmaker may be safely allocated to the basketry described herein, it seems reasonable to believe that much of the cave deposit material represents a pre-Columbian period.

In assigning ten "Basketry Areas of North America," Weltfish (11) has mapped the continent excluding West Texas from District 8. It is believed that this excellent report, if revised today, should include the Big Bend district either as a part of the Southwest or, if research seems to justify, a distinct area of its own.

This paper, originally anticipating the establishment of certain closer relationships with neighboring areas rather tended to estab-

---

PLATE 25

No. 1. Net bag after preservative permitted shaping to original form. The weave is cordage loop without foundation. Note indication of red stripes and mending by stuffing hole with mass of fiber.

No. 2. Additional loop cordage bag forms identical in technique as the closely woven bag but with open mesh assembly.

PLATE 26

Square checker weave basket.

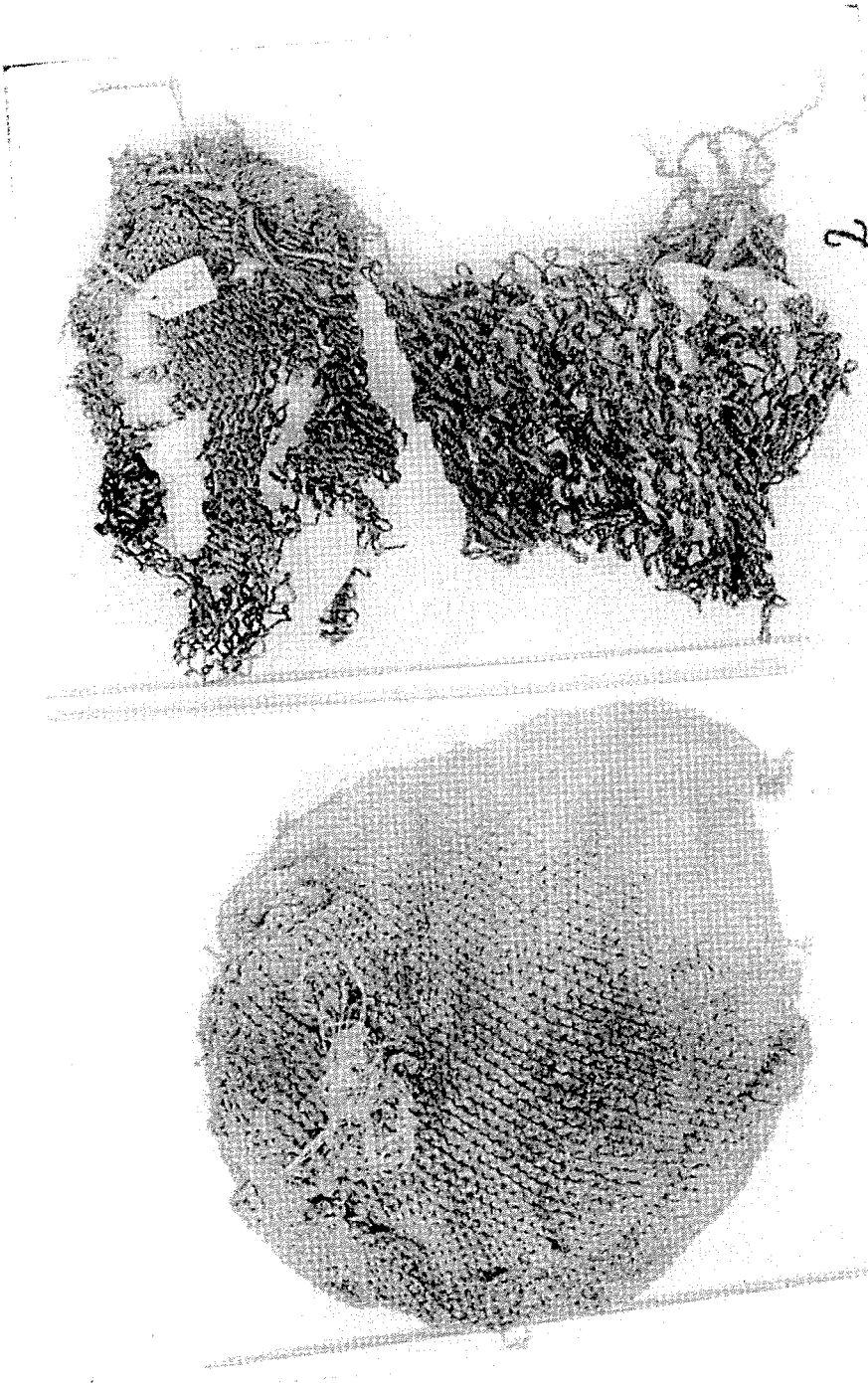


Plate 25

Plate 26

lish the fact of a complex and unsolved problem. In general, however, the whole area tends to relationships with the West and Northwest.

BIBLIOGRAPHY

1. Coffin, Edwin F., *"Archaeological Exploration of a Rock Shelter in Brewster County, Texas,"* Indian Notes and Monographs, No. 48, Heye Foundation, New York, 1932.

2. Harrington, M. R., *"Gypsum Cave, Nevada,"* Southwest Museum Papers, No. 8, Los Angeles, 1933.

3. Hodge, Frederick Webb, *"Handbook of American Indians North of Mexico,"* Part 1, Bulletin 30, Bureau of American Ethnology, Washington, 1912.

4. Kidder, Alfred Vincent, and Samuel J. Guernsey, *"Archeological Explorations in Northeastern Arizona,"* Bulletin 65, Bureau of American Ethnology, Washington, 1919.

5. Nusbaum, Jesse L., *"A Basket-Maker Cave in Kane County, Utah,"* Indian Notes and Monographs, Museum of the American Indian, Heye Foundation, 1922, New York.

6. Pearce, J. E., and A. T. Jackson, *"A Prehistoric Rock Shelter in Val Verde County, Texas,"* The University of Texas, Bulletin No. 3327, 1933, Austin.

7. Setzler, Frank M., *"A Prehistoric Cave Culture in Southwestern Texas,"* American Anthropologist, Vol. 37, No. 1, 1935.

8. Smith, Victor J., *"The Split-Stitch Basket,"* Bulletin 7, Texas Archeological and Paleontological Society, 1935, Abilene.

9. Smith, Victor J., *"Cordage of the Big Bend Caves,"* Bulletin 12, Texas Archeological and Paleontological Society, 1940.

10. Weltfish, Gene, *"Preliminary Classification of Prehistoric Southwestern Basketry,"* Smithsonian Institution, Vol. 87, No. 7, July 12, 1932, Washington.

11. Weltfish, Gene, *"Prehistoric North American Basketry Techniques and Modern Distributions,"* American Anthropologist, Vol. 32, No. 3, Part I, September, 1930.

12. Weltfish, Gene, *"Problems in the Study of Ancient and Modern Basket-Makers,"* American Anthropologist, Vol. 32, No. 1, 1932.

THE VARIOUS TYPES OF THE CLEAR FORK GOUGE

By Cyrus N. Ray

The first specimens of the Clear Fork gouge on record were found on the banks of the Clear Fork of the Brazos River early in 1928.

By the end of that year fourteen specimens had been accumulated, which were studied and compared with illustrations of flints in texts to determine whether the artifacts had been previously described and pictured. At that time no reference to them was found. I then decided that it was a type of Texas artifact not previously described or classified in scientific texts.

At the meeting when the Texas Archeological and Paleontological Society was formed, which was held in my office at 125 1-2 Pine Street, Abilene, Texas, in October, 1928, I read a paper entitled "A Differentiation of the Prehistoric Cultures of the Abilene Section." This was the first time that the Texas Clear Fork gouge was described in scientific literature so far as the writer knows. This article with illustrations was later printed as the first paper in Vol. 1, 1929, Bulletin of Texas Archeological and Paleontological Society. Clear Fork gouges were described on page 18, Plate 1, lower panel, Nos. 8-9-10-11. In the next year's Bulletin, on Page 46, under "Limestone Incrusted Artifacts," Vol. 2, 1930, Plate 10, No. 2, another specimen of the Clear Fork gouge was shown and described. In an article entitled "Flint Cultures of Ancient Man in Texas," in Vol. 6, 1934, I named the Clear Fork gouges as part of the Clear Fork Culture. The name was taken from the place where the gouges were first found, as mentioned in the first description of them in Vol. 1, 1929 issue of the Society's Bulletin. Six more Clear Fork gouges were shown in the 1934 article on Plate 18, Nos. 99-101-102-104-109-110-111. This article also described many other components of the Clear Fork Culture.

In 1935 E. B. Sayles illustrated the same type of gouge in "An Archeological Survey of Texas," Plate X, under the name of "Abilene core scraper." On Plate IX of the same Survey, Sayles also showed a page of points which he listed as "Abilene points," of a type which I listed as "Clear Fork darts (1) and (2)" in "The Clear Fork Culture Complex," Vol. 10, 1938, Bulletin of the So-

ciety. Fourteen Clear Fork gouges were also shown in the latter article in Plate 24, No. 2, two top rows.

In Vol. 7, 1935, of the Society's Bulletin, my report entitled "Folsom Sites," Plate 17, showed two Clear Fork gouges, Nos. 209 and 233. This plate also pictured other components of that culture.

Clear Fork Gouge (1)

The type of Clear Fork gouge found most frequently in the Abilene region is a triangular to ovoid blade, which has been chipped to a curved or scoop like cutting edge at the large end, and to either a point or a chisel edge at the small end. The flaking was done by percussion on both faces, which left a sinous edged thick blade, convex on both faces. Some retouch was done from both faces of the curved cutting edge. (See Plate 27, Nos. 1-2-6-11-12-13-14-15). The gouge (1) type artifacts are usually from 3 to 3¼ inches in length to from 2 to 2¼ inches in width at the cutting end. The deep bevel was cut back into one face of the blade from the broad end. The broad end of the other face was then chipped so that a curved or scoop like cutting edge was made. The depth of the scooped out chipped space varies greatly in different specimens from a few larger ones which are chipped back from the edge as much as 1⅛ inches to a similar number which are only one-half an inch in depth. The scooped out portions of the majority are bevelled back from the cutting edges to depths of between one-half and three-quarters of an inch.

While the majority of the blades are rather uniform in size, there are many much smaller than the figures given above. The smallest of these is 1⅛ inches wide, and 1⅞ inches long. The largest specimen of gouge (1) is 4⅝ inches in length, by 2¾ inches in width. There are however only two of such large size, and the other one is slightly smaller. There are 39 of Gouge (1) which are of sizes below 2½ inches in length. The total number of Gouge (1) type is 206. These vary much in thickness, and in the shape of the scooped ends. Some are broad and relatively thin, and the cutting end more resembles a bevelled edge, except that no matter how narrow the cutting edge may be, it is always curved.

In some specimens one end of the cutting edge has been finished off into a point for boring. There are twelve of these which are definitely so, eleven points were made on the left hand, and one on the right hand. One had points on each end of the cutting edge.

Nearly all of Gouge (1) are heavily patinated in shades of white or tan. Only one, the largest one, is not patinated but another one of nearly the same size has a thick brown patina. Only 22 of the 206 have even a gray patina, all the others have progressed into shades which thoroughly hide the original blue-gray flint color. Some were heavily incrusted with lime or caliche; there were 15 of Gouge (1) lime incrusted in some degree.

Many of these tools show deep chemical alteration of the texture of the stone, indicated by a chalky appearance of the patinated cortex as seen in recently fractured surfaces. In several cases chemical alteration has proceeded to a pitted stage caused by considerable chemical removal of the flint. In one case the left half of the cutting edge has been entirely dissolved and the remainder shows pits of disintegration on the edge and over the blade. This form of gouge is frequently found eroding from the same old beds of red gravel along mountain branches, from which Folsom points, mammoth bones and other ancient types of flints also erode.

Clear Fork Gouge (2) or Planer Gouge

This is the second most numerous class of gouges and there are 175 specimens of Clear Fork Gouge (2) in the collection. (See Plate 27, Nos. 3-4-5-7-8-9-10).

The principal difference between specimens of Gouge (2) and those of Gouge (1) is that all of Gouge (2) have a flat face oppo-

PLATE 27

No. 1, the largest Clear Fork Gouge (1) is 4⅝ in. long by 2⅞ in. wide and ⅞ of an in. thick. Number 2 is one of the smallest of Clear Fork Gouge (1) and is 2⅛ inches long, 1⅝ inches wide and 7/16 of an in. thick. Numbers 3, 4, 5, 7, 8, 9 and 10 are various types of Clear Fork Gouge 2. Number 8 has two small spokeshave notches at the smaller end opposite to the cutting edge. Number 10 has three notches cut into the front or cutting edge. Numbers 1, 2, 6, 11, 12, 13, 14 and 15 are of Clear Fork Gouge (1) type. Number 6 has sharp points at each end of its curved cutting edge. Number 13 has the left end of the cutting edge worked into a short borer. Number 14 is spongy from chemical alteration, and heavily incrusted with lime. Number 15 is a beautiful specimen of iron cemented quartzite from P. H. Walser's collection at Bryan, Texas. A large area of this gouge, near the cutting edge on the reverse side, is polished from use. Numbers 2 and 9 have large patches of caliche incrustation over portions of their chipped surfaces. All of the gouges shown on this plate have their cutting edges turned toward the bottom of the page. Numbers 6 and 13 are of about the usual size of Clear Fork Gouge (1). Number 6 is 2⅛ inches broad at the cutting edge and 3¼ inches long and ¾ of an inch thick. Number 13 is 2 inches broad at the cutting edge, 2¾ inches long and 9/16 of an inch thick.

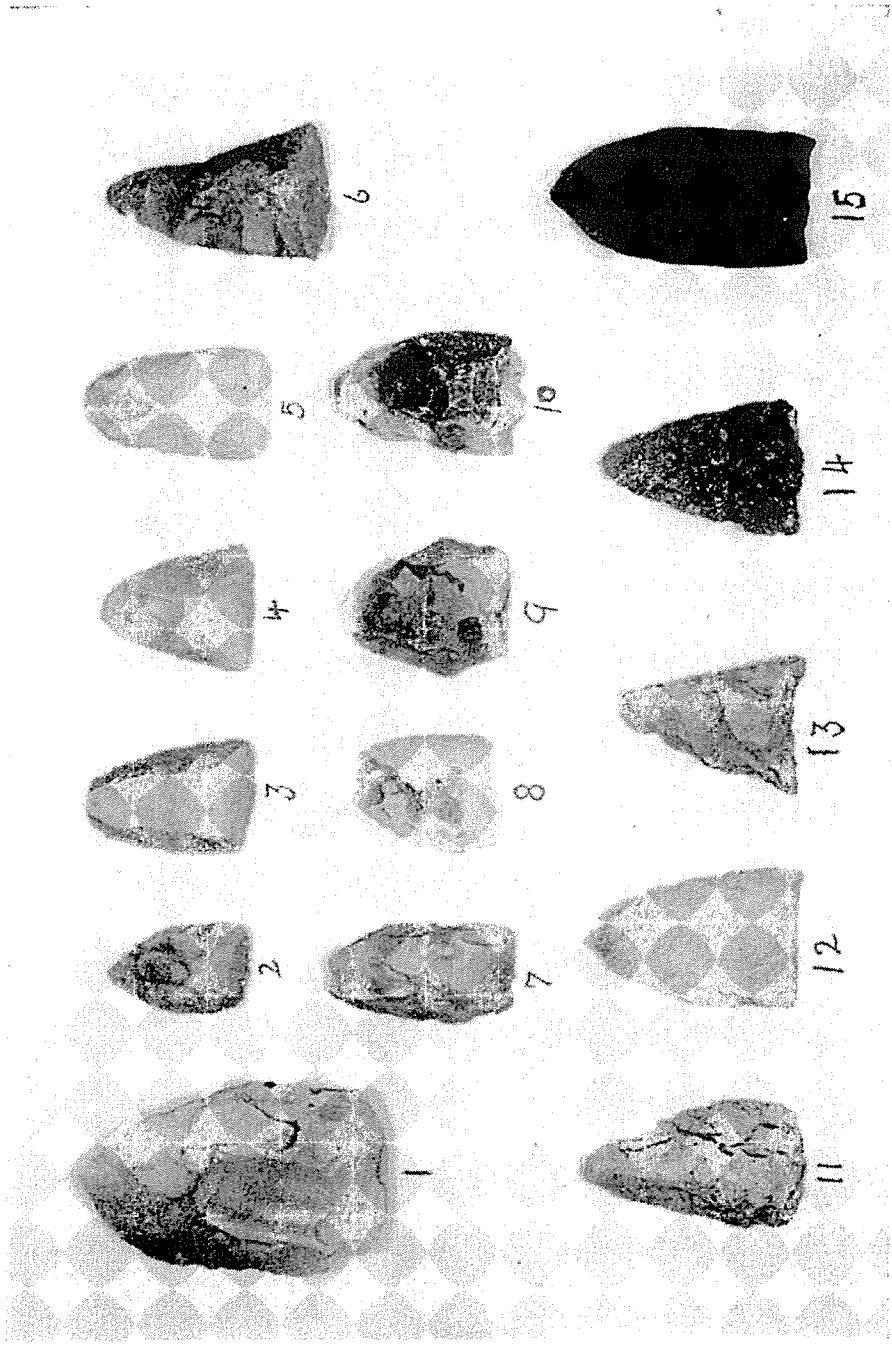


Plate 27

site to the one out of which the scoop or gouge has been chipped. It seems that a large flake with one flat surface was used in making them. The upper surface was flaked off convex and only enough flaking was done along the flat surface to finish off any rough spots on the edges of the blade. Clear Fork Gouge (2) may be divided into those having a curved cutting edge, of which there are 88, and those having a straight or approximately straight cutting edge, of which there are 87 specimens. The specimens of Gouge (2) show the same signs of patination or chemical deterioration that those of Gouge (1) do. Lime incrustation shows on 18 of Gouge (2).

Eight of Gouge (2) had corners of the cutting edges finished off as borers. Three were on the left, two on the right, and three on both ends of the cutting edges. Ten of Gouge (2) contained small notches or spokeshaves which probably were provided for the sharpening of bone awl points. Six had them on the cutting edge, one was at the end opposite to the cutting edge and three were on the sides. There were 20 of these tools not made of flint. Twelve were of a hard gray dense refractory material of about the hardness of jasper. Six were of quartzite, one of fossil wood, one of hematite, and 155 were of flint.

Clear Fork Gouge (3)

There are 33 of Gouge (3) in the collection. (See Plate 28, Nos. 1-2-3-4-6). The specimens of Clear Fork Gouge (3) are long and relatively narrow. The blades have a tendency to be either nearly the same width from the cutting edge to near the other end, or to gradually increase in width from the cutting end to about the middle and then to become slightly narrower toward the other end. Both faces are convex like those of Gouge (1), but the shape is long and relatively narrow, instead of being triangular. Three specimens are incrusted with caliche, two very thickly. All are patinated. Three have a gray patina, and all of the others are either white or some shade of tan or red brown, which are the colors which indicate the thickest coats of chemical alteration. While Gouges (1) and (2) are also found in the same sites with this Gouge (3) type, there are some indications that Gouge (3) may have been used at an earlier period than the others.

Clear Fork Gouge (4)

There are only 11 of Gouge (4). (See Plate 28, Nos. 7 and 10). The distinguishing feature of Gouge (4) is that it has curved cut-

ting edges at both ends instead of at only one, such as those previously described. In shape, eight of Gouge (4) are of about the same width from end to end. Three are of triangular shape similar in form to those of Gouge (1). In seven of Gouge (4) both gouge bevels are made at opposite ends in the same face of the implement. In four specimens there is one bevelled edge on each face, in opposite ends of the implements.

Clear Fork Gouge (5)

There are 9 of Clear Fork Gouge (5). (See Plate 28, Nos. 5 and 11). The implements of this type are long oval, thick blades, which have a very narrow curved cutting edge on the small end and gradually become larger toward the other end, which may be finished off into a rounded or squarish ended knife or a celt edge. The curved cutting edges of these usually vary from one-fourth inch to one-half inch across, which is an exceedingly small cutting edge compared to those of the other types of gouges.

Clear Fork Gouge (6)

There are only 7 of Clear Fork Gouge (6). The distinguishing

PLATE 28

Numbers 1, 2, 3, 4 and 6 are of the Clear Fork Gouge (3) in its various forms. Numbers 2 and 6 are heavily incrusted with caliche, and No. 1 is incrusted to some extent. Numbers 7 and 10 are typical double bitted gouges of Clear Fork (4) type; it will be noted that a small spokeshave notch has been cut into the lower left hand corner of the bottom cutting edge of each, as arranged in this plate. Numbers 5 and 11 are typical specimens of Clear Fork Gouge (5). This is a heavy, long, thick blade with a relatively small bit or curved cutting edge. The curved cutting edge of No. 5 is ½ inch across. The blade is finished off into a flat chisel edge at the broad upper end which is 1⅝ inches wide, and the tool is 5⅞ inches long, and 1⅞ inches broad in the central portion, and is ¾ of an inch thick. The curved cutting edge of No. 11 is ⅝ of an inch across. The upper end of this gouge is also a flat celt or chisel edge, which is 1⅜ inches across, and the tool is 4 inches long, and ½ an inch thick. These are the two largest artifacts of the Gouge (5) class; the usual curved cutting edge is from one-fourth to one-half an inch across. Numbers 1, 2 and 3 are also unusually long and large specimens of the Clear Fork Gouge (3) class. Number 1 is 5 inches long, 1¾ inches across the curved cutting edge, 2⅛ inches wide at the middle and ¾ of an inch thick. Number 3 is 1⅛ in. across the curved cutting edge, 5⅛ in. long, 1⅝ in. across in the middle, and ¾ of an in. thick. Number 7, an example of Clear Fork Gouge (4) is 3 in. long, 1¾ in. broad, and ¾ of an in. thick. Number 10, of the same gouge (4) class, is 3 in. long, 1½ in. across, and 7/16 of an inch thick. Number 8, of Gouge (6) class, is 2½ in. long, 1¾ in. broad and 9/16 of an in. thick. The curved cutting edges of Nos. 1, 2, 3, 4, 5, 6 and 11 are turned toward the bottom of the page. The curved cutting edges of Nos. 8 and 9 are turned upward. It is difficult to photograph these gouges so as to adequately represent them, as the curves often show flat in pictures.

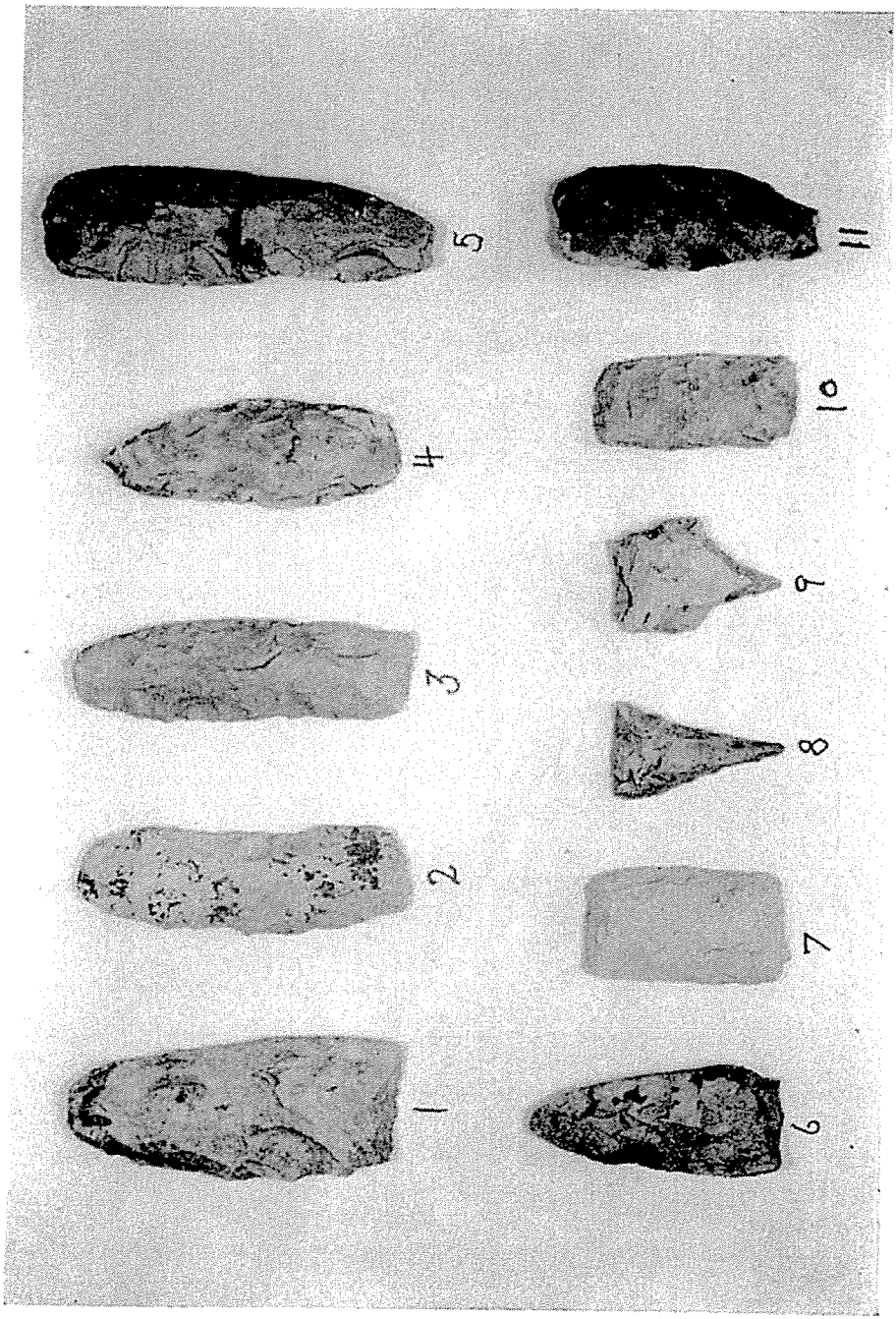


Plate 28

feature of Clear Fork Gouge (6) is that there is a curved cutting edge of Clear Fork shape on one end of the implement and a heavy drill point on the other end. There are two subtypes of these. One kind is nearly flat on the face opposite to the bevelled one, and the edges of the sides run straight to a point from the ends of the cutting edge. The other subtype flares out in the central portion before the drill portion begins. Both types are shown in Plate 28, Nos. 8 and 9. Of No. 8 there are four, and of No. 7 three specimens.

The Clear Fork Gouge An Ancient Implement

All of the Clear Fork gouges described above have been found where they were eroding out of gullies in either ancient red silts, caliche, or red gravel deposits of considerable age. In some of the same types of deposits Folsom and Yuma points and the other components of the Clear Fork Culture have also been found. Their use probably extended back into the Pleistocene to a date comparable with that of the Folsom and Yuma cultures, and also up into the bottom of the lower Burnt Rock Mound Middens. How many thousands of years this type of tool was used yet remains to be determined. It is probable that the long relatively narrow Clear Fork Gouge (3) may be the earliest type, and the smaller specimens of Clear Fork Gouge (1) the latest type. Types (1) and (2) however seem to have had a vogue throughout a tremendous lapse of time.

Probable Uses

It has been my belief since finding the first specimens, that it was not a specialized form of scraper, as some contend, but an entirely different tool which had its own specialized uses. The same Clear Fork people made great numbers of side scrapers, of many shapes, for such uses. The Clear Fork Gouge would be an efficient tool for digging tubers, bulbs or fleshy roots, which probably formed an important part of ancient man's economy. The triangular types such as Gouges (1) and (2) probably were hafted in wooden handles and used like we do garden trowels. Those of type (3) are long enough, and fit the hand well enough to have been used without handles. The cutting edges of most of these tools show marks of use, as though they had been forcibly shoved across some substance of sufficient hardness to slightly break off the edges. This suggests that they may have been used in making atlatls and dart shafts. They may have served to gouge out wooden bowls, or other utensils.

These people had no pottery but that does not signify that they may not have had an extensive industry in perishable wooden implements.

It is possible that they could have been used in hollowing burnt out logs for boats. These tools would also make efficient removers of tree bark which may have been used for food. Of course there is the possibility that the gouges were fitted with handles and used in fleshing hides.

The idea that these tools, and especially those having one flat face—Gouge (2), were used somewhat like a modern carpenter's steel planer and pushed across a surface, is one I have long held. Several years ago the collection was shown to Mr. P. H. Walser of Bryan, Texas, and he remarked that he also had many of the same types of tools, made of materials other than flint. On Mr. Walser's return home he sent me three specimens, two of which were of Clear Fork Gouge (2), and one of Clear Fork Gouge (1). All three were of a brown quartzite appearing stone, which contained considerable iron. The flat faces of both of Gouge (2) had smoothly polished zones of surface near the cutting edges. The Gouge (1), a beautiful specimen, had the largest and smoothest polished zone, also located near the curved cutting edge, where wear would be most active if the tool were shoved across a surface as a planer. (See Plate 27, No. 15).

Long before this evidence was observed, I had searched for just such signs of wear with no success. Evidently the hard nature of the flint used in the Abilene region prevented the development of polish, such as that which showed so plainly on the three specimens from Bryan, Texas.

My collection now contains a total of 441 of the six types of Clear Fork gouges.

Each type as described above could be sub-divided into other divisions if one were to consider it necessary. There is a great diversity of form, especially within the first three divisions. There has been only an attempt to begin classification in a previously uncharted study. The only reason for here describing those types of which few specimens have been found, is that such types may be intrusive in the Abilene region and abundant elsewhere. At any rate their divergences from type are interesting.

P. O. Box 62
Abilene, Texas.

REPORTS AND EDITORIALS

(1) *Some Texas Cave Dweller Artifacts*

The hafted flints, Plate 29, Nos. 1, 2, 3, are instructive in showing various methods of fastening stone points to wood. No. 1 is an atlatl foreshaft, showing the more common method used.[2] No. 2 shows an unusual method of hafting.[3] In historical times a similar implement to that illustrated in No. 2 but with a metal blade, was used by the Apache in gathering sotol.[4] No. 3 may be described as a knife, although the stone blade fastened in the short handle probably was used to cut by a sawing-action. This method of hafting unnotched stone blades was probably more widespread than that indicated by No. 2. Bitumen was commonly used in fastening the blade where this material was obtainable, as evidenced along the West Coast. The use of resin, shown by this implement, indicates that this material may have had a similar use.[5]

The painted pebbles shown in Plate 29, Nos. 4, 5, 6, are characteristic of the Pecos Cave Dweller, where they are normally found, and were probably intrusive in adjoining, contemporaneous cultures.[6] The three specimens illustrated appear to be attempts at showing human faces, or probably represent masks.[7] At most, these human (?) forms are suggestive of those represented by certain "symbolical" pictographs found in the same area, and even more so of the more highly conventionalized petroglyphs.[8] Other

1. Collections of Gila Pueblo, Globe, Arizona, described with the permission of the director. The cultural designations in this article are those established by various complexes of traits listed in Sayles, E. B., 1935. These have been confirmed, in their principal components, by Kelley, J. C., Campbell, T. N., and Lehmer, D. J., 1940. These investigators have retained the designation of Pecos Cave Dweller proposed by the present writer and have proposed Marvillas Cave Dweller for Big Bend Cave Dweller, the latter term being used by them to designate the Texas Cave Dweller Complex as a whole; their investigations did not cover Hueco Cave Dweller sites.

2. Similar foreshafts from western Texas have been described by: Alves, E. E., 1940, pp. 64-68; that illustrated in this paper is shown in Pl. 19, 2 in the article referred to; Coffin, E. F., 1932, p. 31; Mera, H. P., 1938, Pl. 11, 2; Smith, V. J., 1932, p. 58; Pl. 12, Fig. 26.

3. Excavated for Gila Pueblo and described by Smith, V. J., 1938, p. 224. A somewhat similar hafting is described by Martin, G. C., 1933, p. 80; Pl. XXXIII.

4. Information supplied by the late Grenville Goodwin.

5. A similar hafting of a projectile point in a wooden foreshaft is described by Martin, G. C., 1933, Pl. IX, 3 and p. 28, the cement being identified as juagilla gum.

6. Their occurrence in western Texas has been reported by investigators in that area and described by: Coffin, E. F., 1932, p. 24, Pl. IX; Jackson, A. T., 1938, pp. 324-328; Martin, G. C., 1933, pp. 74-78; Pls. XXV-XXVIII; Martin, G. C., and Woolford, S., 1932, pp. 20-24; Pearce, J. E., and Jackson, A. T., 1933, pp. 79-87; see also Kelley, J. C., Campbell, T. N., and Lehmer, D. J., 1940; Sayles, E. B., 1935, p. 63; Table 6.

7. A similar rendition is shown in Figs. 267, 268, 269, Jackson, A. T., 1938.

8. Jackson, A. T., 1938, gives a full description of Texas pictographs.

painted pebbles from sites correlated with the Pecos River Cave Dweller are not analogous to any other American artifacts, of which we have any knowledge.

The purpose of the painted pebbles is unknown, but with the knowledge of these attempts at human representation it might be surmised that they were fashioned to serve the same use as various fetishes, and particularly human figurines.

The highly developed figurine "cult" of Mexico, and an analogous one of the Hohokam in the Southwest, have been interpreted as sig-

PLATE 29

SOUTH TEXAS CAVE DWELLER ARTIFACTS

(1) Wooden foreshaft fashioned from a twig; rubbed smooth; pointed end scored.

The stone point is fitted into a notch in the end of the shaft and is bound with sinew. The point is a light buff-colored chert, with deep lateral notches, and a slightly expanding base. Length, 19.75 cm.

From Hueco Cave Dweller site ("Ceremonial" Cave) about 20 miles northeast of El Paso. Gift to Gila Pueblo by Mr. R. B. Alves.

(2) Thin blade of grey chert, finely chipped and retouched along the edge; set in a section of an oak limb, which had been cut by a crude encircling groove, the central part broken. The slot, in which the blade is firmly held by strips of yucca stalk, had been cut from each side. Length, 31.5 cm.

Maravillas Cave Dweller (originally designated as Big Bend Cave Dweller) site, Sunny Glen Canyon, near Alpine. Excavated for Gila Pueblo by Victor J. Smith.

(3) Bevelled blade of mottled red chert set in wooden handle with resin. Each side of the wooden handle is scored with several parallel lines; end next to the blade being rounded, the other flattened. Length, 14.25 cm.

Maravillas Cave Dweller site, about 30 miles northeast of Presidio.

(4) Painted pebble; flat, crudely shaped pebble; the side shown apparently represents a human face with eyes, mouth and hair delineated; also a series of parallel lines, similar ones appearing on the reverse in an irregular pattern.

(5) Natural pebble decorated with what appears to be eyes and a nose.

(6) Similar to (4) except the eyes are lacking; the reverse consists of a series of lines crossing near the center of the stone. Red pigment, in addition to the black decoration, covers a portion of the surface.

All of the pebbles are decorated with a very thin, black pigment which easily rubs off. Length of 5, 7.5 cm.; from site one mile southwest of Shumla; others, from site 2 miles west of Langtry. All Pecos River Cave Dweller.

(7) Fish Hook: the hook is a portion of a thorn from a "fish hook" cactus; bound to a twisted fiber with a wrapping of similar material; the cord consists of two parts, each composed of two twisted fibers, resembling sinew, and is heavily knotted at the end.

The pebble sinker is held in place by a single knot. Length of hook, 1.75 cm.

Pecos Cave Dweller site, one mile southwest of Shumla.

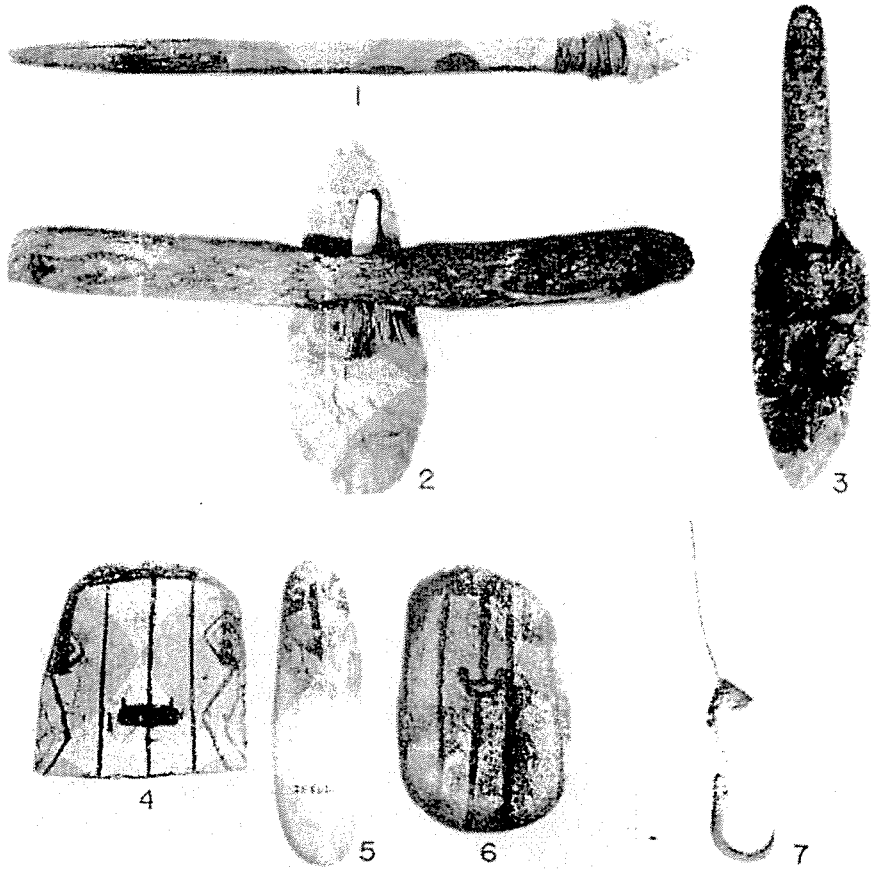


Plate 29

nificant traits of these cultures. A similar interpretation is suggested for the Texas painted pebbles. Although the time relationships between these various manifestations are not known, there is a suggestion of some connection between the Texas Cave Dwellers and the Hohokam, in the finding by Coffin of two complete and 24 fragmentary clay figurines in the Bee Cave, Brewster County. The painting of facial features in black pigments on the clay figures, described by Coffin,[9] is highly suggestive of those represented by Plate 29, No. 5. These Texas clay types are somewhat analogous to those identified with the Pioneer Period of the Hohokam.[10]

The fishing tackle Plate 29, No. 7, is likewise identified with the Pecos River Cave Dweller. Fishing was an important economy of this culture, as shown by the great quantity of fish bones found in their sites. The rigged hook, line and sinker is interesting in throwing light upon the development of this pursuit.[11]

E. B. Sayles,
Gila Pueblo, Globe, Arizona.

REFERENCES

Alves, E. E., 1930. *Shelter Caves of the El Paso District.* Texas Archeological and Paleontological Society, Vol. II, pp. 64-68. Abilene.

Coffin, E. F., 1932. *Archaeological Exploration of a Rock Shelter in Brewster County, Texas.* Indian Notes and Monographs, No. 48. Museum of the American Indian, Heye Foundation. New York.

Haury, E. W., (Gladwin, H. S., Haury, E. W., Sayles, E. B., and Gladwin, N.), 1937. *Excavations at Snaketown: Material Culture.* Medallion Papers, No. XXV. Gila Pueblo. Globe.

Jackson, A. T., 1938. *Picture-Writing of Texas Indians.* University of Texas Publication No. 3809. Anthropological Papers, Vol. II. Austin.

Kelley, J. C., Campbell, T. N., and Lehmer, D. J., 1940. *The Association of Archaeological Materials with Geological Deposits in the*

9. Coffin, E. F., 1932, p. 58; Fig. 17. Martin, G. C., 1933, pp. 77-78, reports the finding of powered manganese in the Shumla Cave; this material may have been the pigment used in painting the black decorations on the pebbles; oxide of iron probably served for the red pigment.

10. Haury, E. W., 1937, pp. 236-237; Pls. CCII, CCVII.

11. Other artifacts, from the same area, composed of cactus hooks may likewise be fishing gear; these have been described by: Martin, G. C., 1935, p. 116; Figs. 173, 175; Coffin, E. F., 1932, p. 53; Martin, G. C., 1933, p. 59; Pl. XIII, describes other fishing gear, including cactus thorns used as hooks.

Big Bend Region of Texas. West Texas Historical and Scientific Society, Publication No. 10 (Sul Ross State Teachers College, Bulletin No. 3, Vol. XXI). Alpine.

Martin, G. C., 1933. *Archaeological Exploration of the Shumla Caves.* Big Bend Basket Maker Papers No. 3. Southwest Texas Archaeological Society, Witte Memorial Museum, Bulletin 3. San Antonio.

1935. *Report on Four Shumla Cave Packets.* Texas Archeological and Paleontological Society, Vol. VII, pp. 115-117. Abilene.

Martin, G. C., and Woolford, S., 1932. *Painted Pebbles of the Texas Big Bend.* Texas Archeological and Paleontological Society, Vol. IV, pp. 20-24. Abilene.

Mera, H. P., 1938. *Reconnaissance and Excavation in Southeastern New Mexico.* Memoirs of the American Anthropological Association, No. 51. Menasha.

Pearce, J. E., and Jackson, A. T., 1933. *A Prehistoric Rock Shelter in Val Verde County, Texas.* University of Texas Bulletin No. 3327, Anthropological Papers, Vol. I, No. 3. Austin.

Sayles, E. B., 1935. *An Archaeological Survey of Texas.* Medallion Papers, No. XVII. Gila Pueblo. Globe.

Smith, V. J., 1932. *The Relation of the Southwestern Basket Maker to the Dry Shelter Culture of the Big Bend.* Texas Archeological and Paleontological Society, Vol. IV, pp. 55-62. Abilene.

1938. *Carved Rock Shelter.* Texas Archeological and Paleontological Society, Vol. X, pp. 222-233. Abilene.

(2) *A Texas Sandia Point*[1]

In the May 6, 1940, issue of "Time Magazine" the writer read an article reporting on the preliminary work done on an older culture, by Frank Cummings Hibben, curator of the Museum of Anthropology, at the University of New Mexico at Albuquerque, New Mexico.

PLATE 30

1. Side view of skull found by W. C. Fritz.
2. Occipital region of the same skull.
3. A Texas point which resembles a Sandia point.

1. Preliminary report "American Antiquity," April, 1937, by Frank C. Hibben.

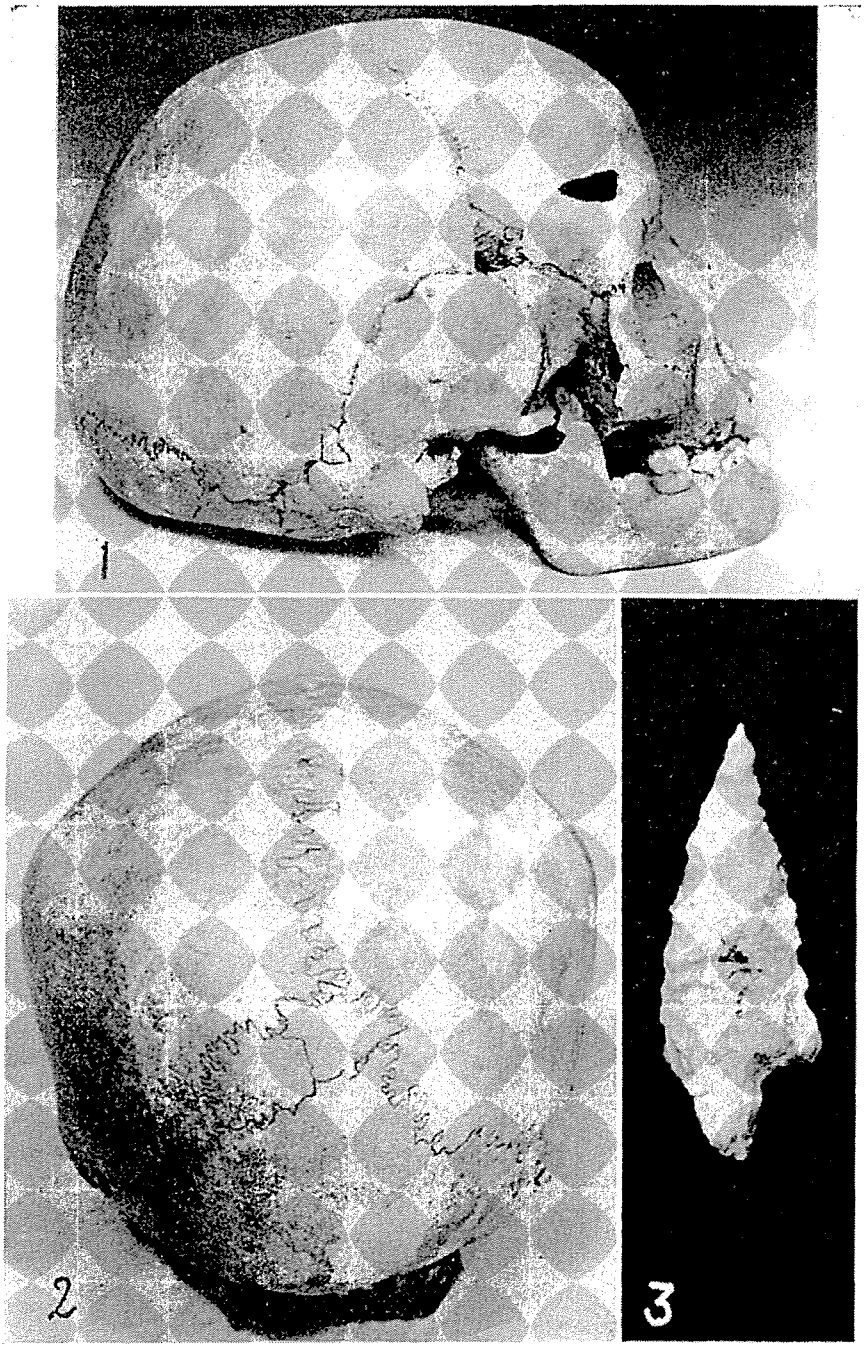


Plate 30

This article indicated that in a cave in the Sandia Mountains, near Albuquerque, New Mexico, a definitely stratified sequence of deposits was found as follows: The surface of the cave floor was covered with the droppings of bats and rats. Underneath this was a layer of stalagmite due to the limestone from the roof of the cave being dissolved out by water seepages and being re-deposited on the old floor of the cave. Beneath this stalagmite deposit was found a typical Folsom Culture stratum, containing Folsom projectile points, charcoal, bones of sloths, and cat like carnivores. Below the Folsom deposit was found an undisturbed layer of sterile yellow ochre. Directly underneath the sterile layer of yellow ochre, was another deposit containing the bones of elephant, horse, camel, sloth, bison, and the projectile points of a culture very different from the Folsom or Yuma Cultures.

The descriptions and illustrations of the projectile points utilized by this culture and assigned the name of Sandia seemed familiar. I was convinced that I had seen these points somewhere before. I immediately began a search through my collection of artifacts to determine if I had this peculiar point. Almost immediately I discovered the point shown on Plate 30. This resembles the illustrations of the Sandia points, as found and reported by Hibben. It is 4½ centimeters in length, 1½ centimeters in width at the shoulder, and almost ¼ centimeter in thickness at the thickest place, which is at the shoulder. This projectile has the characteristic point at both extremities, and the still more characteristic indentation or "shoulder," where normally would be found the tangs of later cultures. The point is rather crudely flaked when compared with the workmanship found on the Yuma or Folsom Cultures. The flaking was apparently effected by pressure with a rather large flaking tool, as the flakes are fairly large.* The material used in the shaping of this point is a fragment, apparently found on the surface as it shows some weathering, of brownish yellow, highly altered limestone. This fragment of metamorphosed limestone is composed of approximately 80 per cent secondary chert, as revealed by examination under a high power binocular microscope. The flaking of this point nowhere compares with the very excellent craftsmanship found in the Yuma or Folsom artifacts.

It is to be regretted that the exact time this point was found cannot

*Edtorial Note: Possibly by percussion.

be definitely reported. It is, however, fortunate that the locality where the point was found, was noted on the point by the symbol "A". This symbol indicated that the point was found in Andrews County, Texas. This gave me a very fair clue as to the time it was found, since my most intensive searching in this region occurred some seven years ago, and was confined to a rather limited sand dune area, which was located on the eastern end of a major sand dune trend. At the time of the finding of this point, I am sure that I considered it to be a "sport" or a crude and imperfect projectile, because most of the points found in the area were Pueblo in type.

Published in the September, 1940, Bulletin of the Texas Archeological and Paleontological Society was a report by this writer, and Mrs. Fritz, of the finding of several fragments and two perfect Folsom type points in the West Texas area. In this article it was observed that in one area in Andrews County, Texas, were found the greatest number of Folsom points or fragments, as well as the greatest number of Yuma type points or fragments. It is interesting to note that this Sandia type point also was found in this rather limited area. Possibly it is coincidence, but a skull that presented some unusual development which was commented on by Dr. Ray in the September, 1940, Bulletin of the Texas Archeological and Paleontological Society, was also found in the same area.

In this area is a trend of sand dunes extending in an east to west direction in southern Andrews County. This is, so far as I have been able to determine, the only east-west trending series of sand dunes in the West Texas-Southeastern New Mexico area. This may be the explanation as to the selection of this area by man as a living site. Most of the camp sites are found on the south flanks of the major sand dune trend, and would receive protection from winter winds from the north. The eastern extremity of this trend is only a few miles west of the Odessa-Andrews paved highway. The western extremity of this series of sand dunes is a few miles east of the New Mexico-Texas state line, and intersects the North-South trending series of sand dunes, which appear as far south as Pecos County, Texas. The most prolific area, yet determined, of the Folsom, Yuma, and Sandia type points occur in the most eastern portion of the East-West trend, in an area covering approximately six miles long and some three miles wide. Game was

probably abundant in this region at the time of occupation as even now one occasionally will see native antelope in the general area. Also edible dwarf oak acorns still grow in abundance. Water probably was also available as numerous thickets and growths of willow trees still exist, indicating a near surface source of water. It is suspected that all of these sand dune trends are the remnants of old drainage systems which have long past reached geologic "old age."

In a few places numerous fragments of weathered bone, and a distinct change in the color of the stratified soil, suggests that fossil deposits are present. Proper excavation might reveal Folsom, Yuma, or Sandia points associated with these suspected fossil deposits. This suggestion is based chiefly upon surface finds of these cultures in the vicinity of, and within the same sand dune blowout, as that containing the weathered bone fragments. A few years ago I directed a representative of the University of Texas to a similar site of weathered bone, and changed soil color in the sand dunes of Eastern Winkler County, Texas, and not so very far south of the site under study. It was reported to me, by oral communication, that preliminary excavation in this site had shown fossil deposits of camel, bison, and horse. I wish to advance the thought that this area offers possibilities in bringing to light more information on "Ancient Man."

W. C. Fritz,
1910 West College St.,
Midland, Texas.

———o———

(3) *A Typographical Error*

In an article in the Vol. 12, 1940, Bulletin, entitled "Triangular Points of Red River County," by George T. Wright, there occurs a typographical error, on the first line of page 174, which reads, "This type embraces all *symmetrical* points . . ." It should read *asymmetrical.*—C. N. R.

———o———

(4) *Two Mistakes Made By the Editor*

The "Iron Button"

In an article entitled "Some Unusual Cremated Burials Found Near Colorado, Texas," printed in Volume Eight, 1936, of this Bul-

letin series the writer suggested an erroneous deduction based on the finding of what then seemed to be a rusted iron trousers button in the cave deposit with four serrated arrow heads, and some long headed skeletons.

The object erroneously identified by the writer as a trousers button has the exact size and shape of a common type of metal trousers button, it also has a hole in the center, and in every respect superficially resembles a much rusted iron button of the type used on a workman's overalls. To the naked eye it has the typical brown rough rusted texture of an old button. It was so self evident that it was a button that the writer and his assistant who helped excavate it, and every one else to whom it was shown, until Dr. A. E. Jenks saw it in 1937, accepted it as such without question.

In December, 1937, Dr. A. E. Jenks made his second visit to Abilene (1) and among many things was shown this object, and he immediately questioned the identification as a button, and applied a geologist's lense to it with the result that it was found not to be a button but composed of a substance having a crystalline structure which probably is crystalline iron similar to many larger brown iron crystals to be found in this region.

Evidently the exact size and form of a button assumed by this crystal structure was purely accidental.

The writer has intended to make this correction each year since then but in the rush of editing and getting out the Bulletins has previously overlooked the matter until after the books were issued.

On the same page is mentioned the occurrence of a Venetian blue glass bead on the surface of the bottom of a sand dune blowout with serrated points, and the later finding of a long headed burial at the same spot when the wind had blown the surface down deeper. While the facts concerning the finding of the glass bead are unquestionably true it should also be mentioned that the blowout is in a plowed field, and the bead could have been dropped by some one at a later date.

We Regret Printing It

There are very few editors who remain active during a long period

1. Dr. A. E. Jenks visited Abilene sites with the writer in August, 1929, and again in December, 1937.

who have not printed articles or pictures which at the time were thought to be significant but which later evidence indicated were not. We now regret having published an article entitled "A Prehistoric Cremated Burial of the Abilene Region," Vol. VIII, 1936, Bulletin of the Society. At the present time we believe that the only scientific significance in the article is in the extracts from correspondence with Mr. Vane Huskey and the associated comments concerning Nueces Canyon scored stones.—C. N. R.

———o———

(5) *An Agreement On Abilene Region Terminology*

Most of the research in the Abilene region thus far has been done by the undersigned. We have to a large extent used different terms for the same artifacts and cultures. This has resulted in some confusion as to the identity of various types mentioned.

To end this confusion, the following chart is published showing the old designations in the middle column, and the new ones to the left. On the right are short lists of type artifacts of each culture, it being understood that these are not complete lists of the components of any of the cultures listed. This chart is only concerned with a brief listing of some of the common marker culture types and their probable placement in time.

Finer differentiations can await the accumulation of more specific knowledge.

The mano and metate are found in the whole series.

CYRUS N. RAY,
Texas Archeological and Paleontological Society,
Abilene, Texas

E. B. SAYLES,
Gila Pueblo,
Globe, Arizona

Original designations in parentheses: R by Ray, S by Sayles

			Culture Types	
Pottery Complex	Valley Creek Culture	(Large Scraper Culture: R) (Wichita Phase: S) (Small Scraper Culture: R)*	1. Pottery 2. Four-edged bevelled knife 3. Double pointed plain knife 4. Bevelled dart 5. Oval keel backed scraper 6. "Pine tree" shaped arrow 7. Side notched triangular arrow 8. Flake Drills	(Edwards Plateau Culture)**
Pre-Pottery Complexes	Brazos Culture	(Sand Dune Culture: R) (Brazos River Phase: S)	1. Serrated arrow heads 2. Long slender "pine tree" shaped arrow 3. Long slender side notched arrow 4. Double pointed knives 5. Square based knife 6. Recessed based knife 7. Side scraper	
	Clear Fork Culture	(Abilene Culture: S) (Abilene Points: S) (Clear Fork Culture: R)	1. Gouge 2. Graver 3. Spokeshave 4. Side scraper 5. Twisted shaft Clear Fork dart (1) R 6. Bevelled base Clear Fork dart (2) R 7. Triangular Clear Fork dart (3) R 8. Triangular Clear Fork dart (4) R 9. Hand Axe 10. Disk	(Folsom Yuma Culture)***
	Durst-Abilene Types****	(Gibson Site Bones and Artifacts: R) (Durst Silt Eoliths: S)	1. Proboscidian (R) 2. Abilene points (R) 3. Gibson point (R) 4. Jones point (R) 5. Mano (R) 6. Side scraper (R) 7. Eoliths (S)	

*Included in the Wichita Phase by Sayles; may represent an earlier phase.
**Burnt Rock Mound Culture of Central Texas: J. E. Pearce.
***Intrusive.
****Culture relationships not yet definitely determined.

(6) *Another Type of Gibson Site Point*

Early in June, 1941, the writer again visited the Gibson Site following a heavy creek rise; and finding the cold water had receded enough to permit examination, sent his assistant, John Allen, across to examine the bank. He soon located a point embedded just below the gravel stratum at a depth below the soil surface of 24 feet, 3 inches.

Despite the writer's recovery from illness, a short time previously, he then plunged in to verify the depth and nature of the find, and fortunately with no bad results.

The point is two and three-eighths inches long and three-fourths of an inch broad.

This flint has the size and the twisted blade characteristic of one of the Clear Fork Culture dart heads. The base is bevelled to the right on the right edge, but the left edge of the base is straight. If this point were bevelled to the right on both edges of the base, it would carry the characteristics of both of the first two types of Clear Fork Culture dart heads described, combined in one point.[1] A point having only the right edge bevelled is something not previously noticed. Last year a Clear Fork point bevelled to the right on both edges of the base was found in the loose gravel of the stream bed below the Gibson stratified deposits where it could have washed out of the site. Previously a long narrow Clear Fork gouge was found in the same loose gravel below the midden strata. There are some, at present indistinct indications, that the genesis of the Clear Fork Culture may lie somewhere deep in the Durst Silt deposits.—C. N. R.

———o———

(7) *The Society Acquires A New Museum Case*

Several years ago the University of Texas excavated a mastodon skeleton from a Taylor County site which I showed them. The tusks were beautifully prepared in Austin and returned to Abilene to be shown in the Museum of "The Society," which is housed in the West Texas Resource and Museum Institute of the West Texas Chamber of Commerce. No museum case then installed in the

1. The Clear Fork Culture Complex, Vol. 10, 1938, Plate 25, No. 1, top four rows of dart heads.

Institute was large enough to receive the tusks and they remained in storage in the musem's vault for a period of two years. During the spring of 1941 permission was obtained for the installation of a new double case of sufficient size to hold the tusks, and in addition a collection of other bones of prehistoric animals. In a space of somewhat over three hours time I saw thirty persons, and raised the sum of $175.50 in cash from twenty-seven of them, with which to build the case. This case is three feet, eight inches wide, eight feet long, and seven feet tall. The case has a floor deck and four plate glass exhibition shelves. It is one of six fine museum cases owned by Texas Archeological and Paleontological Society which are installed in the West Texas Resource and Museum Institute in Abilene, Texas. Four of these are single cases which are glassed on the front and ends only and made to stand against the walls. Two of them are double sized cases, plate glassed on both sides, and the ends. The six cases, which are entirely paid for, cost the sum of $775.50.—C. N. R.

REPORT OF THE SECRETARY-TREASURER OF THE TEXAS ARCHEOLOGICAL AND PALEONTOLOGICAL SOCIETY

Report for the period from the annual meeting on October 26, 1940, to September 1, 1941:

RECEIPTS

Balance on October 26, 1940	$ 57.19
Forty-eight Memberships, 1939-1940	144.00
Sixty Memberships, 1941	180.05
Fifty-nine Bulletin Sales	177.00
Article Reprint Sale	35.00
Collection on Color Print	5.00
Collections on New Museum Case	175.50
Bridwell Excavation Fund	35.00
Total	$808.74

DISBURSEMENTS

Balance on 1940 Printing Bill	$291.51
To President's and Secretary-Treasurer's Offices	14.50
Paid on New Museum Cases	175.00
Paid on 1940 Annual Meeting Expenses	6.50
Bridwell Excavation Fund	2.60
Total	$490.11
Bank Balance on September 1	318.63

ACCOUNTS PAYABLE

For 300 Copies of 1941 Bulletin	
For Engraving in 1941 Bulletin	

MEMBERSHIP LIST 1940-1941

Honorary Members

Harold J. Cook, Cook Museum ..... Agate, Neb.
*Dr. Robert T. Hill ..... Deceased
Albert G. Ingalls, Scientific American ..... New York City, N. Y.
Dr. Julius Olsen ..... Abilene, Texas

Members

Abilene Chamber of Commerce ..... Abilene, Texas
Abilene Printing & Stationery Co. ..... Abilene, Texas
American Museum of Natural History ..... New York City, N. Y.
American Philosophical Society ..... Philadelphia, Pa.
A. E. Anderson ..... Brownsville, Texas
A. W. (Pete) Anderson ..... Clovis, N. M.
Dr. K. H. Aynesworth, 601-602 Praetorian Bldg. ..... Waco, Texas
Max W. Ball ..... Box 156, Edmonton, Alberta
D. A. Bandeen, West Texas Chamber of Commerce .... Abilene, Texas
H. J. Bass ..... Abilene, Texas
Baylor University Library ..... Waco, Texas
Joe Benton ..... Nocona, Texas
Mrs. Mayne W. Bonner (L. Frank), 918 Parkview Ave. ..... Dallas, Texas
Dr. Kirk Bryan, Harvard University ..... Cambridge, Mass.
John P. Byram ..... Abilene, Texas
C. M. Caldwell ..... Abilene, Texas
Price Campbell ..... Abilene, Texas
T. N. Campbell, University of Texas, Dept. of Anthropology ..... Austin, Texas
Mrs. Elizabeth W. Crozer Campbell ..... Twenty Nine Palms, Calif.
Sam Chamberlain ..... Refugio, Texas
Cleveland Public Library ..... Cleveland, Ohio
Edward B. Cochran, 1020 W. Woodland Ave. .... San Antonio, Texas
Columbia University Library ..... New York City, N. Y.
Dr. Stewart Cooper ..... Abilene, Texas
Cox, Hunter, Hall Agency ..... Abilene, Texas
Col. M. L. Crimmins ..... Ft. Sam Houston, Texas
Dallas Public Library ..... Dallas, Texas
J. Walter Davenport, Witte Memorial Museum .... San Antonio, Texas
E. C. DeMontel, 537 Harvey-Snider Bldg. ..... Wichita Falls, Texas

Denver Art Museum ..... Denver, Colo.
Ellis Douthit ..... Abilene, Texas
William A. Duffen, Dept. of Anthropology,
U. of Texas ..... Austin, Texas
Duke University Library ..... Durham, N. C.
George L. Edwards ..... Box 57, Donna, Texas
Prof. Loren C. Eiseley, University of Kansas ..... Lawrence, Kans.
Henry E. Elrod, 316 Petroleum Bldg. ..... Houston, Texas
Field Museum of Natural History ..... Chicago, Ill.
R. E. Forrester ..... Moran, Texas
W. C. Fritz, Skelly Oil Co. ..... Midland, Texas
W. S. Fulton, 170 Hillside Ave. ..... Waterbury, Conn.
Judge O. C. Funderburk ..... Eastland, Texas
J. Joe Finkelstein, University of Tennessee ..... Knoxville, Tenn.
Gila Pueblo ..... Globe, Ariz.
C. W. Hanley, 2307 Fifth Ave. ..... Fort Worth, Texas
R. K. Harris, Dallas Historical Society .... Hall of State, Dallas, Texas
*Major John B. Hawley ..... Deceased
R. W. Haynie ..... Abilene, Texas
Mrs. Dwight B. Heard, Heard Museum ..... Phoenix, Ariz.
Dr. T. Wade Hedrick ..... Abilene, Texas
Curtis J. Hesse, Texas A. & M. College ..... College Station, Texas
Frank C. Hibben, University of New Mexico ..... Albuquerque, N. M.
Peter Hinsch, 2002 1st Ave. S. ..... Fort Dodge, Iowa
Dr. T. L. Hodges ..... Bismark, Ark.
Dr. W. C. Holden, Texas Technological College ..... Lubbock, Texas
Houston Public Library ..... Houston, Texas
J. C. Hunter ..... Abilene, Texas
Instituto Panamericano de Geografia e Historia; Avenida del
Observatorio Num. 192 .... Tacubaya D. F., Republica Mexicana
A. T. Jackson, University of Texas, 508 E. 46th St. ..... Austin, Texas
Henry James ..... Abilene, Texas
Morgan Jones ..... Abilene, Texas
Percy Jones ..... Abilene, Texas
Roland Jones ..... Abilene, Texas
Harold M. Kautz ..... Sterling City, Texas
Ed King ..... Abilene, Texas
Forrest Kirkland, 501 Linz Bldg. ..... Dallas, Texas
Laboratory of Anthropology ..... Santa Fe, N. M.

Prof. E. M. Landers, Hardin-Simmons University .....Abilene, Texas
R. B. Leach .....Abilene, Texas
Eli Lilly, 5807 Sunset Lane .....Indianapolis, Ind.
Judge Harry J. Lemley, Federal Bldg. .....Little Rock, Ark.
La Retama Public Library .....Corpus Christi, Texas
Dr. J. G. McAllister, Dept. of Anthropology,
Univ. of Texas .....Austin, Texas
Metropolitan Museum of Art Library .....New York City, N. Y.
Museum of American Indian, Heye Foundation, New York City, N. Y.
The Newberry Library .....Chicago, Ill.
New York Public Library .....New York City, N. Y.
Northwestern University Library .....Evanston, Ill.
Oklahoma A. & M. College Library .....Stillwater, Okla.
Miss Magdalen Payne .....Trent, Texas
Peabody Museum of Archeology and Ethnology, Harvard
University .....Cambridge, Mass.
H. A. Pender .....Abilene, Texas
Judge Hermon C. Pipkin .....Amarillo, Texas
Phillips Academy Library .....Andover, Mass.
Omar Radford .....Abilene, Texas
Dr. Cyrus N. Ray, Box 62 .....Abilene, Texas
Erik K. Reed, Box 461 .....Santa Fe, N. M.
Rev. Henry Retzek, St. Alexius Church .....West Union, Minn.
P. M. Rice .....Hamilton, Texas
Dr. R. N. Richardson, Hardin-Simmons University .....Abilene, Texas
Thomas E. Roberts .....Abilene, Texas
Rosenberg Library .....Galveston, Texas
San Diego Scientific Library, Balboa Park .....San Diego, Calif.
N. A. Sansteby, 535 Hoefner Ave. .....Los Angeles, Calif.
E. B. Sayles, Gila Pueblo .....Globe, Ariz.
Henry Sayles .....Abilene, Texas
Dr. Ellis W. Shuler, Southern Methodist University .....Dallas, Texas
Judge O. L. Sims .....Paint Rock, Texas
Dr. R. E. Smallwood, 144 Park Hill .....Hot Springs, Ark.
Prof. Victor J. Smith, Sul Ross State College .....Alpine, Texas
Smithsonian Institution .....Washington, D. C.
Southern Methodist University Library .....Dallas, Texas
Southwest Museum Library, Highland Park .....Los Angeles, Calif.
Russell Stephens .....Abilene, Texas

Floyd V. Studer, 635 Amarillo Bldg. ..... Amarillo, Texas
Mrs. Maud Durlin Sullivan, El Paso Public Library.... El Paso, Texas
Texas Technological College Library ..... Lubbock, Texas
Texas Library and Historical Commission ..... Austin, Texas
The Rice Institute Library ..... Houston, Texas
Dr. R. H. Tull ..... Abilene, Texas
Tyrrell Public Library ..... Beaumont, Texas
University of Arizona Library ..... Tucson, Ariz.
University of Arkansas Library ..... Fayetteville, Ark.
University of California Library ..... Berkeley, Calif.
University of Chicago Library ..... Chicago, Ill.
University of Illinois Library ..... Urbana, Ill.
University of Kansas Library ..... Lawrence, Kans.
University of Michigan Library ..... Ann Arbor, Mich.
University of Nebraska Library ..... Lincoln, Neb.
University of New Mexico Library ..... Albuquerque, N. M.
University of Oklahoma Library ..... Norman, Okla.
University of Pennsylvania Museum ..... Philadelphia, Pa.
University of Texas Library ..... Austin, Texas
Vanderbilt University, Dr. L. C. Glenn, Dept. of
Geology ..... Nashville, Tenn.
W. J. Van London, 3126 Albans Road ..... Houston, Texas
S. A. Vernon, Route 1 ..... Ovalo, Texas
Waco Public Library ..... Waco, Texas
P. H. Walser, 306 Robertson Ave. ..... Bryan, Texas
Frank H. Watt, Box 1176 ..... Waco, Texas
Dr. Otto O. Watts, Hardin-Simmons University ..... Abilene, Texas
William C. Watts, 2111 23rd St. ..... Lubbock, Texas
Dr. C. H. Webb, The Children's Clinic ..... Shreveport, La.
C. L. West ..... Hamilton, Texas
A. H. Witte ..... Henrietta, Texas
George T. Wright, 190 Bonham St. ..... Paris, Texas
Welty Wright ..... Shallowater, Texas
Lestor B. Wood, Phillips Petroleum Co. ..... Houston, Texas
Yale University Library ..... New Haven, Conn.

BULLETIN

OF THE

Texas Archeological and Paleontological Society

Volume Fourteen
SEPTEMBER
1942

Published
by the
Society at
Abilene,
Texas

PRINTED IN THE UNITED STATES OF AMERICA

The Texas Archeological and Paleontological Society

OFFICERS

CYRUS N. RAY, *President*
R. N. RICHARDSON, *Vice-President*
OTTO O. WATTS, *Secretary-Treasurer*
JULIUS OLSEN, *Honorary Vice-President for Life*

DIRECTORS

CYRUS N. RAY, D. O.
JULIUS OLSEN, Ph. D., Sc. D.
OTTO O. WATTS, Ph. D.
W. C. HOLDEN, Ph. D.
R. N. RICHARDSON, Ph. D.
C. W. HANLEY

REGIONAL VICE PRESIDENTS

JUDGE O. L. SIMS ..... Paint Rock, Texas
A. E. ANDERSON ..... Brownsville, Texas
C. L. WEST ..... Hamilton, Texas
VICTOR J. SMITH ..... Alpine, Texas
COL. M. L. CRIMMINS ..... San Antonio, Texas
FLOYD V. STUDER ..... Amarillo, Texas
FRANK WATT ..... Waco, Texas
FORREST KIRKLAND ..... Dallas, Texas
J. G. MCALLISTER, Ph. D. ..... Austin, Texas

TRUSTEES

ELLIS SHULER, Ph. D. ..... Dallas, Texas
STEWART COOPER, M. D. ..... Abilene, Texas
PRICE CAMPBELL ..... Abilene, Texas
A. T. JACKSON ..... Austin, Texas
RUSSELL STEPHENS ..... Abilene, Texas
H. A. PENDER ..... Abilene, Texas

EDITOR

CYRUS N. RAY, D. O.

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 and minor 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.

BULLETIN

of the

Texas Archeological and Paleontological Society

TABLE OF CONTENTS

1. Indian Pictographs and Petroglyphs in the Panhandle Region of Texas, By Forrest Kirkland 9
2. Channelled Points From Clear Fork Sites in North Texas, By Adolph H. Witte 27
3. Prehistoric Novaculite Quarries of Arkansas, By Harry J. Lemley 32
4. Evidence of European Influence in the Pictographs of West Texas, By Victor J. Smith 38
5. Prehistoric Paintings Covered With Staligmitic Deposit, By Cyrus N. Ray 49
6. Historic Material From Fielder Canyon Cave, By Forrest Kirkland 61
7. Certain Caches of Flints From the North Texas Area, By Adolph H. Witte 72
8. The Genus Bootherium, With a New Record of Its Occurrence, By Curtis J. Hesse 77
9. A New Species of Capromeryx From the Pleistocene of West Texas, By Grayson E. Meade 88
10. Vertebrate Paleontology in Texas, A Review, By Curtis J. Hesse 97
11. Animal Hole Molds in the Permian, By Cyrus N. Ray 120
12. Obituaries 130
13. News Notes and Editorials 137
    (1) Ancient Artifacts and Mammoth's Teeth of the McLean Site. (2) Are These Permian Glacial Grooves?
14. Secretary-Treasurer's Report 157
15. Membership List 158

Vol. 14, 1942, Price $3.00

Abilene, Texas

LIST OF ILLUSTRATIONS

Plate 1 ..... Page 11
Pictographs at Rocky Dell near Adrian.

Plate 2 ..... Page 15
Petroglyphs at Rocky Dell.

Plate 3 ..... Page 17
Petroglyphs at Mujeres Creek.

Plate 4 ..... Page 21
Petroglyphs at Brown's Camp.

Plate 5 ..... Page 25
Petroglyphs at Aqua Piedro Creek; Chimney Rock; and Lehey Creek.

Plate 6 ..... Page 29
Sloth tooth, flint projectile points and Clear Fork Gouges from ancient sites.

Plate 7 ..... Page 33
No. 1, Quarry pit. No. 2, Hammerstones, Arkansas novaculite quarries. No. 3, More hammerstones from novaculite quarry. No. 4, Debris from quarry.*

Plate 8 ..... Page 39
Decorative and conventionalized pictographs, Chalk Draw, Brewster County.

Plate 9 ..... Page 43
Drawings of missions.

Plate 10 ..... Page 47
Miscellaneous West Texas pictographs representing shelter units.

Plate 11 ..... Page 51
No. 1, View of rock shelter containing red paintings covered with staligmitic deposit. No. 2, Close up view of rock wall containing red paintings.

Plate 12 ..... Page 53
No. 1, Horizontal figure showing phallus. No. 2, A four-armed object. No. 3, Ball with tassel. Nos. 4 and 5, Three alphabet-like designs. No. 6, Small human figure.

Plate 13 ..... Page 57
No. 1, Exceedingly slender male figure. No. 2, Nude male figure with exceptionally flat head and showing ears. No. 3, Nude male figure with raised arms. No. 4, Skirted slender figure. No. 5, Mano shaped drawing.

*Error. The reader for Plate 7, on page 32, is incorrect. It should be as above shown in List of Illustrations.

Plate 14 ..... Page 59
No. 1, Skirted dancing figure with feathers on head. No. 2, Ball below arm of No. 1. No. 3, Unusually flatheaded figure with phallus and showing horns. No. 4, Female skirted figure holding racquet-like object.

Plate 15 ..... Page 63
Articles found in Fielder Canyon Cave.

Plate 16 ..... Page 67
Historic Indian artifacts showing use of metal objects found in Fielder Canyon Cave.

Plate 17 ..... Page 73
Flints from the Johnson cache.

Plate 18 ..... Page 79
No. 1, Bootherium Brazosis, cranial roof. No. 2, Bootherium Brazosis, side view.

Plate 19 ..... Page 83
Superior view of skull outlines of various Ovibovinae.

Plate 20 ..... Page 91
No. 1, Capromeryx Minimus, Sp. Nov. Type W. T. M. No. 18. No. 2, Capromeryx Minimus W. T. M. No. 19.

Plate 21 ..... Page 101
Standard geologic time scale modified to show formations important in vertebrate paleontology of Texas.

Plate 22 ..... Page 107
Texas Permian Vertebrates, A. Dimetrodon, B. Stegocephalion, C. Eryops, D. Diplocaulus.

Plate 23 ..... Page 113
Texas Cretaceous Vertebrates. A. Pteranodon, B. Trinocromerum, C. Trachodon, D. Triceratops.

Plate 24 ..... Page 117
A. Synthetoceras francisi, a Miocene antelope, B. Tetrameryx, a four horned Pleistocene antelope, C. Bootherium, a rare musk-ox like animal of the Pleistocene.

Plate 25 ..... Page 121
Nos. 1-2-3, Three views of the Permian bedding plane which contains thousands of animal hole molds.

Plate 26 ..... Page 125
Animal Hole Molds in the Permian. Nos. 8-9-10-12 and 13 are hole mold ends. Nos. 4-5 and 6 were guttered by later bored holes. Nos. 11 and 15 show portions of smaller later holes driven into older molds.

Plate 27 ..... Page 127
Animal Hole Molds in the Permian. Nos. 1-6-7-13-14 show hole mold endings in matrix where molds have dropped out. No. 3 shows shale matrix with holes where molds have dropped out; the circular scorings produced in boring the holes are seen. Nos. 4-5-8-10-11-12 are side guttered hole molds.

Plate 28 ..... Page 131
Forrest Kirkland.

Plate 29 ..... Page 135
Dr. Julius Olsen.

Plate 30 ..... Page 139
Nos. 1 and 2 show both faces of a typical Clear Fork Gouge.

Plate 31 ..... Page 141
Nos. 1 and 3 show both faces of a section of a fine Folsom blade from McLean site. Nos. 2 and 4 show two sides of a Folsom side scraper from same site.

Plate 32 ..... Page 143
Nos. 1 and 3 show both faces of a channelled blade from McLean site. Nos. 2 and 4, both faces of a dart point found in same site.

Plate 33 ..... Page 145
Nos. 1 and 3 show two faces of a channelled point from McLean site. Nos. 2 and 4 show another McLean Site blade.

Plate 34 ..... Page 149
No. 1 shows long Folsom blade found embedded in alluvium with mammoth bones and teeth in McLean site. No. 2 shows a beautifully polished Yuma blade found in alluvium of same site.

Plate 35 ..... Page 151
Shows one of the mammoth's teeth found with the Folsom blade in the McLean Site. Approximately natural size. (Photographs shown in Plates 35-36 by E. H. Sellards).

Plate 36 ..... Plate 153
Shows two teeth of the mammoth's skeleton found with the Folsom blade in the McLean Site. Approximately half natural size.

Plate 37 ..... Page 155
Nos. 1 and 2 are two views of a series of highly polished grooves in the top of a horizontal stratum of Permian limestone.

INDIAN PICTOGRAPHS AND PETROGLYPHS IN THE PANHANDLE REGION OF TEXAS

By Forrest Kirkland*

In these times when so much stress is being laid on evidence of age, when so many archeologists are concentrating on work that promises to shed light on the age of America's oldest inhabitants, and when the burden of so many archeological reports seems to be the proof of great age, it may seem a bit unusual for one to continue year after year working and reporting on a project that deals chiefly with comparatively recent cultures and, so far, has been useful only in dating historic time. The study which the writer and his wife have been making of Texas Indian pictographs is just such a project.[1]

The two weeks we spent last summer (1941) in the Panhandle region was our seventh vacation devoted to the project. Through the splendid cooperation of Floyd V. Studer of Amarillo, Curator of Archeology and Paleontology at the Panhandle Plains Museum at Canyon, and the owners and foremen of the ranches on which we worked, we were able to visit and copy every legible picture at eleven sites in the region—every known site with the exception of two or three which contain only a few unimportant designs. Washed out bridges and roads prevented our reaching these.

The object of this paper is to describe and reproduce the best examples of the Panhandle Indian pictures. And although none of these pictures date back more than a few hundred years at most, the great majority being historic, we believe they furnish interesting and valuable information about certain Indian tribes that once inhabited the state—information that is well worth collecting and reporting now while it is still available. The soft sandstone on which the designs were painted or carved is already beginning to disintegrate and destroy this crude but interesting record left by the Indians.

The Panhandle pictures are chiefly petroglyphs — carved, scratched, or pecked into the rocks. They are of two apparently

1. Forrest Kirkland; Texas Archeological and Paleontological Society Bulletins, 1937, 1938, 1939, 1940, 1941.
*Deceased, See Obituaries.

unrelated types, evidently representing different cultures and, no doubt, are widely separated in time. One type, (Plate 3, No. 3) found at only two sites, consists of crude human and animal figures and human tracks coarsely pecked into the exposed surface of hard limestone boulders. The other type found at eight sites consists of human and animal representations and various kinds of marks and designs carved into soft sandstone or lightly scratched on the sandstone surfaces. These petroglyphs are found on the protected walls of cliffs and sandstone blocks or in small shelters. Although there are differences in the subject matter at several sites the similarity of the work indicated that it was produced by related Indians or tribes.

Pictographs were found at only two sites. A highly conventionalized representation of a man, five feet high, holding a spear in his right hand (Plate 4, No. 6), and four positive hand prints, all in dim red paint, were all that remained at one site in Tule Canyon. Faint indications of another man holding a bow could be made out on an exposed wall of the cliff. This was also in red. There is little doubt that this unimportant group is comparatively recent.

The other pictograph site which also contains many petroglyphs is on a small tributary of the Canadian River in a rock shelter at Rocky Dell about six miles northwest of Adrian. This is the largest and best known group of pictures in the Panhandle (Plate 1; Nos. 1, 2, 3). It was reported as far back as 1853 and was described in Mallery's classic monograph on American Pictographs in 1880. Jackson gives an excellent review of its history in his "Picture Writing of Texas Indians."

The outstanding picture at the site is that of a strange animal 13 ft. long, with horns, a vicious mouth, and a forked tail, (Plate 1; No. 1). It faces a smaller animal with long ears and tail and what appears to be an anthropomorphic man 4 ft. tall. This strange animal is said to represent the plumed serpent, guardian of the water—a myth of the Pueblos; who were in New Mexico a

---

PLATE 1

PICTOGRAPHS AT ROCKY DELL NEAR ADRIAN

Nos. 1 and 2 are continuous on the back wall. No. 3 is directly under No. 2. Much damage had been done to pictographs by chalking. The most interesting figure—the plumed serpent—guardian of the water. No. 3, with man on horse, shows European influence.

Plate 1

little more than a hundred miles to the west. This may be true since Pueblo potsherds have been found at the site, but the writer has found no proof of the claim. There are several positive handprints in white, red, and black, and numerous other smaller pictures of animals and men at the site. The colors used were red, black, yellow, and white. Unfortunately the principal designs have been chalked so heavily that it was difficult to make accurate copies. Some antiquity has been claimed for these pictographs, but it should be noted that one of the dimmest groups at the site shows a buffalo hunt with a man riding a horse, (Plate 1; No. 3). This is the only pictograph at the site showing white influence, but it is unmistakable evidence that at least part of the designs are comparatively recent.

The many petroglyphs at the site are either sharply incised into or lightly scratched on the shelter wall or floor and are in poor state of preservation. They consist of many aimless lines, simple geometrical designs (Plate 2; Nos. 1, 4), and human and animal representations, (Plate 2; Nos. 5, 6, 7). The dozen or more outlines of sandals on the shelter floor are unique, (Plate 2; Nos. 1, 2, 3, 5). No other such designs were found in the Panhandle, nor have we found similar designs anywhere else in Texas. Pictures of tepees were only found at this site, (Plate 2; Nos. 2, 8). The horseback rider and the church date the work as historic, (Plate 2; No. 2).

No similarity between the pictographs and petroglyphs at the site could be recognized that even suggested that they were made by the same Indians. The fact that similar petroglyphs were found at seven other sites nearby containing no pictographs leads to the conclusion that they were not made by the same Indians. The site was probably a buffalo hunting camp visited at different times by various tribes which would easily account for the two radically different types of work, even since historic time.

The next site of importance in the Panhandle is on Mujeres Creek about 15 miles west of Rocky Dell. It contains only petroglyphs which are both scratched and carved into the protected surface of a sandstone bluff above the creek. There is a narrow shelf of earth at the base of the cliff which afforded a small partially protected camping space. The pictures are scattered along the bluff for about 50 feet and extend from 5 ft. above the ground

to about 12 ft. The scratched designs were probably never very clear; but the carved pictures are still in good condition.

An interesting feature was first noticed at this site—the scraping off of the rock within certain pictures to give them a smooth surface. The grooved outline of the picture, however, was not scraped away, (Plate 3; Nos. 1, 2). In two cases smaller petroglyphs were carved on this smooth surface within the large picture (Plate 3; No. 2), proving that the surfaces were scraped away by Indians and not by later white visitors who have carved names, initials, and dates on most of the smoothed areas as well as on other parts of the cliff.

The twenty or more buffalo pictures at this site average about 2 ft. long and are similar to those at three other sites along the Canadian River, but are more expertly done, (Plate 3; No. 2). The interesting little group or story telling pictures are almost always the work of late historic nomads. This is confirmed here by the large number of horse pictures, (Plate 3; No. 1). The numerous pictures of guns definitely date the site as very recent, perhaps, just before the Indians were driven out of the district.

The group of war implements carved into the cliff above the other petroglyphs and more than 10 ft. above the ground is the most interesting and detailed group of such weapons yet discovered in

---

PLATE 2

PETROGLYPHS AT ROCKY DELL

They show no evidence of having been made by the same Indians that made the pictographs. Nos. 1, 4, show aimless lines and simple geometrical designs. Nos. 5, 6, 7, human and animal representations. Nos. 2, 8, pictures of tepees found only at this site. Nos. 1, 2, 3, 5, show outline of sandals which we found no other place in the Panhandle, nor anywhere else in Texas.

PLATE 3

PETROGLYPHS AT MUJERES CREEK

Nos. 1, 2. Petroglyphs at Alibates Creek house ruins, No. 3.

Nos. 1, 2, contained petroglyphs with smooth surfaces, first noticed here. Group of war implements, No. 2, most interesting and detailed group yet found in Texas. No. 1, shows deeply carved picture of man wearing robe, which was carefully painted red after it was carved. First painted petroglyph we had found. No other color at site.

No. 3, crude pictures of man, turtles, headless animal and exaggerated human tracks pecked into the top surface of hard limestone boulders. It has been suggested that the petroglyphs may be connected with the house ruins.

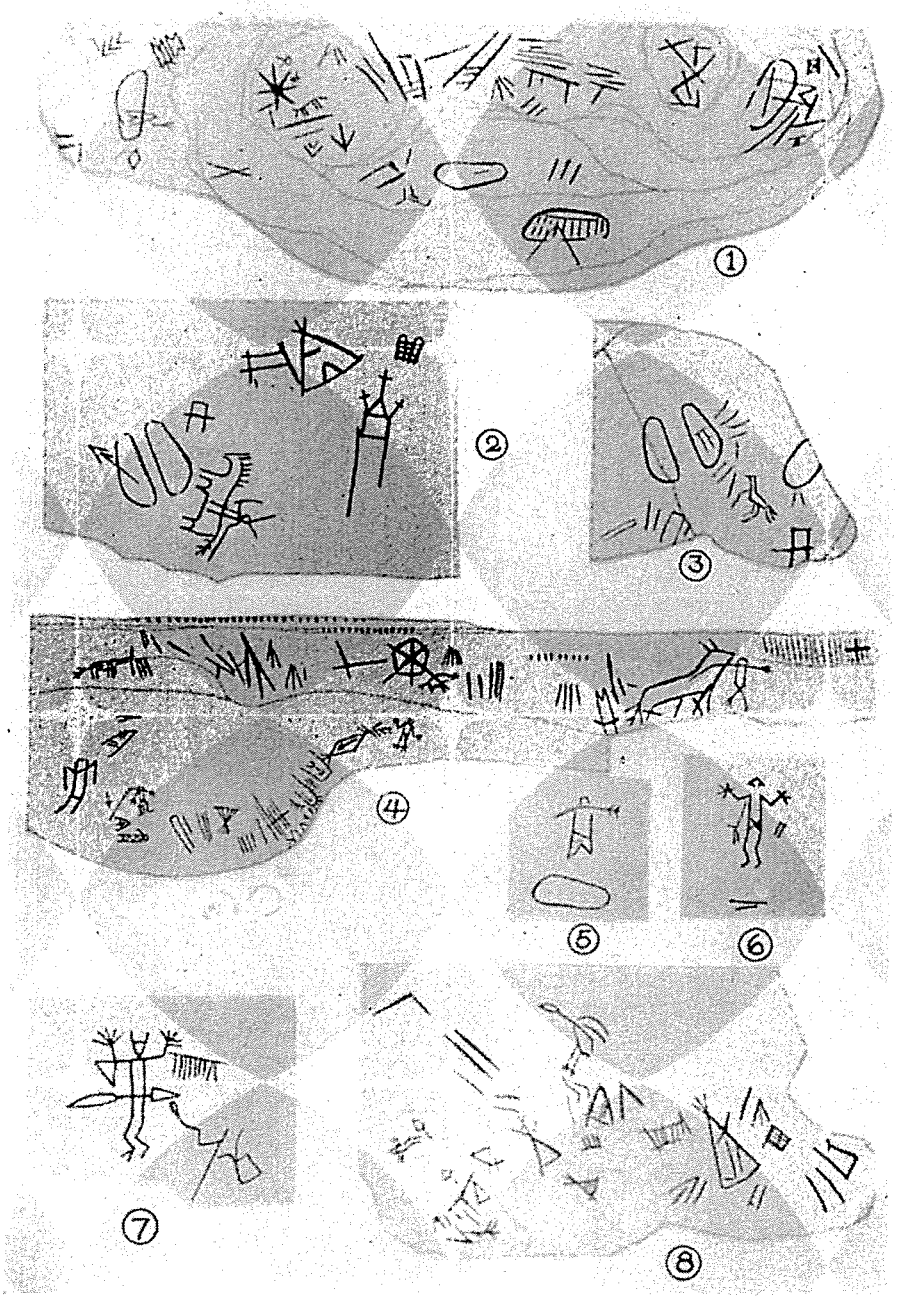
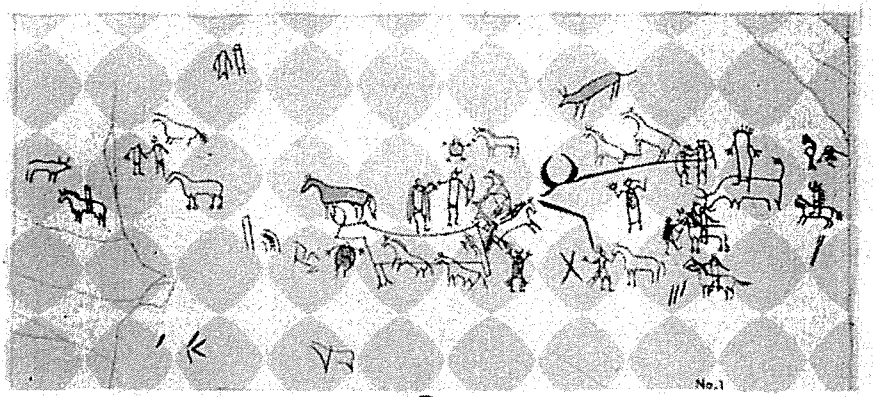
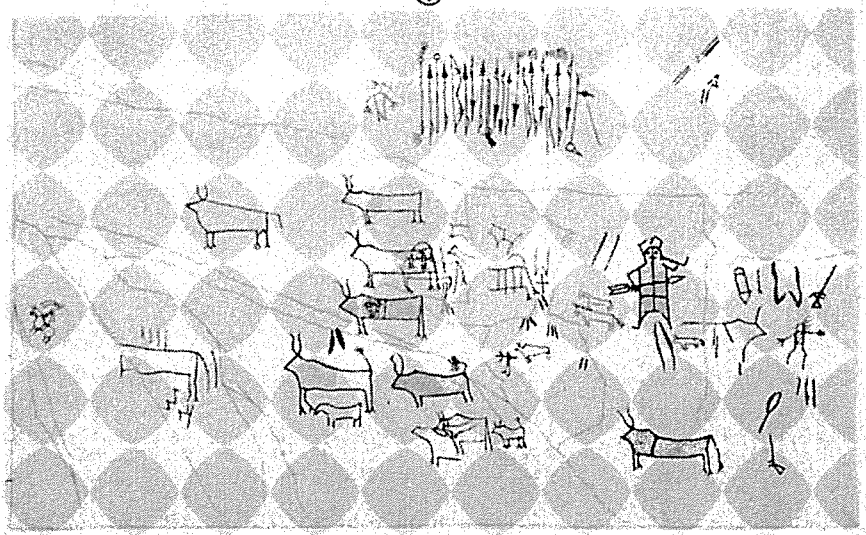


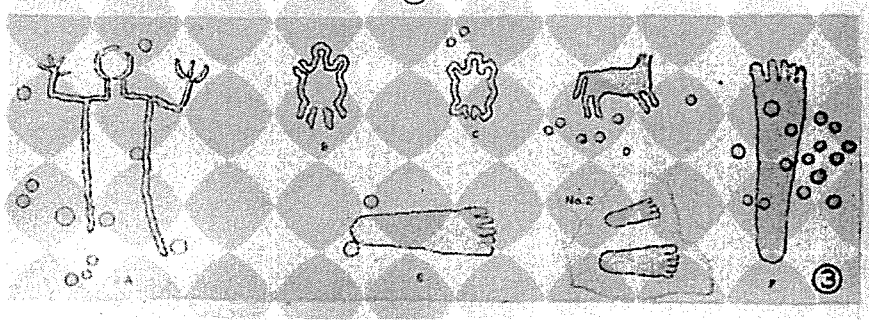
Plate 2



①



②



③

Plate 3

Texas, (Plate 3; No. 2). It consists of three bows, thirteen arrows, three war clubs, and one gun; most of which are decorated with feathers or other ornaments. The average length of these weapons is 20 inches.

Another picture at this site is unique among the petroglyphs we have copied in Texas. It is a deeply carved picture of a man about nine inches high wearing a robe of some sort. The unusual thing is that it was carefully painted red after it was carved, (Plate 3; No. 1). No other color of any kind was found at the site.

We discovered a small petroglyph site on rocks at the end of a small mesa in front of the ranch house at Browns Camp on the Matador Ranch. This site is only three miles west of the Mujeres Creek site. A good spring which now furnishes water for Browns Camp runs from beneath the mesa cap rock. The petroglyphs which belong to the late historic period are on exposed or poorly protected rocks and although they were originally carved deep into the rocks they are now quite dim, (Plate 4; No. 4). If lightly scratched designs were ever made at this site, they are completely gone now.

We copied the pictures at two more sites on the Matador Ranch. They are about three miles west of the Dipping Vat Camp which is twelve miles northwest of Adrian. One site is on an isolated mass of soft gray sandstone in a valley near the mouth of Aqua Piedro Creek. The few deeply cut Indian pictures can hardly be distinguished from names, dates, and cattle brands carved on the same surface by cow hands. They are unquestionably very recent and are unimportant.

The other site is on a red sandstone bluff on the bank of Aqua Piedro Creek. It contains several deep cut designs including two buffalo pictures more than five feet long (Plate 5; Nos. 9, 10), and a few small lightly scratched pictures of men and horses. The pictures are similar to those at Mujeres Creek but more crudely executed.

There are two more groups of these late historic petroglyphs on the north side of the Canadian River on the Bivens Ranch, situated about ten miles west of the U. S. Highway 287 crossing. One is at Chimney Rock where the Panhandle Plains Museum has built a substantial field house and begun excavating an extensive group of

house ruins between the Chimney Rock and the end of the mesa. The petroglyphs are on the bluff at the end of the mesa and on the side of Chimney Rock itself. Although they are badly weathered and dim and contain no horses or other definite proof of white contact, they resemble the other late historic pictures so closely that we feel sure they belong in that period, (Plate 5; Nos. 7, 8).

It does not seem likely that even deep carved lines in the soft sandstone could have survived the six or seven centuries necessary to connect them with the ruins at the foot of the cliff.

A few of the pictures at this site show more realistic human form than is usual for petroglyphs, (Plate 5; Nos. 11, 12). They resemble the designs painted on historic buffalo robes and on historic pictographic records like the autobiographies of Sitting Bull. One of these figures has its surface scraped away like the designs at Mujeres Creek, suggesting a similar date for the work. Two or three other pictures of men at the site which we judged to be the work of white men may actually have been made by these very late Indians.

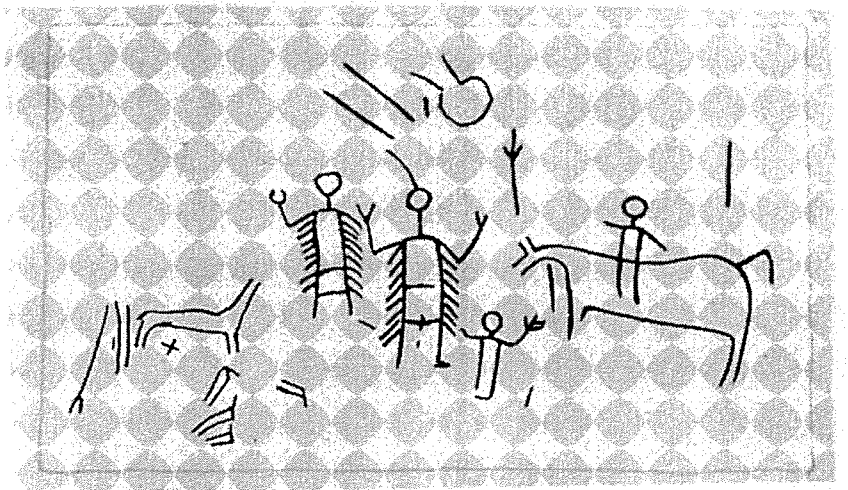
About three miles east of Chimney Rock on the end of a small mesa near the mouth of Lehey Creek is the other late historic petroglyph site. It contains both scratched and carved pictures of animals and men, (Plate 5; Nos. 13, 14). The projectile point pictures at this site are similar to those found at many other late sites in various parts of Texas.

The eighth and last late historic petroglyph site which we studied in the Panhandle is on the north rim of the Palo Duro Canyon a short way from the Newton Harrell Ranch house, which is located seventeen miles south of Washburn. The designs are carved and scratched on the floor of a small shelter in the bank of a spring creek. The decorations on the men's clothing are of more than ordinary interest and the "thunder bird" reminds one of the promi-

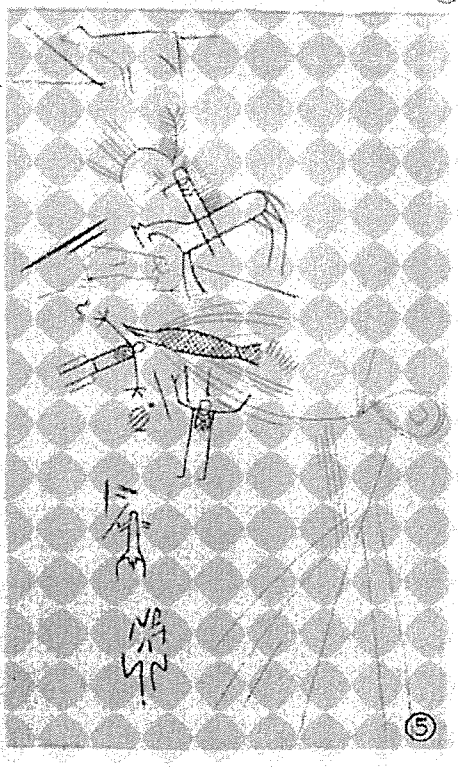
---

PLATE 4

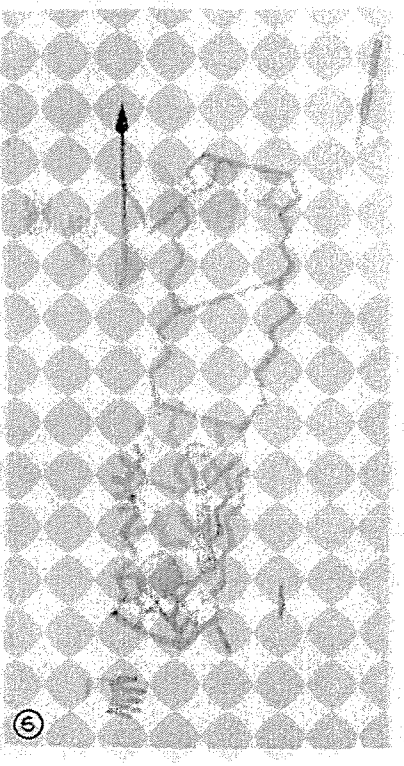
No. 4, petroglyphs at Brown's Camp west of the Mujeres Creek site. No. 5, designs carved and scratched on floor of small shelter. The decorations on the men's clothing are of more than ordinary interest and the "thunder bird" reminds one of the prominent birds at Meyers Springs, Terrell County. No. 6, a highly conventionalized pictograph of a man in red, in Tule Canyon near Tulia, Texas.



④



⑤



⑤

Plate 4

nent painted birds[2] at Meyers Springs in Terrell County, (Plate 4; No. 5).

We found an entirely different type of petroglyphs on Alibates Creek, three miles from the Canadian River only a few yards from the well known Alibates Creek house ruins, forty miles north of Amarillo. The crude pictures were roughly pecked into the top surfaces of hard limestone boulders. They consisted of a man, two turtles, a headless animal, and two exaggerated human tracks. On the same boulders and on others nearby were numerous small cup-shaped depressions apparently small mortars not related to the pictures in any way. The largest track measures 24 in. long. The designs are now so badly weathered that they are not easily made out, (Plate 3; No. 3).

The house ruins, situated only a few yards away, have been carefully excavated and approximately dated by intrusive pottery from New Mexico at 1200 or 1300 A. D. It has been suggested that the petroglyphs and the ruins are the work of the same people, which may be the case, since the rocks are sufficiently hard to have retained the impressions for a long time and the designs show signs of considerable age; but unfortunately no evidence of any kind could be found to prove the association.

We investigated another site near the Gulf Camp, five miles south of Stinnett, which was reported to have contained eight human tracks pecked into the top of boulders. We found that all of the boulders containing the tracks had been removed and divided between several men working at the refinery. We were able to locate only one of the rocks which contained two tracks. The stone and workmanship was similar to that at Alibates Creek. However, the tracks—one adult and one child—were actual size and so realistically done that one can readily understand why they were first reported as fossil human tracks,* (Plate 3; No. 4). An effort should be made to locate more of these interesting petroglyphs to obtain more information about the culture.

The above report accounts for every site reported to us in the Panhandle region except a pictograph site containing two or three dim pictures in the Palo Duro Canyon about two miles east of the

2. Kirkland, 1937, Plate 19; Nos. 1, 3.
*Webb, W. E., 1872.

Newton Harrell ranch house, a petroglyph site containing three pictures of buffalos three miles west of Brown Camp on the Matador Ranch, and a site in Hansford County about fifteen miles west of Gruver. There are no doubt, other sites in the district not yet discovered or reported but very likely they will fall into one of the three types discussed above.

REFERENCES CITED

Jackson, A. T., 1938. *Picture Writing of Texas Indians.* Anthropological Papers, Volume II, The University of Texas, Austin.

Mallery, Garrick, 1882-83. *Pictographs of the North American Indians.* Annual Report of the Bureau of Ethnology.

Ewers, John Canfield, 1939. *Plains Indian Paintings.* Plates 17, 22, 23, 28.

Webb, W. E., 1872. *Buffalo Land.*

Kirkland, Forrest, 1937. Plate 19; Nos. 1, 3. *A Study of Indian Pictures in Texas.* Texas Archeological and Paleontological Society Bulletin, Volume 9.

1938. *A Description of Texas Pictographs.* Texas Archeological and Paleontological Society Bulletin, Volume 10.

1939. *Indian Pictures in the Dry Shelters of Val Verde County, Texas.* Texas Archeological and Paleontological Society Bulletin, Volume 11.

1940. *Pictographs of Indian Masks at Hueco Tanks.* Texas Archeological and Paleontological Society Bulletin, Volume 12.

1941. *Petroglyphs of the Abilene District.* Texas Archeological and Paleontological Society Bulletin, Volume 13.

PLATE 5

PETROGLYPHS AT AQUA PIEDRO CREEK, MATADOR RANCH; CHIMNEY ROCK, BIVINS RANCH; LEHEY CREEK, NEAR THE CANADIAN

Nos. 7 and 8 resemble other late historic petroglyphs and probably belong to the same period. Nos. 9 and 10, buffalo pictures more than five feet long. Nos. 11 and 12, show more realistic human form than is usual for petroglyphs. Nos. 13 and 14, scratched and carved pictures at mouth of Lehey Creek.

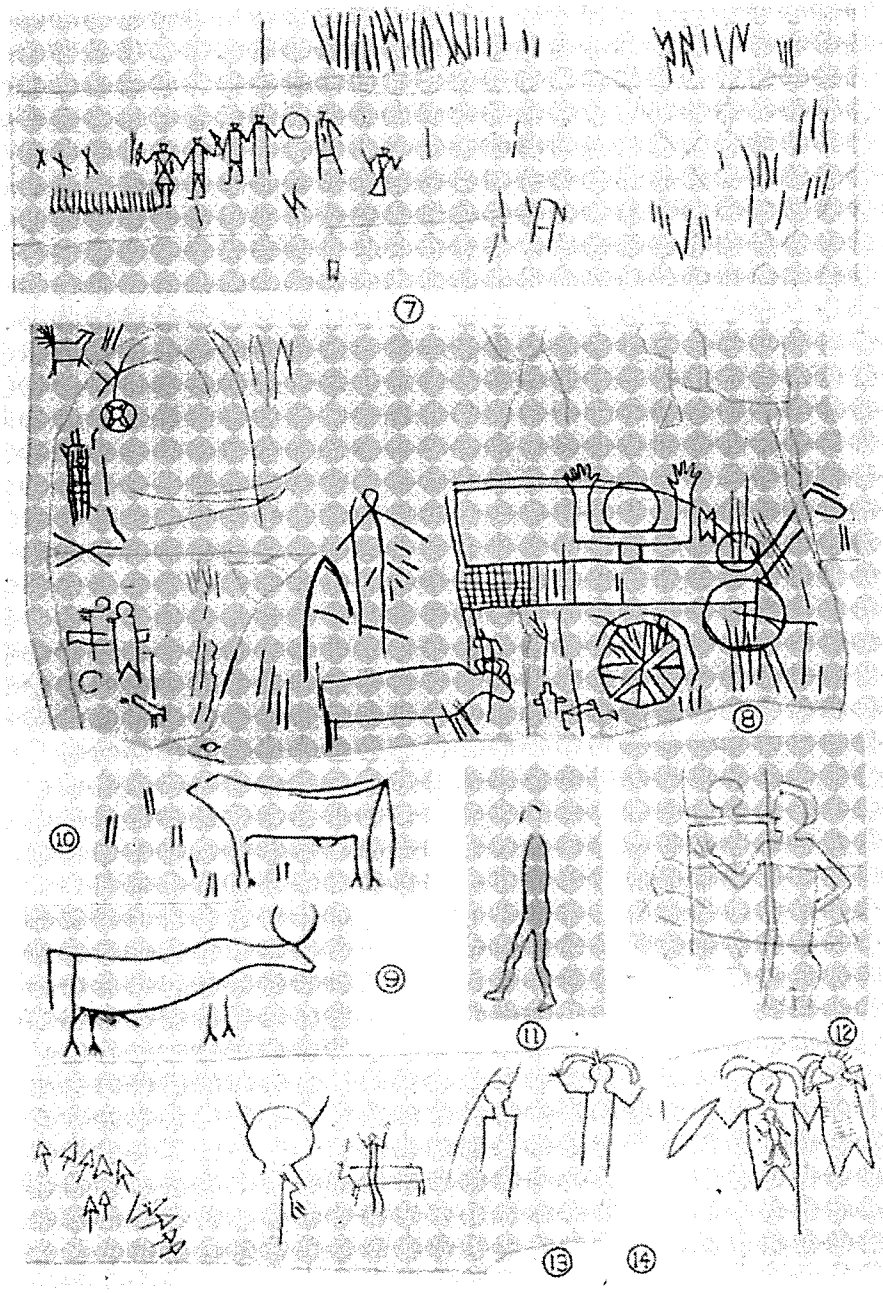


Plate 5

CHANNELLED POINTS FROM CLEAR FORK SITES IN NORTH TEXAS

By Adolph H. Witte

Channelled or Folsom-like points have been reported from many places in the Southwest. Recently, Ray, (1) Sellards, (2) and Hibben (3) have described other types of projectiles that were found in the same stratified sites in which channelled specimens were found. Finds from certain stratified, stream terrace sites in North Texas seem to indicate a similar interesting association of ancient implements. A brief discussion concerning some of these sites follows:

Thaxton Ranch

The site is in an old stream terrace on the south side of Little Wichita River, in Clay County, Texas. The top of the terrace is estimated to be at least 40 feet above the present water level and it does not overflow during flood stages. The artifacts are found weathering from near the base of the terrace and rest directly upon undisturbed Permian clay. The collection includes several Clear Fork gouges, one turtleback, one graver, four channelled points, and two bases from projectiles of the Yuma type. The Clear Fork artifacts were fashioned from pebbles which occur locally in Pleistocene deposits. In sharp contrast, two of the channelled points and the fragments from the Yuma-like items are all from a reddish brown flint. It is quite doubtful that these could have been quarried in the region. Similar red cherts outcrop in the Palo Duro Canyon, which is situated two hundred miles westward. The two remaining channelled points are of materials which probably were obtained within this area.

The next three sites to be discussed in this paper are located in Montague County. The surface formations are of Lower Permian, Upper Pennsylvanian and a part of the lower Comanche Series of the Cretaceous. Dissected stream terraces occur along the larger streams and at various altitudes above the present high water levels. These terrace deposits consist of reworked materials from the Paleozoic and Cretaceous outcrops. Recently, a number of fossil bones have been collected from some of the high terraces. Most of the

forms discovered to date, apparently are extinct. The following fauna has been reported to the writer.

Bison, one skull, a small specimen, probably Bison Bison. Beaver Creek.

Elephant, one molar, tusk, various limb bones. Braden Branch.

Elephant, one molar. Dye Creek.

Mastodon, several molars, tusk fragments, etc. Dye Creek.

Mastodon, right ramus with molar. Denton Creek.

Saber tooth cat, several canines, apparently too small for Smilodon. Denton Creek.

Alligator, several teeth, skull fragments, etc. Denton Creek.

Turtle, fragments from several carapaces. Denton Creek.

Garfish, a number of scales. Denton Creek.

Farmer's Creek Site

This is situated in an old stream terrace on the east side of Farmer's Creek in Montague County. The estimated elevation above the present water level in the creek is 35 feet, and the site does not overflow. Artifacts were collected on the surface of an almost completely eroded terrace. The specimens found here include 11 Clear Fork gouges, a number of Clear Fork knives, sidescrapers, two turtlebacks, etc. The base of one channelled point was found.

Big Sandy Creek Site

The locality is an old stream terrace on the south side of Big Sandy Creek in Montague County. Apparently the top of the terrace is about 20 feet above the present water level in Big Sandy Creek and does not overflow. The artifacts came from the surface and edges of the terrace. They include four Clear Fork gouges, one graver, several knives, one turtleback. The base of one channelled point was found in this site.

Briar Creek Site

This site is located on a stream terrace on the east side of Briar Creek in Montague County. The estimated elevation for the top of

---

PLATE 6

(Top row, starting on left end): Sloth tooth and notched point from Evans Site. Remaining five are channelled points from various Clear Fork sites mentioned in paper.

(Bottom Row): Five recessed base gouges of Clear Fork types from sites described.

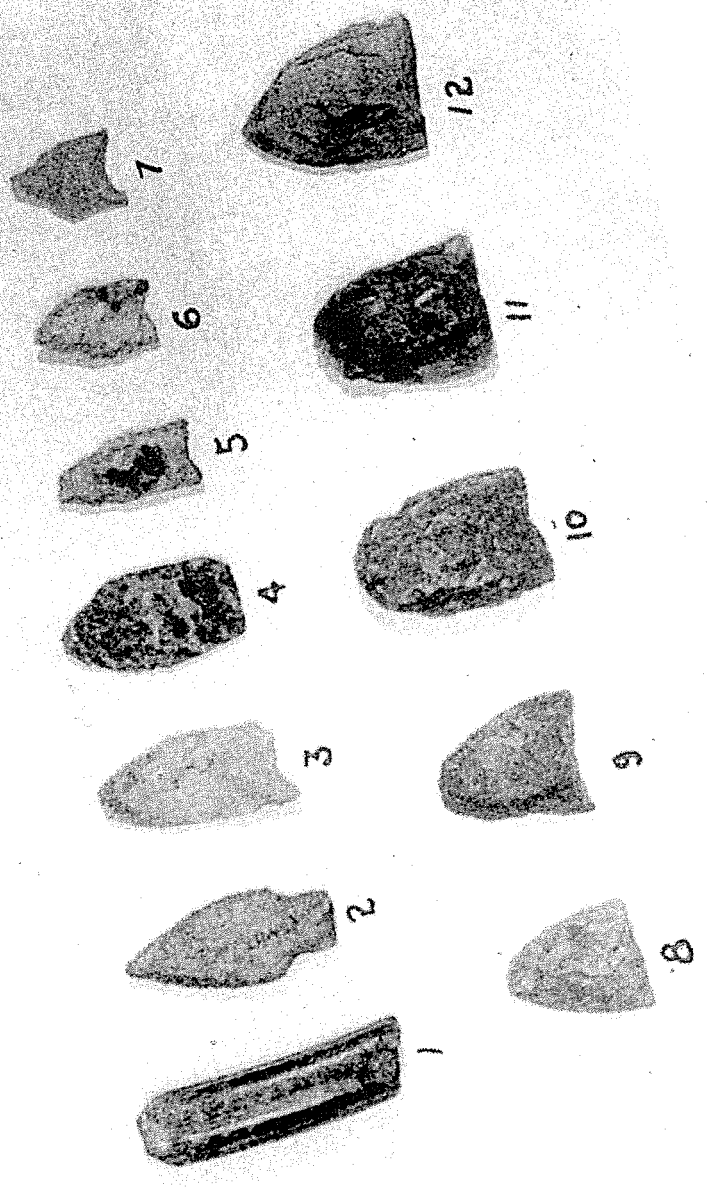


Plate 6

the terrace is 40 feet above the present water level in Briar Creek. This stream intrenchment is sufficient to prevent the site from overflowing. The artifacts were discovered near the base of the terrace. Clear Fork specimens include twelve gouges, two turtlebacks, several incomplete knives, points and gravers. Two channelled points were found (see plate 6, top row of artifacts).

Cliff Evans Site

During April of this year (1942) additional data upon the faunal age of the stream terraces in this region came to hand. A fine long tooth from one of the Edentates was found on the eroded surface of a Little Wichita River terrace, two miles west of Henrietta. Several unnamed culture types of artifacts were collected in close association with the sloth tooth. This stratified site does not overflow and is quite similar in height above the present water level to the four artifact-bearing stream terraces described previously. Farther down-stream, the writer has collected extinct mammoth, horse, bison and other fossil bones from terraces of similar height. Obviously, the faunal age of these terraces is some stage of the Pleistocene, and the Clear Fork, Yuma, Folsom, and other unnamed culture types of artifacts have been sealed within these terraces since that time.

Henrietta, Texas.

BIBLIOGRAPHY

(1) Ray, Cyrus N., 1941. *The Various Types of the Clear Fork Gouge.*

(2) Sellards, E. H., 1940. *Early Man in America.* Index to Localities and selected Bibliography.

(3) Hibben, Frank C., 1941. *Evidences of Early Occupation in Sandia Cave, New Mexico.*

PREHISTORIC NOVACULITE QUARRIES OF ARKANSAS

By Harry J. Lemley

Among the best known quarries from which the Indians procured their flint are the novaculite quarries of Arkansas.[1]

Novaculite is a siliceous rock, believed to be of sedimentary origin, having a hardness of seven in a scale in which the diamond is rated at ten, and occurs in many colors, red, white, pink, blue, yellow, gray, black, and numerous shades between. Branner[2] gives the following as an analysis of a typical novaculite: "Silica, 99.45; alumina, .26; soda, .54; potash, .19; lime, .12; magnesia, a trace; water, .06."

Novaculites are of two classes, known as the Arkansas and the Ouachita. The former, a true novaculite, is a fine grained, homogeneous stone of waxy luster, translucent, with a marked conchoidal fracture. The Ouachita stone is less dense, coarser, less translucent and lacks the waxy luster of the true novaculite; and has the dead appearance of unglazed porcelain. Both stones were used in the manufacture of stone implements, and for the past hundred years have been used for whetstones.

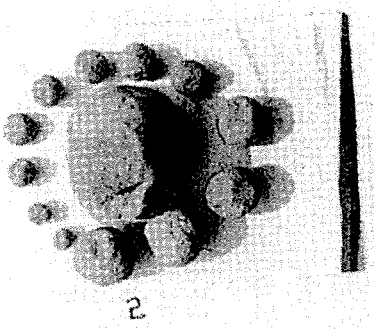
The novaculites are found in formations of from 500 to 600 feet in thickness along the edges of the Ouachita Uplift in west central Arkansas. Branner[3] estimates that there are between 300 and 500 miles of novaculite ridges in the state. On these ridges, principally in the neighborhood of Hot Springs, but reported at other points between Hot Springs and the Oklahoma line, are ancient pits from which the novaculite used by the Indians was taken. Implements of this material are found in great profusion in Arkansas and,

1. Bureau of American Ethnology, Bulletin 30, Pt. I, page 865.
2. Branner, Geo. C., "Outlines of Arkansas' Mineral Resources," State Geological Survey, Little Rock, Arkansas, page 179, 1927.
3. Branner, Geo. C., op. cit. p. 180.

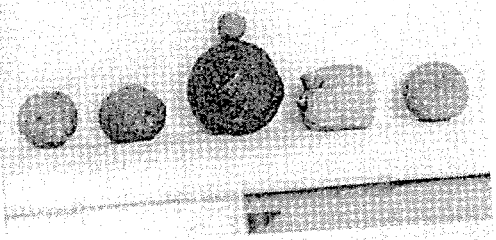
PLATE 7

No. 1. Hammerstones, Arkansas novaculite quarries.
No. 2. More hammerstones from novaculite quarry.
No. 3. Quarry pit. No. 4. Debris from quarry.

1



2



3

4

Plate 7

sparsely, as far east as Virginia and as far west as New Mexico. The quarries near Hot Springs are the largest found in the novaculite area. Groups of these are located on the crest of Indian Mountain, about two miles northeast of that city, and also near Magnet Cove on the south arm of Basin Mountain, locally known as Spanish Diggings Mountain,* about twelve miles east of Hot Springs.

Indian Mountain Quarries

These consist of a large excavation on the crest of the ridge and a number of smaller pits nearby. The large excavation, which is partially filled with debris, is oval in shape, about 150 by 200 feet, with its long axis approximately north and south. It has the appearance at the present time of two conical pits, each about 25 feet deep, with a low saddle between. The entire excavation is lined with small broken pieces of novaculite; and it is possible that the low saddle referred to is a large pile of debris heaped up in the center thereby giving it the appearance of two pits with shallow diggings between. Surrounding the large excavation and the smaller pits referred to, and extending over the adjoining area, are enormous amounts of broken pieces and chips of novaculite, of almost every color. This area represented the work shop used in connection with the mine. Crude quartzite hammer-stones, used in the excavation and in reshaping the material, are found in considerable numbers both in and around the quarries. Those collected by us range in size from two to eight inches in diameter.

The pits on Indian Mountain were observed by Featherstonhaugh in 1834.[4] He described them as follows:

"Lofty hills are found there, composed entirely of this material (novaculite). On one of these I saw several large pits, twenty to thirty feet deep and as many in diameter, resembling inverted cones, the insides of which were covered with broken chips of this beautiful mineral, some white, some red, some carmine, some blue, some quite opalescent. In and near these pits round and long masses were scattered about, of a hard green stone I had found in place eighteen miles distant, and none of them too large for the hand. They were, undoubtedly, Indian tools, and these were the quarries from whence the

*So called on account of an erroneous belief that the quarries represented old Spanish diggings.

4. Featherstonhaugh, G. W., Geological Report of an Examination made in 1834 of the Elevated Country between the Missouri and Red Rivers, Washington, 1835, p. 69.

Indians had formerly obtained the materials they had used for their arrow heads, and other weapons of offense."

Featherstonhaugh's estimate of the diameter of the larger pits falls far too short.

Holmes visited Indian Mountain in 1891, and later described the quarries.[5] He referred to what appeared to be evidence of fire in some of the lateral diggings. The blackened patches mentioned by him have now disappeared. At least, the writer has been unable to find them. However, modern quarrymen who have dug into some of the ancient quarries around Hot Springs report finding ashes in the bottoms of some of the pits.

Quarries Near Magnet Cove

The diggings on the south arm of Basin Mountain resemble in a general way those on Indian Mountain, but are much more extensive. A series of deep and shallow pits extends almost continuously along the crest of the ridge for a distance of about 3 1-2 miles. In and around these pits are enormous accumulations of rejectage, in which an occasional hammerstone may be found.

Griswold,[6] who evidently saw only a part of the quarries, describes them as follows:

"The so called 'Spanish Diggings' near Magnet Cove are situated on the crest of a very narrow ridge of novaculite which rises sharply from the valley of Cove Creek to a height of 500 feet or more above it. The 'diggings' consist of round or oval-shaped hollows made in the ledges of the very crest of the ridge, varying from a few feet up to a hundred or more for the longer axis, by fifty feet in width. They are comparatively shallow, the largest being perhaps twenty-five feet deep. They extend along the top of one ridge for more than a mile, almost changing the top of the ridge from a rounded back to a hollow trough."

Holmes made a hurried examination of these quarries on the occasion of his visit to Indian Mountain and incorporates in his report a description furnished him by Professor Jenney.[7] Jenney states that the excavations examinel by him consisted of a number of shallow diggings covering a belt 300 to 600 feet in width and

5. Holmes, W. H., Bulletin 60, Pt. I, Bureau of American Ethnology, p. 178, 1919.
6. Griswold, L. S., "The Novaculites of Arkansas," Annual Report of the Geological Survey of Arkansas for 1890, Vol. III, p. 175.
7. Holmes, W. H., op. cit. p. 198.

extending for a distance of one and a half miles on the crest of the mountain.

Mr. J. M. Lowery, of Hot Springs, who owns the land upon which most of the diggings are located, reports that in the year 1932, a shaft was sunk in one of the larger pits to a depth of 35 feet through debris, and that when the shaft was abandoned at this depth, debris was still in evidence.

So far as we are aware, no complete scientific investigation has been made as to the depth of, or actual area covered by, the quarries on either Indian or Basin Mountain.

Hope, Arkansas.

EVIDENCE OF EUROPEAN INFLUENCE IN THE PICTOGRAPHS OF WEST TEXAS

By Victor J. Smith

I. *Representations of Shelter*

Man has always been occupied with problems of food, shelter, clothing, and combat. It is to be expected that the things in which his interest centered would form the motifs for most of his efforts in the field of art. Two other factors, however, probably influenced his selection of petroglyph and pictograph studies. These are the ego of man shown in his efforts to record events reflecting credit upon himself, and of magic, by which some charm or extra power is derived. It seems true that these last two factors were of great influence since an examination of thousands of recorded primitive drawings yield so many records of warfare, and the hunt, as evidenced by animals or hunting scenes. Relatively few drawings indicate articles of clothing since little distinctive apparel was worn which could be described within the narrow limitations of rock inscription or painting. It is of some interest, however, to note that here and there among early inscriptions and drawings are to be found conventionalized building or shelter forms. This is to be expected in the Southwest since its occupation by the Spaniards developed the distinctive type of architecture represented by the Missions. The interesting fashion in which the Indian artist represented this massive outline, the window openings, roofs, and the surmounted cross are illustrated in drawings accompanying this article.

It is important to note that petroglyphs and pictographs generally fall into roughly classified groups as follows:

1. Representations of events, people, situations, or objects, possibly crudely drawn, but intended to show the object or the events exactly as the artist observed them.

2. Drawings which include symbolism or the representation of an idea rather than the actual event or object. We may also credit certain areas of the Old World as well as some of the tropical areas

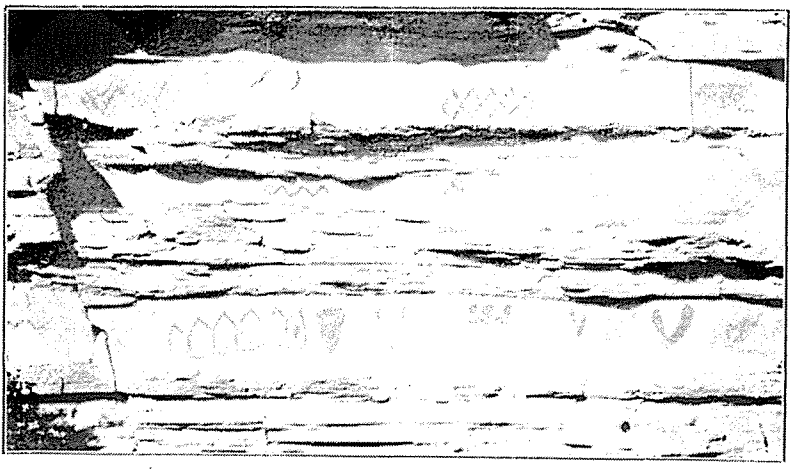


PLATE 8

Decorative and conventionalized forms, Chalk Draw, Brewster County. Six shelter units are shown in a row with indicated lodge of the medicine man or chief.

of the New World with taking the next great culture step and using pictures for the purpose of representing the sound of syllables or letters, but it is with the items *1* and *2* above that our discussion is now centered with respect to the purpose of this paper, i. e., to point out the use of pictograph representations and conventionalization of building forms (shelter) among the Indian drawings of West Texas.

Such representations of shelter have appeared among some of the oldest records of this form of art. Frobineus and Fox[2] report rock engravings representing ancient pile dwellings from the Camonica Valley of Northern Italy. Crediting these drawings to the Iron Age they report, "Of particular interest are the frequently recurring pictures of pile dwellings with gable, cupola, or barrel roofs. Similar structures with gable roofs often topped with phallic symbols are still built by the peasants of Asturias and Galicia in Northwestern Spain who use them as granaries."

In Mallery's extensive report[5] concerning picture-writing there appear enough shelter representations to indicate that the practice was not uncommon among the American Indians generally. For example, he reproduces records of authentic conventionalizations of the medicine lodge, the lodge of the spirit, the grand medicine lodge, the trading store, lodges, lodges occupied by girls, agency houses, dwellings, earth lodges, the tipi, the adobe house, etc. Some of these drawings are at once to be recognized to be crude but clear representations of log construction, smoking chimneys, etc. Many, on the other hand, are highly conventionalized from long use, the meaning of which would not likely be known except by means of the early and careful type of research and record presented by Mallery. Reference to the types of shelter or dwellings among North American picture-writing recorded by Mallery (Plateel) will indicate the similarity of those he observed to many of the West Texas drawings. The exact meaning of the latter has long been lost in obscurity and can now be only a matter of interpretation of the evidence and careful comparison with known translations. Other West Texas forms merge into reasonably definite pictures and are easily identified as structures of the Spanish Mission type.

My first opportunity to record a conventionalized shelter among the pictographs was in 1921, when Dr. R. A. Studhalter and myself made a reconnaisance trip into southern Brewster County. A small

limestone cliff in Chalk Draw yielded an interesting group of geometrical forms (Plate 8), some decorative and others indicating conventionalization such as symbols for lightning or for water. Of most interest, however, was a row of six lodges, one of which was evidently of more importance as if occupied by the leader of the group. Here, as elsewhere, the main lodge was identified by an extra rectangular decoration or symbol. These pictographs, as well as all others reported from Texas in this paper, were drawn with red pigments or cinnabar red. It is to be remembered that Brewster County is still extensively mined for cinnabar ore (mercury) and there seems to be no doubt but that this basic pigment was extensively sought after, traded, and highly prized by the Indians. Jackson[3] in his comprehensive study of Texas pictographs reports almost this same symbol from Presidio County, which is a short distance to the West in the Big Bend. Students interested in a broad survey of Texas pictographs should by all means consult Mr. Jackson's valuable contribution.

Other conventionalized drawings in West Texas are likely to represent temporary dwellings as a series of circles. Research has indicated this at a number of places, prominently so at Rock Circle Village in Brewster County. In areas where it was difficult to drive stakes, stones were used to weight down the sides of circular shelters, hence a series of circles were drawn to represent such a village site. Other more conventionalized drawings with a similar probable meaning are of rectangular and irregular forms.

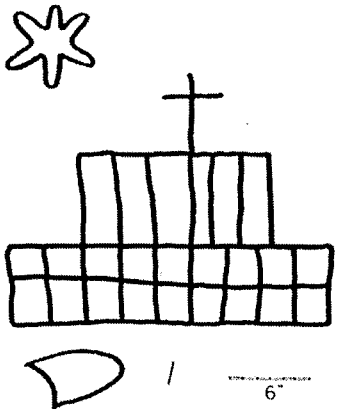
Mallery very properly points out the distinctions between the types of lodges constructed by different tribal groups and records the symbolism used to distinguish these different types among the pictographs. He also calls attention to the niceties of interpretation according to arrangement and the position of elements on a drawing, if confusion is to be avoided in their solution.

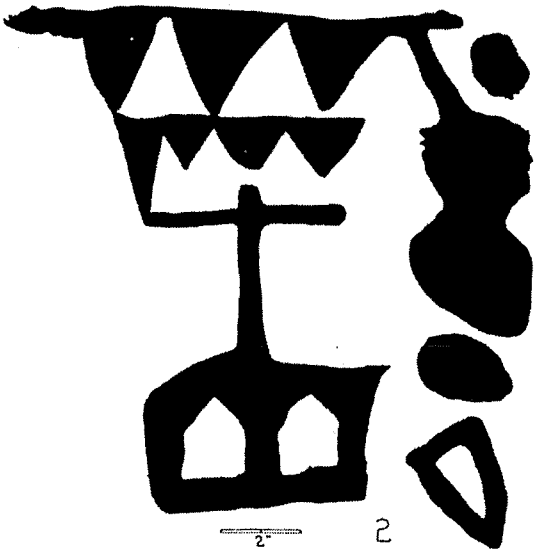
Six reproductions to exact scale in my pictograph collection group themselves somewhat together as being comparable in size, color,

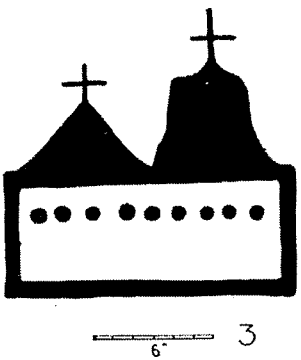
---

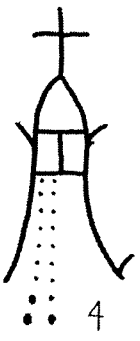
PLATE 9

Figure 1. Point of the Rocks, Jeff Davis County.
Figure 2. Ajua Frio, Brewster County.
Figure 3. Paint Rock, Concho County.
Figure 4, 5 and 6. Three units from Meyers Springs, Terrell County.









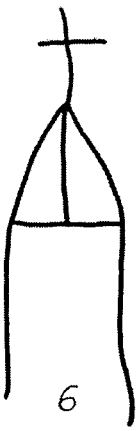


Plate 9

and subject matter, though they are widely scattered geographically. These are Mission building forms and are illustrated in Plate 9, Figures 1 to 6. Figure 1 was copied at the Point of the Rocks Ranch, near Skillman Grove in Jeff Davis County (Location 20, 1921) in an overhanging shelter which contained several dim paintings. A hand and arm with star could be recognized as well as the 24 inch wide mission with cross as represented in the illustration. This was a line drawing and probably could have been drawn with crayon. Figure 2 was found on a boulder at the foot of Ajua Frio Bluff in Brewster County (Location 22, 1921). This drawing is smaller in area individually but more massive in effect and is surrounded by correlated and adjacent designs of some interest. At Ajua Frio a group of horses and riders suggest other European influences which are altogether quite rare in West Texas generally with the exception of the Meyers Springs group in the Eastern portion of the Trans-Pecos. At Meyers' Springs there are numbers of priests bearing the cross, stage coach, horses, guns, and other evidence of European influence.[7] The third figure was sketched and photographed at Paint Rock (Location 79, 1924), Texas, by permission of Judge O. L. Sims. Added interest is centered in the double roof area (each with a cross) and in the row of nine conventionalized window openings. In this, as well as in many other cases pointed out by Kirkland,[4] there is much to be considered with respect to the art of simplified design among the pictographs as well as items of balance, arrangement of mass, and movement. Figure 4 embodies the idea of an interesting conventionalization representing people entering the church (a series of dots). It is probable, however, this may intend to represent the idea of a center aisle leading to the altar, since the line wall areas enclose the "footsteps." Most of the missions did have a walled area to the front of the structure, hence our thought of footsteps represented in a manner similar to the indication of horses traveling by a series of "horseshoe" tracks.

It is generally conceded that the time and effort of the artist in the production of pictographs were not the result of idle scrawling[6] as many of them were high out of reach and their production difficult. It may, therefore, indicate that the recurrence of the cross on structures could be the result of some belief in the power of the

white man's religion and that in other cases the thought of the tepee or other shelter held a meaning somewhat comparable to our thoughts of "home" today.

West Texas Historical and Scientific Society Museum
Alpine, Texas.

BIBLIOGRAPHY

1. Campbell, Floy, *Alphabets in the Making*, School Arts Magazine, Vol. XII, No. 7, 1913.

2. Frobenius and Fox, *Prehistoric Rock Pictures in Europe and Africa*, Museum of Modern Art, New York, 1937.

3. Jackson, A. T., *Picture-Writing of Texas Indians*, Archeological Papers, Vol. II, University of Texas, 1938.

4. Kirkland, Forrest, *A Description of Texas Pictographs*, Texas Archeological and Paleontological Society, Bulletin No. 10, Abilene, 1938.

5. Mallery, Garrick, Bureau of Ethnology, Smithsonian Institution, Tenth Annual Report, 1893.

6. Smith, Victor J., *Indian Pictographs of the Big Bend in Texas*, Texas Folk-Lore Society, Publication Number II, 1923.

7. *Early Spanish Exploration in the Big Bend of Texas*, West Texas Historical and Scientific Society, Alpine, Publication No. 2, 1928.

PLATE 10

Miscellaneous West Texas pictographs representing shelter units.

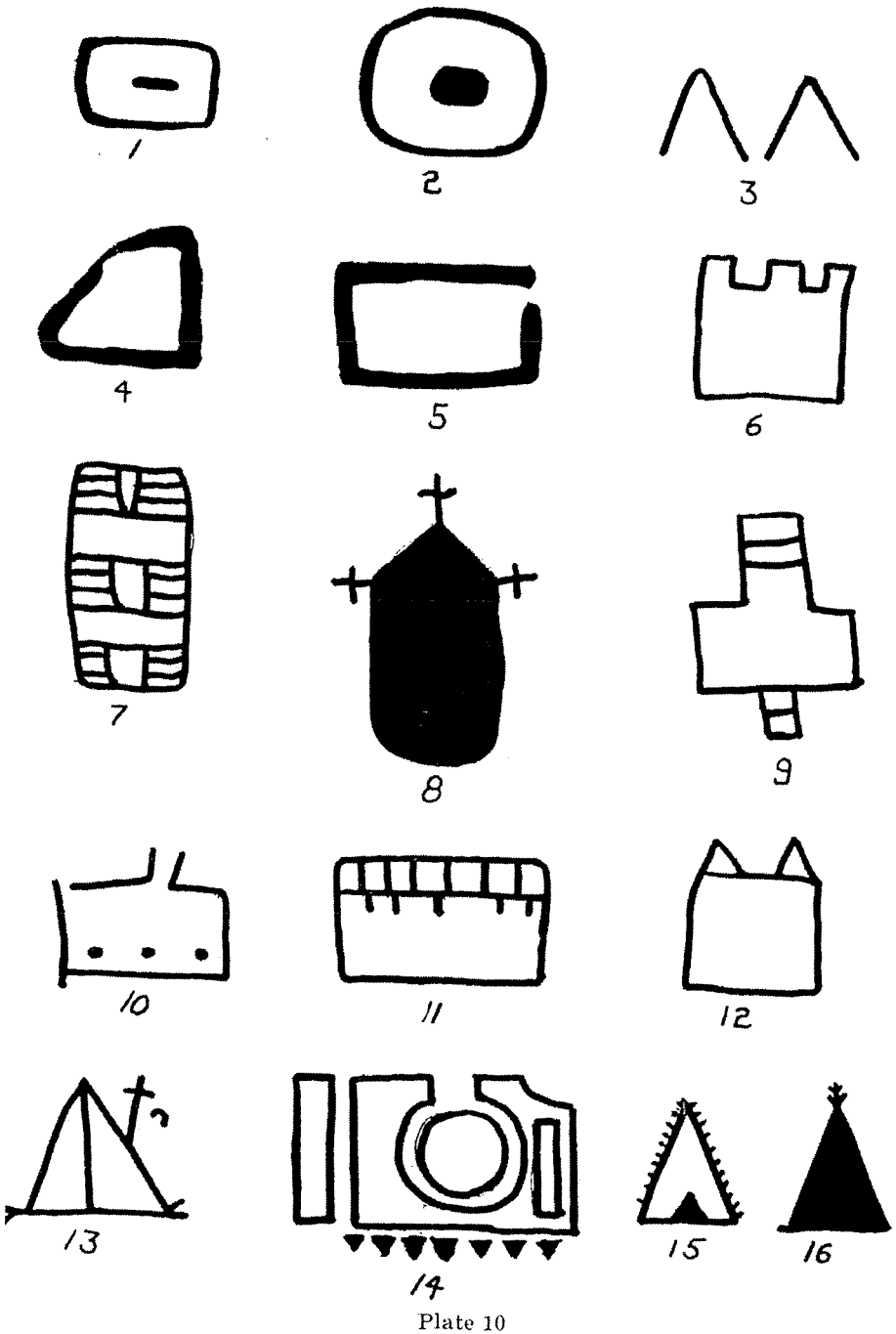


Plate 10

PREHISTORIC PAINTINGS COVERED WITH STALIGMITIC DEPOSIT

By Dr. Cyrus N. Ray

In recent years much has been published concerning prehistoric American cave and rock shelter paintings and some similarities to European Paleolithic cave art have been noted. Most of these rock paintings were made in dry portions of the caves where there was no subsequent alteration from dripping water. However in March 1941 the writer examined a Texas cave shelter where considerable surface change had occurred after the paintings were made. This rock shelter, located ten miles northeast of Moran in Stephens County, Texas, contained thirteen red paintings and of these four had become covered with transparent staligmitic deposit since the paintings were made.

In the numerous writings about American rock paintings the writer does not recall seeing in the literature any previous mention of staligmitic deposit covering American rock paintings. The deposit in this shelter is so transparent that it evidently was overlooked by previous visitors.

The site is located on a hill immediately above the east bank of a creek where it flows approximately north and south. The limestone capped hill parallels the stream and rises to a height of about 150 feet above the creek. Near the top of the south end of the escarpment a limestone ledge faces west and the paintings are on the vertical wall beneath this overhanging ledge.

Beginning on the north end of the wall and describing the paintings in order from there to the south, we have the following:

The first one is of an exceptionally slender standing human figure. The head is broad and flat on top and is roughly heart-shaped. The right arm is bent at the elbow and points down. The left elbow is also bent and the arm points upward. The legs are widely spread and the phallus is shown. See Plate 13, No. 1.

This painting is of a round ball and from it a line sweeps upward with a tuft on its end. See Plate 12, No. 3.

The next one shows a small human figure with an irregular halo

or feather head dress above the head and a flattened E like marking joining its lower border on the right. Plate 12, No. 6.

This painting is of a forked drawing shaped somewhat like a sling-shot fork. Plate 12, No. 5.

The next one has a superficial resemblance to the letters G V. The drawings described above are all small except the first one.

The next painting is one of a skirted human figure which seems to be dancing; it is holding the arms extended at full length, the right held higher than the left, as though whirling in a dance. The head is round and decorated with three feathers. Beneath the left arm is a circular object which is represented as in the air and may be a ball. See Plate 14, Nos. 1 and 2. There is no staligmitic deposit on any of the paintings thus far described.

The following described figure is of a man whose head is broad and flat on top; and it shows the ears, which is unusual. The arms are extended and slightly bent at the elbows. The right fist is shown shut and the left open. The legs are widely spread and the feet are indicated, and also the phallus is shown. This figure is partly covered with clear staligmitic deposit. This one is 3 feet tall and 14 inches from hand to hand. See Plate 13, No. 2.

This painting is of a round headed man whose arms are half raised and extended as though in a dance. The legs are widely spread and the phallus is shown. There is a quite thick deposit of clear staligmitic deposit over this figure. Plate 13, No. 3.

The next figure is long, slender, and skirted. The head is broad, rounded and flat on top. The right arm is extended with what seems to be the open hand although no fingers show. The left arm is bent upward at the elbow and something, evidently a fringe, hangs down from the point of the elbow. This painting is 3 feet, five

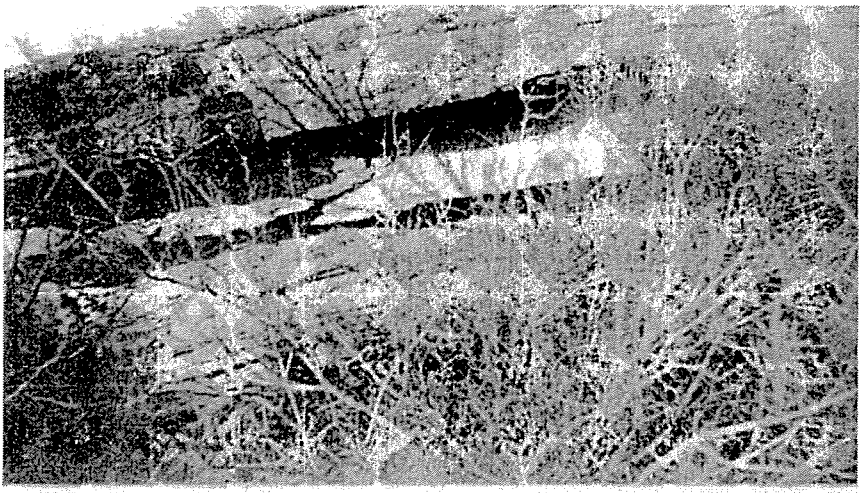
---

PLATE 11

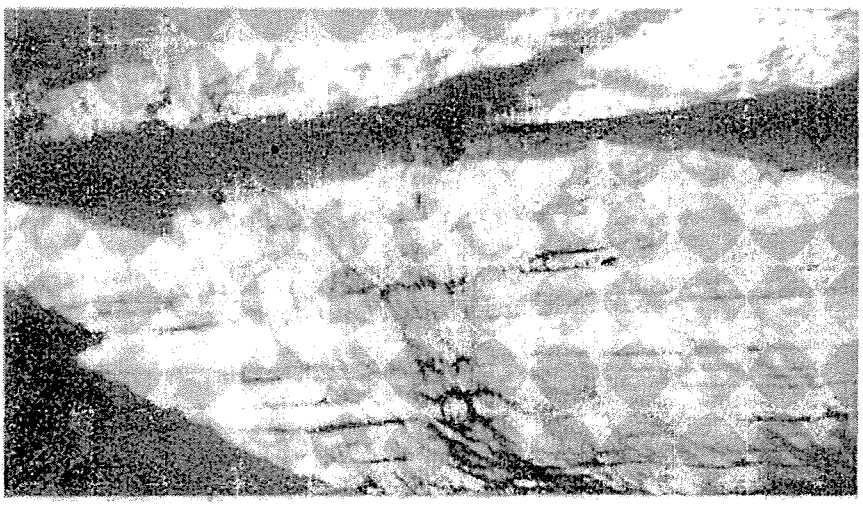
No. 1. View of rock shelter containing paintings covered with staligmitic deposit. No. 2. Close up picture of paintings which show dimly in photographs. The areas which show light below the shadows are paintings.

PLATE 12

No. 1. Horizontal nude male figure. No. 2. Unknown object between left leg and arm. No. 3. Ball with string and tassel. Nos. 4 and 5. Drawings of alphabetic appearance. No. 6. Small human figure with head-dress.



1



2

Plate 11

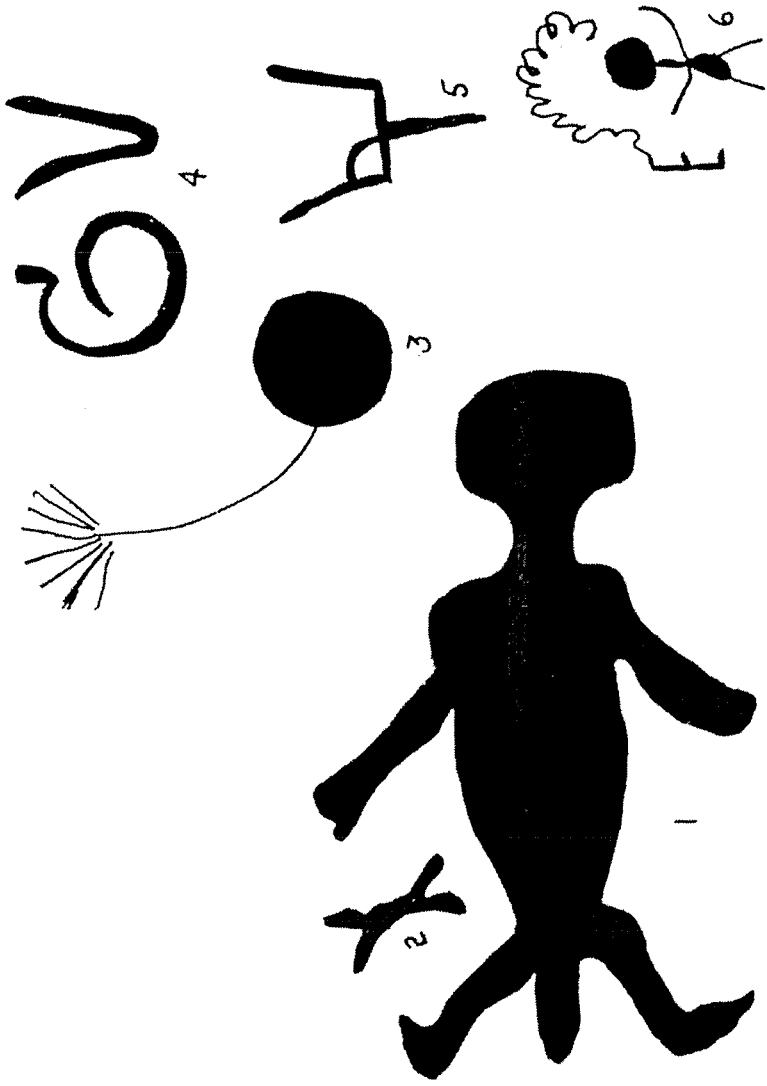


Plate 12

inches tall, and eleven inches across from hand to hand. To the left of the feet an oval object shaped like one of the local Texas manos is shown. See Plate 13, Nos. 4 and 5. This figure has the greatest thickness of staligmite of any except the next one to be described.

This painting is so thickly covered with staligmitic deposit that it cannot be copied. It seems however to have represented another long slender skirted human figure.

This one shows a thick bodied male which has a broad, flat topped head showing horns. The arms are extended and turned slightly downward and the right fist is clenched. The legs are wide spread showing knobs for feet and the phallus is shown. The figure is 17 inches tall and 12 inches from hand to hand. There is no staligmitic deposit on this picture, and none on the two following described ones. See Plate 14, No. 3.

All of the previously described figures have been shown standing vertical. The next painting is of a male in horizontal position. The head lies to the south and is broad and flat on top. The arms are extended downward. The legs are widely spread, and show feet, and the phallus is shown. Between the upward turned arm and leg is a peculair four armed object of undetermined type. See Plate 12, Nos. 1 and 2. This man's figure is 30 inches long and 17 inches across from hand to hand.

The next painting is of a skirted figure. The head is flattened on top but narrower than those of the definite males. The right hand holds a long handled racquet like object higher than the head and this is fifteen inches long. The human figure otherwise is twenty-five inches tall and seventeen inches from hand to hand. The left hand and arm are extended and four fingers may be counted. See Plate 14, No. 4.

This hill top site is dry except during rains when some water drains down from the top and falls over the ledge above the paintings. The area on top of the hill is small and whether enough lime gets into solution during these brief rainy periods under present conditions to have produced the staligmitic deposit seems rather doubtful to the writer. If so, it must have required a very long

period of time to form the staligmitic deposit; which is now about the thickness of a table knife blade.

Apparently no previous visitor had noticed the deposit until the writer unwittingly called attention to it in the hearing of a collector of artifacts. At that time little damage had been done to the paintings. On another visit to the same site about fifteen months later he found that vandals had chipped off large portions of the staligmitic deposit and ruined many parts of the underlying paintings.

Whether or not the smaller drawings belong in age with those representing the human figures would be hard to determine. The same kind of red paint was used in all the paintings. There is one feature common to nearly all of this site's pictures of human beings which is quite unusual and worthy of note, and that is the extreme relative breadth of the heads and the unusual flatness of the tops of the heads. Nearly all of the human figures show a flatness of the vertex which the writer believes was neither accidental nor coincidental. The sense of motion and other artistic values conveyed by the human figures would lead one to wonder if the prehistoric artist did not execute true depictions of some extinct ancient Texas race which carried an unusual skull flatness.

Box 62
Abilene, Texas.

PLATE 13

Nos. 1-2-3 are paintings of three flat headed figures showing phallus. Nos. 4 and 5, paintings of flat headed skirted figure, and an oval object.

PLATE 14

Nos. 1 and 2 are of skirted dancing figure with feathers on head, and ball beneath arm. No. 3 is of flat headed male with horns. No. 4 is of a skirted female holding racquet like object.

Plate 13

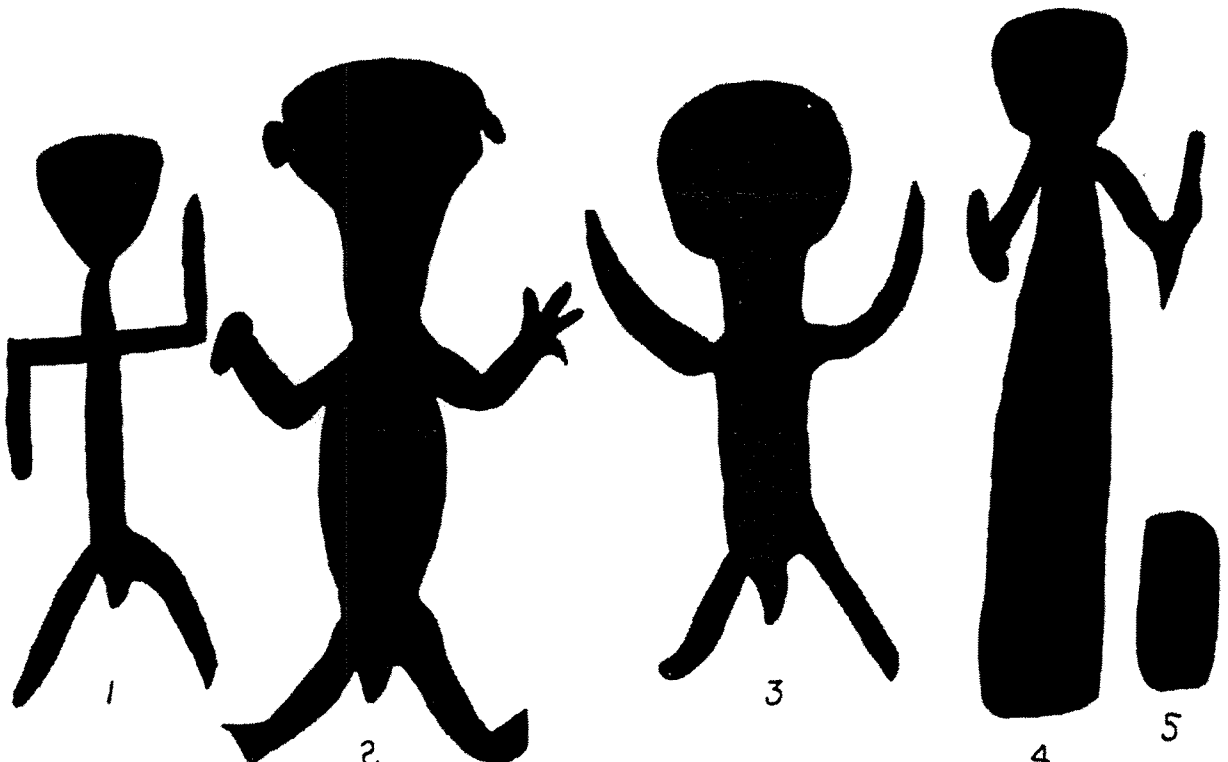


Plate 14

HISTORIC MATERIAL FROM FIELDER CANYON CAVE

By Forrest Kirkland

Fielder Canyon runs into the Pecos River on the northeast side about one mile below the Ozona-Langtry highway crossing in the northwest corner of Val Verde County, Texas. There are numerous caves in the district, usually high up the sides of the cliffs and small mountains. Many of these caves contain evidence of occupation by the typical Texas "Basket-Maker" Indians.

The cave which we will describe here is in Fielder Canyon about three miles from its mouth, and under the cap rock thirty feet below the top of the canyon wall. A long, steep talus extends from the mouth of the cave downward to the bottom of the canyon which is about 200 feet below. The mouth of the cave is about 5 feet square. Its inside width is about 8 feet, its depth 12 feet, and its height 5 feet. There are several large flat rocks in front of the cave. Beyond these rocks the ground recedes down the talus in narrow flat spaces like an irregular stairway.

Discovery of the Cave

The cave was discovered by Walter Babb, a local rancher, twenty years ago when his dogs ran a bobcat* into a hole in the top of the cave. In trying to get at the cat, he discovered four or five arrow foreshafts and a number of small glass beads on a ledge in the cave. The foreshafts are said to have been of hard wood, about 8 inches long and tipped with barbed metal arrow points. The necks of the points were inserted into the ends of the shafts which were encircled by flat strips of metal. These objects were taken to the ranch but were soon lost and forgotten.

While visiting at the Babb Ranch in 1938, a teacher in the Ozona school happened to mention finding a metal arrow point on a ridge near the mouth of Fielder Canyon. This brought to mind the arrow shafts and beads found many years before and led to a visit to the cave which was located with some difficulty. Instead of finding

*U. S. localism for a type of the lynx (Ed.).

additional metal arrow points as was expected, an assortment of metal objects, broken glass, and trade beads, were discovered on the cave floor and on the ground around the flat rocks in front of the entrance. Everything in sight was collected and divided between the two. The teacher has since moved from Ozona and there is no record of his part of the material.

Description of Objects From the Site

The writer and his wife were shown the material in Mr. Babb's collection during the summer of 1939 while copying pictographs on the Babb Ranch. The collection consisted of: More than 150 conical, bell like, metal ornaments one inch long, three-sixteenths of an inch in diameter at one end and one-sixteenth inch at the other, (Plate 15, Nos. 14, 15).

Over 50 flat uniformly cut pieces of metal one inch long, three-fourths of an inch wide at one end and one-fourth inch wide at the other—blanks from which the ornaments were made, (Plate 15; Nos. 12, 13).

Several fragments of flat hoop iron one inch wide from which the objects described above appear to have been cut, (Plate 15; No. 9). Also fragments of the same material three-fourths of an inch wide and one-half an inch wide, (Plate 15; Nos. 10, 11).

One iron buckle, one and one-fourth inches long and one and three-eighths inches wide, similar to buckles used on harness, (Plate 15; No. 4).

Two oblong brass rings formed from heavy brass wire three-sixteenths of an inch in diameter. The larger ring measures two and three-fourths inches the long way; the smaller, two and one-half inches—a shape and size suitable for bracelets, (Plate 15, Nos. 1, 2).

Two brass buttons about three-fourths of an inch in diameter,

PLATE 15

ARTICLES FOUND IN FIELDER CANYON CAVE

Nos. 1, 2, Brass rings; No. 3, Rusty scissors; No. 4, Iron buckle; No. 5, Fragment of flint arrowhead; No. 6, Blue, and white trade beads; Nos. 7, 8, Buttons from uniforms; Nos. 9, 10, 11, 12, Strips of flat hoop iron and rusty tin from which ornaments were made; No. 13, Ornaments in stages of manufacture; No. 14, Single ornaments; No. 15, Ornaments stacked, two and three together.

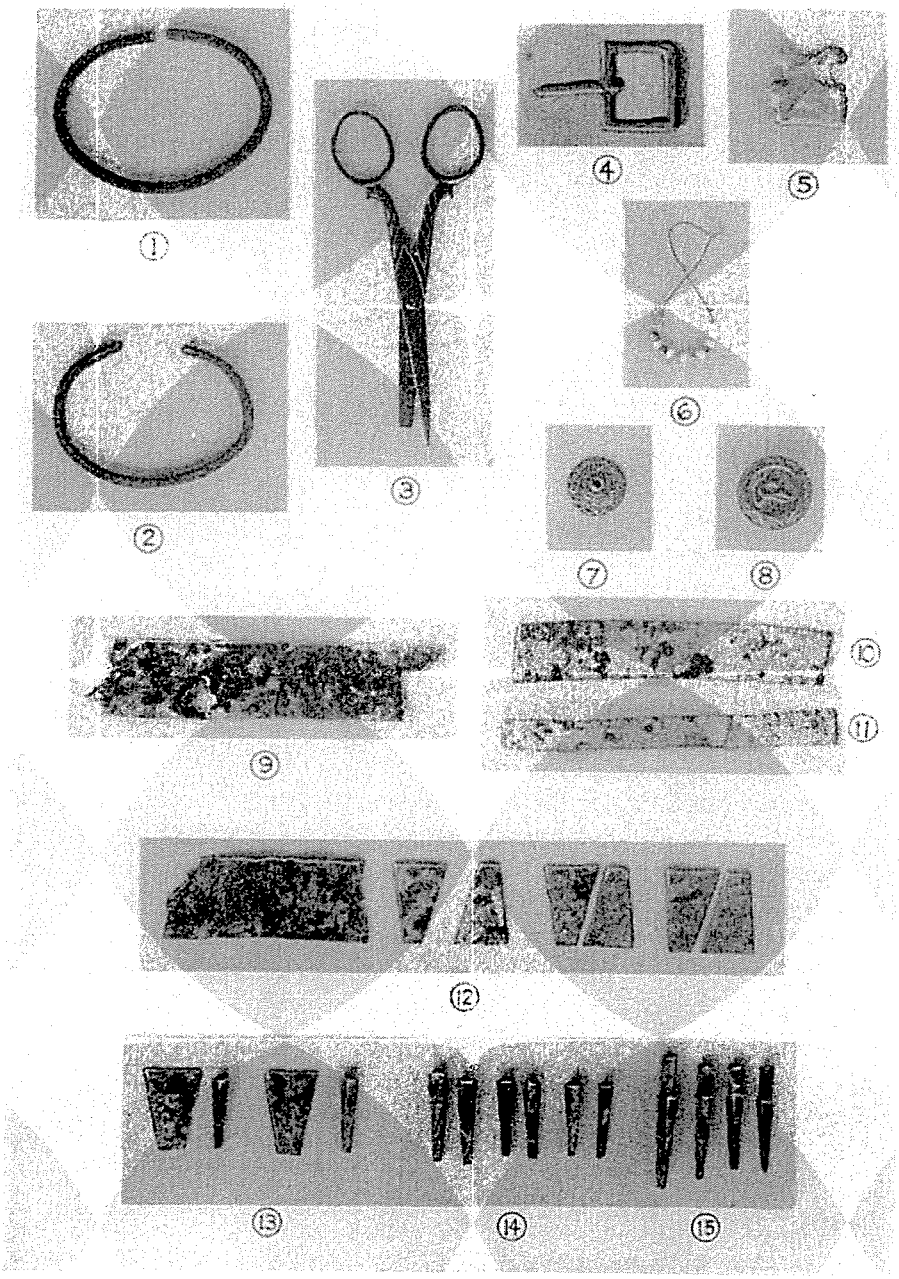


Plate 15

similar to buttons used on uniforms. One button contains a raised floral design, (Plate 15, No. 7); the other, a floral border with the head of a wolf in the center, (Plate 15; No. 8). The school teacher is said to have a button from the cave similar to the latter except that it contains the head of a horse.

Fourteen glass beads about one-eighth of an inch in diameter. Six are light blue and eight are white, (Plate 15; No. 6).

Several fragments of heavy, colored glass bottles.

One broken flint projectile point, (Plate 15; No. 5); and a flake of flint.

We at once recognized the unusual nature of the material, but our schedule for 1939 would not allow for immediate investigation. However in August, 1940, we returned to Babb's ranch to work out the problem if possible. And with the full cooperation of Mr. Babb, we visited the site, explored for additional material, took photographs, and gathered all the information possible about the cave, the material, and the early history of the community.

A shallow deposit was found on one side of the cave floor. This was not completely removed because test pits proved that it consisted only of about two inches of sheep manure and several inches of sterile chalk from the roof of the cave. We found no midden or other signs that the cave had been occupied for any great length of time. Mr. Babb said that he and the teacher found a few metal ornaments and beads on the cave floor; but we found only two of the ornaments inside of the cave.

Most of the material found by Babb and the teacher was on the surface at the base of the flat rocks in front of the cave. It could not have come from the cave floor, because a crevice in the rock at the entrance would have caught anything falling from the floor above. No artifacts were found in the crevice. Most of the objects appeared to have been originally lost on the ground outside the cave.

Few artifacts were exposed on the surface when we visited the site; but by carefully sifting the loose earth between our fingers, we found on the levels in front of the cave: 75 complete bell-shaped ornaments, 14 metal blanks, 3 fragments of sheet iron, one blue

glass bead, one fragment of thick glass bottle, and a pair of small scissors, (Plate 15; No. 3).

The scissors were found on the surface about twenty feet from the entrance to the cave. They measure four and one-half inches long, they are bradded together and have about one-fourth of an inch broken from one point. They are not different from cheap modern factory made scissors. They have no trade mark, firm name, or other means of identification stamped on them. The other objects are merely duplicates of those already described.

It will be noted that all of the material collected is of European origin except the projectile point and the sliver of flint. It seems most likely that these were accidentally associated with the modern objects since the hill above the cave is covered with flint flakes and it may have been an ancient flint workshop.

We could find no direct evidence that Indians lost the material at the cave. However, similar metal ornaments were universally used by historic Indians, and similar caves in secret, out of the way places were commonly occupied by them. It seems most unlikely that a white trader who might have carried such goods would have occupied a cave in so difficult a location when a desirable place with level ground, shade trees, and a spring of good water, was available at the mouth of the canyon only three miles away.

Old Military Post in Fielders Canyon

In the meantime, Mr. Babb had discovered an old half-forgotten military post about two miles down the canyon from the cave, which throws considerable light on the cave and its contents. He had collected from the site of the old post almost a bushel of iron and glass objects, including many fragments of thick round-bottomed liquor bottles identical with the glass fragments found at the cave. If the glass at the cave was contemporaneous with the other objects

---

PLATE 16

SANDALS, SHEATH, BAG, AND WAR CLUB SHOWING USE OF ORNAMENTS

No. 1, Sandals with fringe of tin ornaments. No. 2, Quiver with tin ornaments as sheaths for tassels of bright red feathers. No. 3, Fringe of tin ornaments at bottom of bag. No. 4, Tin ornaments as sheaths for tassels of red feathers. Nos. 2, 3, 4, Articles in Mrs. Anna W. Dove's collection at the Dallas Museum of Fine Arts, probably made by the Pacific Coast Indians.

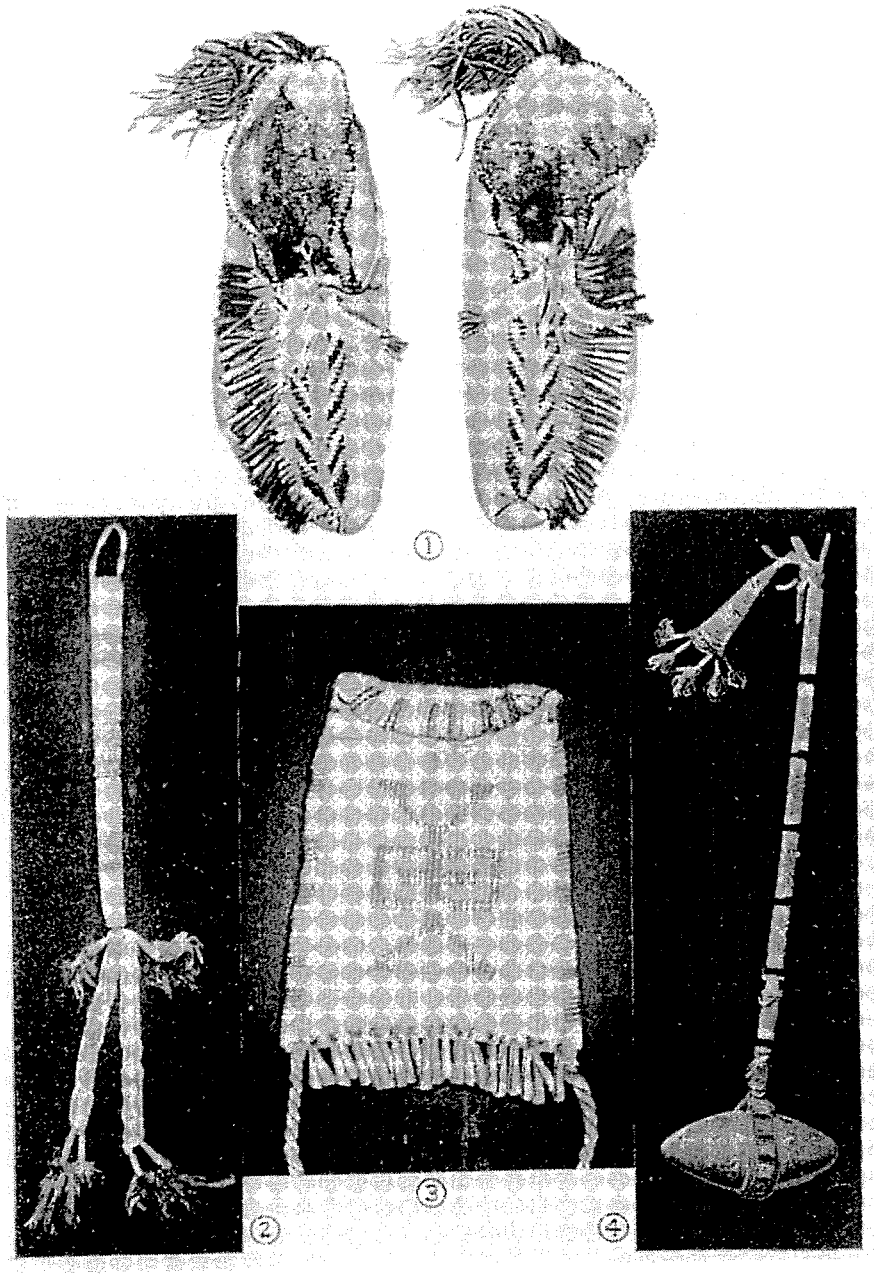


Plate 16

there, as it seems to have been, the occupation of the cave must have been during or after the time of the encampment. This makes it seem reasonable to suppose that the old post may have been the source of the sheet iron bands, buckle, buttons, and other metal objects found at the cave.

A statement from H. H. Fielder, whose father settled at the mouth of the canyon which bears his name, was furnished the writer by Mrs. Josephine Couch of Ozona, Texas, who for some time has been collecting information in that district for a history of the Langtry country. He said, "In the early part of '79 my father, C. S. Fielder, his brother Zeno Fielder, with my mother and three sisters and myself came to this country. We first camped in the motte** at Howard Springs (at the mouth of Fielder Canyon) . . . Renegade Apaches were thick at that time. They gave little trouble except for the stealing of horses. During the spring of '79 my father went to San Felippe Springs (Del Rio, Texas) and asked an officer in Bullis' command for soldiers to be placed in our locality. I cannot tell you just when the soldiers were camped there (at the old fort) or for how long they stayed, but I do remember them camped there at the old "Soldiers Camp". It was just a few and they did scout duty throughout this locality."

Mrs. Couch said that from all the information she had gathered the camp was established during the summer of 1879 and was occupied by soldiers for about five years. She identified the two buttons from the cave as those used by two troups of Bullis' scouts.

Similar Objects Found At Other Places

Bell-shaped metal ornaments were in common use by most Indians in early pioneer days, and it is said they were an important item in the stock of early Indian traders. This is borne out by the fact that many ornaments of this kind have been found on a camp in Central Texas near an old Indian trading post, and around the site of Old Spanish Fort on the Red River.

An assortment of metal objects were taken from a cache between Marathon and Alpine and are now in the Big Bend Memorial Museum at Alpine. This cache contained several brass rings similar

**U. S. localism for a clump of trees in prairie, usually liveoaks in Texas. (Ed.).

to the two found at Fielder Canyon Cave and many of the metal bell-shaped ornaments. A large number of these ornaments and many glass beads were also found with a burial in Jones County, Texas, and are now in the Abilene Museum. Similar ornaments made of brass have recently been found in a mortuary on the Potomac River below Washington, D. C.

Use Made of the Ornaments

The bell-shaped ornaments are quite common on clothing and ceremonial objects in most ethnological collections. They were usually made from bright tin and were used as decorations on such articles as bags, sheaths, war clubs, and ceremonial images, (Plate 16; Nos. 1, 2, 3, 4). On these objects they usually served as sheaths for tassels of bright colored feathers or hair. They were also used in great numbers as fringes on dance costumes and sandals. In this way they acted as little bells, giving off a pleasant tinkling sound with each movement of the dancer.

Conclusions

The assortment of metal objects from the Fielder Canyon site indicate that it may have been a place where ceremonial paraphernalia and garments were manufactured. The bell-shaped ornaments were unquestionably manufactured there, because they were found in all stages of manufacture. The scissors are too light to have been very serviceable in cutting the metal for the ornaments, but they would have been excellent for cutting cloth or other thin materials used in making garments. The beads, buttons, and brass rings fit into the garment factory theory.

The flat rocks in front of the cave would have served well as work tables; and the fact that most of the objects were found on or in the soil at the base of these rocks seems best explained by assuming that the objects were accidentally dropped from these work tables and trampled into the earth and lost.

Our investigation, therefore, indicates that the Fielder Canyon Cave site was occupied for a comparatively short time, probably by roving bands of late historic Indians shortly after 1879, that the occupants of the site had contact with the military post situated two miles down the canyon, from which they secured at least some of the

objects found at the site, and that the site was probably used as a place for manufacturing ornaments, garments, and ceremonial objects.

REFERENCES

1. Letter from Mrs. Couch, dated October 11, 1940.

2. Central Texas Archeologist, No. 3, pp. 52-55; and conversation with Frank H. Watt, Waco, Texas.

3. Texas Archeological and Paleontological Society Bulletin, Vol. 10, Plate 31.

4. Conversation with Victor J. Smith, Alpine, Texas.

5. Information from card accompanying the objects in the Dallas Fine Arts Museum, belonging to Mrs. Anna W. Dove, Estes Park, Colorado.

6. American Antiquity, Vol. IV, No. 1, Plate IV.

CERTAIN CACHES OF FLINTS FROM THE NORTH TEXAS AREA

By Adolph H. Witte

Several similar caches of worked flints have been discovered in the North Texas area. Data on four lots are in the writer's file, and these will be described here. The first two groups are of special interest as they do not seem to correlate with known culture complexes. This fact itself is not surprising since Texas remains are largely unexplored and neglected. However some progress has been made toward outlining a stream terrace chronology based upon paleontological contents. Obviously these stream terrace explorations should be expanded and accelerated since more and more ancient implements are discovered each year in the Pleistocene deposits in the state.

Whitzitt Cache

A group of 28 unusually large flint implements was brought to the writer during 1935. The cache had been discovered beneath a flat stone on the Whitzitt farm in Jack County. The area lies within the drainage pattern of the Trinity River and the topography is rough, with scrub oaks and mesquites dominating the landscape. Various members of the Lower Harpersville formation of the Upper Pennsylvanian System are exposed along the strike which extends almost east to west. The formations exposed consist of sandstones, shales, and coal measures and do not contain cherts or siliceous nodules suitable for artifacts.

Subsequently, the writer visited the locality where the cache had been discovered, but was unable to find middens or workshops which might be correlated with the cache.

The weight of the cache is six pounds. The average length of the implements was 3¼", the width 3", the thickness almost ¼". When considered as a whole the entire group is somewhat similar in outline, and might be described as ovoid with a point. One flint is evidently a scraper, as it is chipped only on one face. Another

PLATE 17

Four Flints From the Johnson Cache

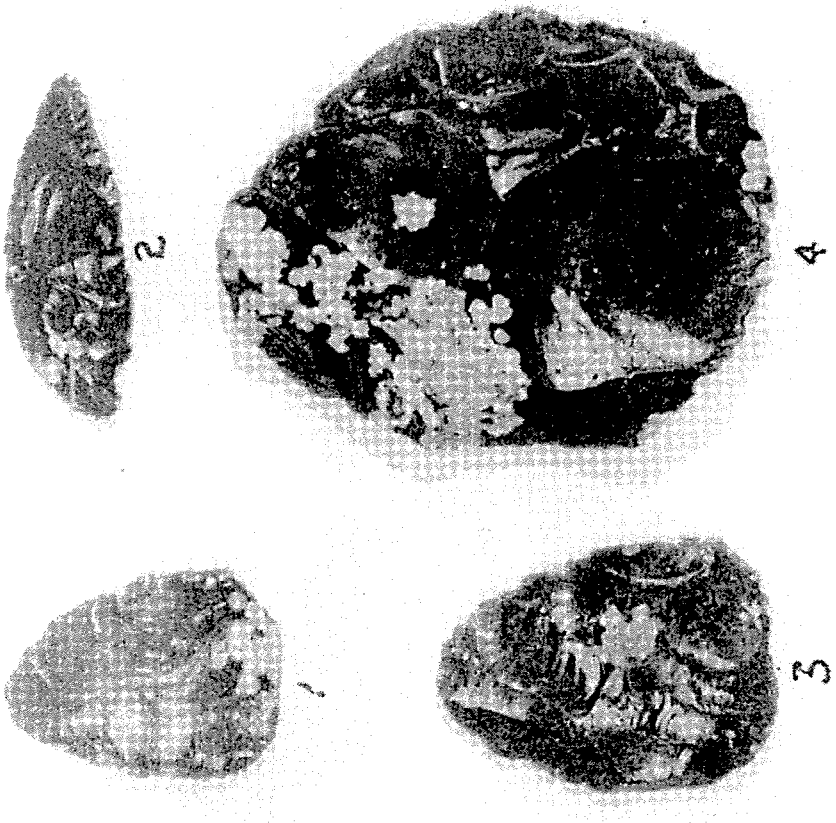


Plate 17

specimen might be classified as a spokeshave. The opposite edges of one axe show a curious S twist; as if the blade had been plastic and had been twisted. Similar "twisted" axes appear to be found exclusively with Acheulean tools in Europe, according to Burkitt. All of the tools exhibit long, well controlled flake scars. The technique employed in manufacture is percussion. The edges of all the tools are dull, indicating considerable use, and perhaps age. Four of the artifacts are light brown in color; and the source of this excellent stone is unknown. The remaining 24 are of a fine semi-translucent flint usually considered Cretaceous in origin. The color includes various shades of blue with many light colored spots due to patination since manufacture.

Johnson Cache

This cache was also found within the Trinity River drainage and was discovered a few inches below the surface of a cultivated field. The locality is in Clay County and is approximately 20 miles eastward from where the Whitzitt cache was discovered. The area is near the contact of the Harpersville and Pueblo formations and suitable cherts are not found.

This cache consists of 30 implements and the weight is 9 pounds. With only one exception the individual flints are somewhat smaller than those of the Whitzitt cache. However, the material is of the same light blue Cretaceous flint and came from distant quarries. The largest specimen in the group is a big oval axe with point, and this measures 7¼"x6" and is almost 2 inches in thickness. The pointed end shows considerable battering. There are no grooves or notches to indicate that this huge 3½ pound object was ever hafted (See Plate 17). One knife-like object is four inches in length and semilunar in outline. Another specimen, a finely fashioned axe, exhibits a "twisted" appearance, and is very similar to the one described from the Whitzitt cache. Considered as a whole, the Johnson and Whitzitt caches are surprisingly similar.

Palo Duro Cache

The cache was discovered two feet below the surface of the tableland and in the edge of a small gulch which drains into the Palo Duro River, a few miles from Canyon, Texas. The cache consists of 608, sharp, unworked, flint flakes. The weight is 7½ pounds.

The materials, red and brown cherts. The flakes are from 1 to 4 inches in length and obviously could have been fashioned into almost any type of artifact. The source of this cache, a vast prehistoric quarry, was discovered a short distance down the canyon. Many huge hammers and quarrying tools were observed in situ, just as the ancient miners left them. Countless spalls, chips, and flakes mantle the slopes below the horizon where the chert nodules are exposed. The chert deposit seems to be Triassic in age. Much of the debris has changed color since it has been exposed to weathering. This fact itself is significant, as Palo Duro cherts and artifacts seldom exhibit patination.

The picturesque Palo Duro Canyon abounds in archeological stations of various sorts, such as middens, workshops, quarries, and burials. Shallow oval and deep circular mortar holes are found in addition to the rare boat-shaped type.

Potter County Cache

This lot, consisting of 81 unworked flakes was discovered 3 feet below the surface of the tableland in a ravine which drains into the Canadian River. The material is of a red varigated chert, possibly Alabates. The size ranges from 1 inch to 5 and all are covered with gray mineral incrustations. Cord marked pot sherds and small triangular points with side notches of recent Panhandle types were observed on the surface of the locality. The weight of this cache is 2 pounds.

Henrietta, Texas.

THE GENUS BOOTHERIUM, WITH A NEW RECORD OF ITS OCCURRENCE

By Curtis J. Hesse

The Pleistocene formations of North America are rich in vertebrate remains as well as localities from which collections have been made. Tar seeps, lake beds, caves, river terraces, and glacial drift have all contributed and still contribute to the ever growing faunal list of this epoch. In no other subdivision of geologic time is our knowledge of the vertebrate life so complete from the tiny shrew and vole to the huge *Paraelephas*. Since the first papers on Pleistocene vertebrates appeared in this country, over one hundred years ago, the detailed knowledge of the animals of these deposits has steadily increased.

Probably the earliest North American fossil locality to become well known throughout the world was Bigbone Lick, Kentucky. As early as 1739 fossils were collected here and vast quantities of fossil bones were later sent to various Museums. Here was collected a Pleistocene fauna, not extensive in species, but typical of many later discoveries. The animals of the Bigbone Lick are well known now. As the years have progressed, other localities and Bigbone Lick itself have yielded additional material of the forms represented.

An exception to this generalization is the extinct genus named *Bootherium*. The original specimen, a cranium and incomplete horncores, was found at Bigbone Lick. It was a part of the collection made there by Governor William Clark and sent to President Thomas Jefferson who was keenly interested in such things. In 1818 C. Wistar described the specimen and regarded it as allied to the Bison. A few years later Harlan (1825) confirmed this view and gave it the name *Bos Bombifrons*. As the years went on the specimen was mentioned by other authors, but it was not until 1852 that Joseph Leidy recognized the Muskox-like characters of this queer animal. He gave it the distinctive name *Bootherium bombifrons*.

For almost 100 years our knowledge of this genus has remained unchanged. Various writers have discussed its relationships, some

differing but mostly agreeing with Leidy's interpretation. In 1908, Dr. J. W. Gidley (p. 683) described a second specimen from the "Pleistocene, post glacial" of Moorland Swamp, Michigan. This specimen was little better than the first, a frontal and complete horn-cores, the basal rugosities of which; "extended much beyond the horn-core base, nearly or quite meeting the one from the opposite side in the median line." Other writers did not agree with Gidley's generic reference, and believed that his *B. sargenti* was a female skull of *Symbos cavifrons*. This idea does not seem to have met with wide acceptance and Gidley's specimen stands in the literature today as he originally referred to it.

In 1915, O. P. Hay (p. 523) described a third species, basing it on both horncores and frontals of a specimen that had been collected in 1880 at Elephant Point, Alaska. This specimen was intermediate in its horn characters between the original *B. bombifrons* and *B. sargenti.* It was designated as *B. nivicolens.*

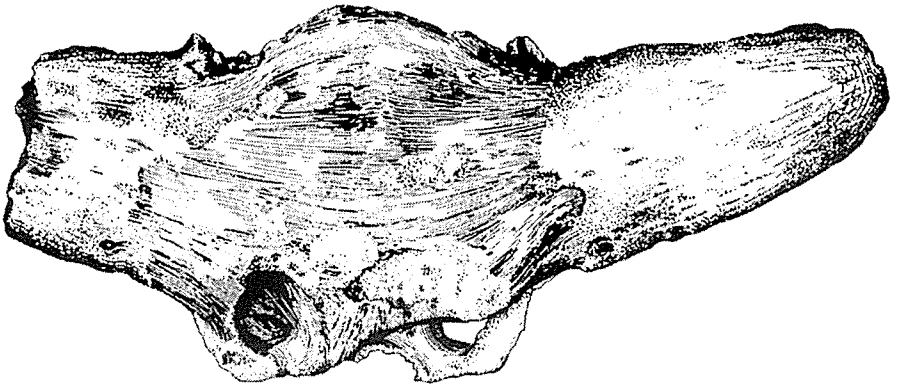
Some years prior to this Gidley (1906, p. 165) described a peculiar ruminant from the Pleistocene of New Mexico. Again the specimen was a very poor one, and Gidley did not compare it with *Bootherium.* He did point out that it was more closely allied to *Ovibos* (the living Muskox) than it was to the California *Eucerath-erium-Preptoceras* forms. Unfortunately Gidley used a preoccupied generic name, *Liops zuniensis* for this form, and a year or so later (1908, p. 584) attempted to substitute the name *Lissops* for his genus. Meanwhile M. Cossmann (1907, p. 64) had already substituted *Gidleya* as a generic name, and for many years it stood as such in the literature. In the recent work of Frick (1937, p. 560) on these groups, this specimen is regarded as (?) *Ovibos* but from a study of Gidley's figures it seems to the writer that it is more likely another *Bootherium.* This view was also suggested by Gidley himself (1908, p. 684), but due to the confusion of names, it was not made clear.

This completes the list of described species, so we may now turn to the additional finds which may be referred to the genus *Boother-*

PLATE 18

Fig. 1. *Bootherium brazosis,* incomplete cranial roof and horn-cores, superior view. T. A. M. C. No. 2553, Brazos County, Texas. Type specimen.

Fig. 2. *Bootherium brazosis.* Side view of type specimen.



1

2

Plate 18

ium. Other finds, recorded in the early literature as *Bootherium cavifrons* are now regarded as *Symbos.* The records of *Bootherium* are few in number and often of questionable accuracy. The first of these is from Bigbone Lick, Cooper (p. 173) wrote that a second skull was preserved in the Finnell (Phinnell) Collection which was made in 1830. The whereabouts of this specimen is today unknown. Second, in faunal lists and reports of the early 50's Liedy mentioned *Bootherium* as one of the animals found at Natches, Mississippi, but all evidence seems to indicate that *Symbos cavifrons* was the animal he identified. Third, in 1870, after partly draining Beaver Lake in Newton County, Illinois, skeletons of *Mastodon and Bootherium* were supposed to have been found. What became of this material is unknown, but again it is more likely that the find was *S. cavifrons* since this form is more common. These records are all discussed by O. P. Hay in his work on the Pleistocene of North America.

Hay (1924, p. 263) in discussing a Pleistocene fauna from Kemmswick, Jefferson County, Missouri, mentions a horn core "resembling that of *Bootherium bombifrons.*" This specimen was in the private collection of Mr. C. W. Beehler of St. Louis. One of the most important finds of material of this genus was that described by Peterson (1926, p. 258) from Frankstown Cave in Pennsylvania. Unfortunately, so little of the skull was preserved that the generic determination may be uncertain. Frick (1937, p. 565) suggests that this may possibly represent true *Ovibos* which was discovered in a nearby cave. There was, however, considerable skeletal material and a few teeth with this discovery, which providing the identification is correct, gives us the only information we have on these parts of *Bootherium.* The latest recorded find of this genus, the usual incomplete cranial roof and broken horns, was described by Barbour (1931, p. 227). This specimen was probably found near Omaha, Nebraska, and from the measurements given seems to be slightly smaller than the genotype. In 1937 Frick (p. 566) records the finding of three new specimens referred to *B. nivicolens* in Alaska, but does not describe the material.

From the above records, we may consider *Bootherium* as definitely recorded from Kentucky, Michigan, Alaska, Nebraska and probably Missouri. It is probably recorded from Illinois, Pennsylvania, and if Gidley's genus is *Bootherium*, from New Mexico. To this

list we may now add Texas, the southern most record yet established.

Bootherium brazosis n. sp.

Type: An incomplete cranium with bases of horncores, T. A. M. C. No. 2553.

Locality: This specimen was collected in the spring of 1940 at Pitt's Bridge (loc. no. 3), Brazos County, on the Brazos River. Material has been collected here since 1899 as the river cuts away its lowest terrace. Few specimens are found in place, but are picked up, as was this one, on the bars below the eroding banks. The specimens are mostly fragments, but two fairly complete *Paraelephas* skulls have recently been found in place here. That the specimens are indicative of Pleistocene age, no one would question, but assigning this age to the terrace itself might be open to question, since the fossils may have been transported to their present site.

Description of the specimen: This specimen is less complete than the others, it consists of the cranial cap made up of the heavy frontals, with the base of the right horn core and about two-thirds of the left. The fragment is well preserved, and since the sutures are completely obliterated it was probably a fully adult animal. The most striking feature of the specimen is the great thickness of the cranial roof in proportion to the size of the skull. Just back of the bases of the horn cores this is 63 mm. thick, and while there is some suggestion of thinning anteriorly this roof is approximately 50 mm. thick in the region of the orbits. The horn cores are round in cross section, are set on a well marked pedicel and are directed outward and down. It is difficult to orient the skull cap accurately enough to say which way the horns are then deflected. The horncores themselves do not have a heavy burr, but their bases are quite distinct. The parts preserved are not ridged or grooved and while they are somewhat rugose they are by no means as much so as *Ovibos* or *Bison.* There is no sign of the development of exostosis

---

PLATE 19

Fig. 3. Superior view of skull outlines of various Ovibovinae. A. *Bootherium bombifrons*, genotype. B. *B. nivicolens.* C. *B. sargenti.* D. *Symbos.* E. *Bootherium* sp. indet., from Nebraska. F. *B. brazosis.* G. *Gidleya zuniensis.* H. *Ovibos.*

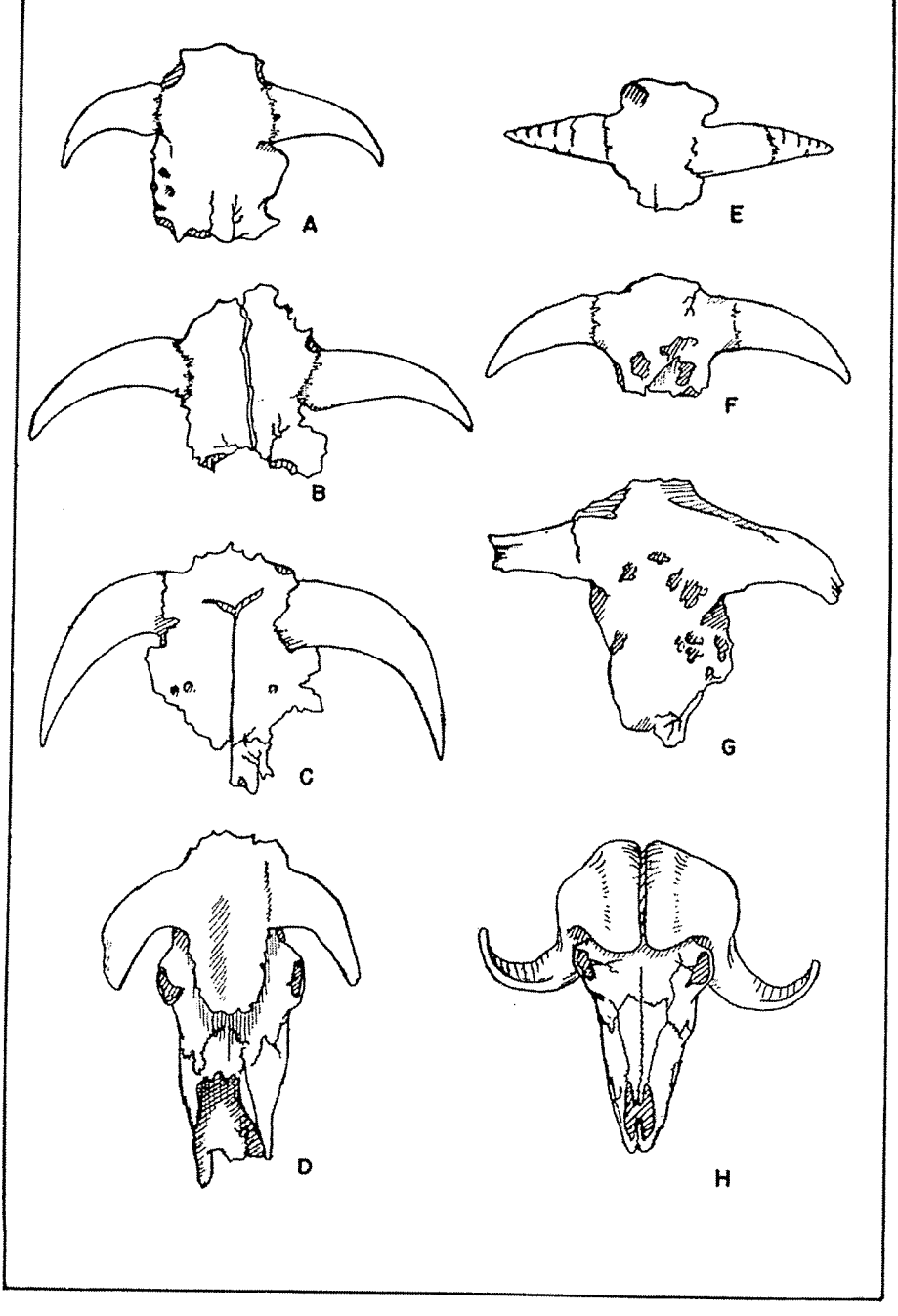


Plate 19

across the forehead or of any outgrowths on the horns at all. Another outstanding feature is the facial angle of the dorsal outline of the skull. As in the original specimen, this angle is divided by a line between the bases of the horncores. Allen (1913, p. 211) gives the figure of 55° for the angle between the front and back parts of the genotype. In the Texas specimen the angle is 60°+. In the mid-line of the posterior part of the specimen is a wide but very low ridge, this feature also is readily seen in Allen's figure (p. 211, Fig 45) of the genotype. Little more may be said of the specimen. Within the heavy boney cap are large sinus cavities and the general construction of the skull is heavy although it is small.

Relationships of B. brazosis to the other species: Of the three described species of the genus, *B. brazosis* is most closely allied to the genotypic one. The three species are most readily distinguished on the direction, size, and exostosis of the horncores. In *B. bombifrons* the horn cores leave the skull at right angles, have a pedicel, and curve slightly forward and down. In *B. nivicolens* the horn cores are directed outward and less downward, and on the upper surface exostosis has developed to the extent that the pedicel is obscured. In *B. sargenti* the exostosis has developed even further and the slender horncores sweep forward and downward. This last species has been regarded by some (see Allen, 1913, p. 214) as a female of *Symbos cavifrons,* which is allied to the true Muskox. The Texas specimen approaches most closely the condition of *B. bombifrons* as does the specimen recorded by Barbour from Nebraska. From a careful study of the figures of *B. bombifrons* its horncores are much more ribbed, have a larger, more definite "burr" at their base and turn down more sharply than those of *B. brazosis.* Judging from Allen's figure of the Kentucky specimen the skull is somewhat arched transversely between the horncores, while in the Texas form this area is flat. In size there is little difference, the Texas specimen is a few millimeters larger in most comparable dimensions.

In this connection it is of interest to note the Nebraska skull described in 1931. This specimen is somewhat less complete than the genotype. The horncores are very similar to those of the Texas form, but leave the skull at a much higher angle, this producing a broad valley instead of a flat or convex surface between the bases of the horncores. In other respects it seems to resemble the geno-

type and the Texas specimen. It is difficult to evaluate such characters, since we know so little of the genus.

General Relationships of the Genus Bootherium

Bootherium is one genus of a family about which we know very little. Some difference of opinion exists as to the families and subfamilies into which these groups are divided. In general the *Cavicornia* is an old world family, with its present center of distribution in Africa. It originated either in southern Europe or Asia, although certain genera are undoubtedly of North American origin. The group is characteristic of the Pleistocene in North America, and is of particular importance for the domestic forms it contains (sheep, goats, etc.).

The subfamily Ovibovinae contains one living genus and four that are extinct. The living form *Ovibos* is the Muskox, an inhabitant of the tundra of North America. In Pleistocene time it ranged over Asia and Europe as well as North America as far south as the United States. *Symbos,* an extinct genus, is most closely allied to the living Muskox and was probably an animal of similar habits. *Bootherium* discussed in the paper is a third genus, also extinct, and resembles the Muskox more than any other animal. However it is distinct enough to suggest that it had different habits, and since it is so rare it was probably not one of the common Pleistocene forms. *Euceratherium* and *Preptoceras* may be sexual variations of the same animal. In their characters they are not closely related to the Muskox, although they have a general resemblance to the other animals that make up the subfamily. By some (Frick, 1937, p. 540) they are regarded as between the sheep and the true antelope. At best we can only regard them as peculiar horned animals of somewhat uncertain relationships.

Assistant Curator, The Museum
Agricultural and Mechanical College of Texas,
College Station, Texas.

BIBLIOGRAPHY

Allen, J. A., 1913. *Ontogenetic and Other Variations in the Muskoxen with a Systematic Review of the Muskox Group, Recent and Extinct,* Mem. Amer. Mus. Nat. Hist., N. S., 1, Part IV, pp. 103-226, 45 Fig's., 7 Pls.

Barbour, E. H., 1931. *The Musk-Oxen of Nebraska,* Bul. Neb. State Mus., 1, No. 25, pp. 211-233, 15 Figs.

Cooper, W., 1831. *Notices of Big Bone Lick,* Mo. Amer. Jour. Geol. and Nat. Sci., 1, pp. 158-174; 205-217.

Frick, C., 1937. *The Horned Ruminants of North America,* Bull. Amer. Mus. Nat. Hist., 69, pp. 1-688, 68 Figs.

Gidley, J. W., 1906. *A New Ruminant from the Pleistocene of New Mexico,* Proc. U. S. Nat. Mus., 30, pp. 165-167, 3 Figs.

Gidley, J. W., 1908. *Descriptions of Two New Species of Pleistocene Ruminants of the Genera Ovibos and Bootherium, with Notes on the Latter Genus,* Proc. U. S. Nat. Mus., 34, pp. 681-684, 3 Pls.

Harlan, Richard, 1825. *Fauna Americana; Being a Description of the Mammals of North America,* Anthony Finely Publisher, Philadelphia.

Hay, O. P., 1915. *Contributions to the Knowledge of the Mammals of the Pleistocene of North America,* Proc. U. S. Nat. Mus., 47, pp. 515-575, 7 Pls.

Leidy, Joseph, 1854. *Remarks on the Question of the Identity of Bootherium cavifrons with Ovibos Meschatus,* Proc. Acad. Nat. Sci. Philadelphia, vii, pp. 209-210.

Peterson, O. A., 1926. *The Fossils of the Frankstown Cave, Blair County, Pennsylvania,* Ann. Carnegie Mus., 16, no. 2., pp. 249-300, 10 figs. 8 Pls.

Wistar, Caspar, 1818. *An Account of Two Heads Found in the Morass, Called the Big Bone Lick,* and Presented to the Society by Mr. Jefferson, Trans., Amer. Philos. Soc., N. S., 1, pp. 273-380, 2 Pls.

A NEW SPECIES OF CAPROMERYX FROM THE PLEISTOCENE OF WEST TEXAS[1]

By Grayson E. Meade

INTRODUCTION

During the past few months an intensive search has been made for Pleistocene vertebrates with which it would be reasonable to expect to find associated artifacts. In cooperation with the Department of Geology and the West Texas Museum, exploratory work has been carried on in eastern New Mexico and a number of counties in western Texas. In the course of this work a new Pleistocene vertebrate fossil quarry was discovered in Lubbock County.

The site is a former Pleistocene lake basin which was drained and subsequently dissected by the headward erosion of Yellowhouse Canyon, a tributary of the Brazos River. The quarry has been worked intermittently for several weeks whenever the weather permitted. The prospects are excellent for obtaining a fine Pleistocene mammalian assemblage from this locality. The material discussed in the following pages is from this quarry and was found in association with *Parelephas, Equus, Camelops* and as yet unidentified carnivora and rodents.

The genus *Capromeryx* was described by Matthew (1902) from the Pleistocene deposits in Sheridan County, Nebraska. Frick (1937) figured two horn-cores of *Capromeryx* collected at the type locality which serve to substantiate the association of dentition with horn-cores of this species. Taylor (1911) and Furlong (1925) described *C. minor* and *C. mexicana* and the horn-cores of these species are considered as typical of the genus.

Hesse (1935) suggested the possibility that *C. furcifer* might have been collected from the Pliocene exposures at Hay Springs. Frick (1937) does not consider this a possibility. In as much as his material is recorded as from the Pleistocene the question may be presumed settled. Frick (1937) described a new genus, *Texoceros,* based upon a fragmentary horn-core from the Optima fauna. He considered that the dentition of *Capromeryx altidens* belongs with

1. The study involved in the preparation of this paper has been forwarded by the Research Fund of Texas Technological College.

Texoceros. Apparently he reasoned that all the Pliocene species of Capromeryx are actually *Texoceros*, with horn-cores like that of the latter genus. Stirton (1938) pointed out that if the dentition referred by Hesse to *Capromeryx altidens* actually belonged with the horn-core of *Texoceros*, then *Texoceros* would automatically become a synonym of *Capromeryx*. Either interpretation may be correct, but in as much as no typical *Capromeryx* horn-cores have been found in the Pliocene, it may tentatively be argued that *Capromeryx* does not occur in the Pliocene. If this is correct, then the genus *Texoceros* would not be synonymous with *Capromeryx*.

Capromeryx, like many other fossil genera in which there is a questionable association of parts, is subject to a great diversity of interpretation. Whether or not the belief that *Capromeryx* is confined to the Pleistocene is accepted, that is the status of the genus as it now appears in the literature. The genus *Capromeryx*, then, is made up of the following species. *C. furcifer, C. minor, C. mexicana, C. gidleyi, and C. minimus.*

Antilocapridae Gray

Capromeryx minimus sp. nov.

Holotype.—West Texas Museum No. 18. Incomplete left mandible with P/3 to M/3 (figure 1).

Horizon and locality.—Pleistocene. About five miles north of Slaton, Lubbock County, Texas, on the W. E. Smart Ranch, north side of Yellowhouse Canyon.

Material.—In addition to the type there is an incomplete right mandible with milk dentition, W. T. M. No. 21, and two left horn-cores, W. T. M. Nos. 19 and 20.

Diagnosis.—Smallest of the known species of *Capromeryx*. Ramus slender; not foreshortened and deep below M/3. M/3 proportionately longer and narrower than in other species. Horn-cores with reduced anterior prong and nearly vertical, slender posterior prong.

Description.—The fragmentary portion of the left ramus is relatively longer and more slender than in *Capromeryx minor* or *C. mexicana*. The teeth are narrow, high crowned, typically antilocaprid and are similar to those of *C. minor*. The premolars are short-

ened antero-posteriorly. P/3 is similar to the corresponding tooth of *C. minor,* but the lingual inflection is broadly U-shaped and not V-shaped as in the latter species. There is a slight postero-external inflection. P/4 is similar to P/3 except that there are two lingual inflections. There is but one lingual inflection on P/4 in *C. minor.* The anterior inflection is V-shaped; the posterior inflection broad and shallow. The external contours of the tooth are like those of P/3.

The first and second lower molars do not differ from those of *C. minor* in any diagnostic way. M/3 is proportionately narrower and is longer than the corresponding tooth of *C. minor.* The third lobe is well developed, noticeably longer than either of the other two lobes, though this may partially be the result of the stage of wear of the teeth. This elongation of the third lobe makes the total length of the tooth row nearly equal to that of *C. minor,* despite the shortness of the other teeth.

C. minor and *C. mexicana* have jaws which are foreshortened with a considerable depth of ramus below M/3. The jaw of *C. minimus* does not exhibit these characters. *C. minimus* is immediately distinguished from *C. furcifer* by its much smaller size and the construction of the premolars.

Description of horn-cores.—W. T. M. No. 19 (Figure 2) is a small horn-core, well preserved except for the distal tip of the posterior prong. The two prongs arise from a common, laterally constricted base as in the other species of *Capromeryx.* The posterior beam is much the longer of the two prongs. Although the distal tip is not preserved its estimated height is less than that of *C. mexicana.* It is considerably longer and more slender than the corresponding beam of *C. minor.* It tapers uniformly from the point of union with the anterior beam to the distal end. It is slightly flattened transversely so that its diameter averages about 2 mm. less in that direction than

PLATE 20

Fig. 1. *Capromeryx minimus* sp. nov. Type, W. T. M. No. 18. External view of left mandible with P/3 to M/3 and occlusal view of lower cheek teeth.

Fig. 2. *Capromeryx minimus.* W. T. M. No. 19. Left horn-core, external view.

Plate 19

antero-posteriorly. From the lateral view it has a forward inclination which starts just above the point of union of the two beams, though this inclination is not nearly so pronounced as in *C. mexicana.* The posterior face of the larger beam is deeply grooved as in *C. mexicana* and *C. furcifer.* In *C. minimus* and *C. mexicana* the groove runs ventrally and terminates in the margin of a broad, deep sulcus that lies at the base of the horn core. Furlong (1925) states that there is a similar groove in *C. minor,* which terminates above a narrow, deep pit-like sulcus. In *C. minimus* the anterior face of the posterior beam has a shallow groove which extends ventrally from the antero-internal side and terminates on the mid-anterior surface at the point of junction between the two beams. Viewed from the top the anterior and posterior grooves give the appearance of separating the right and left sides of the beam, as though they were joined in a slightly off-set fashion. The outer side extends slightly farther anteriorly than the inner side, while the portion medial to the two grooves extends farther posteriorly than does the outer side of the horn core.

The anterior beam is nearly half the height of the posterior beam measured from the dorsal rim of the orbit. It is triangular in cross-section with the apex of the triangle pointing forward. The posterior face of the beam is deeply concave. Externally, near the anterior margin is a deep groove which extends from the base of the beam nearly to the distal end. The anterior beam is similar to the corresponding beam of *C. mexicana, C. minor,* and *C. furcifer,* but it is much more reduced.

Another left horn-core W. T. M. No. 20, is not as well preserved as the one described above, and is badly pitted and etched by solution. It exhibits no particular differences from specimen No. 19 that can be determined except for a slightly more robust anterior prong and a longer posterior prong; differences that probably arise from individual variation.

The horn-cores of *Capromeryx mexicana* differ from those of *C. minor* in the slightly different construction of the posterior groove on the larger prong; in its longer and more slender posterior prong and in its forward curvature. The anterior prong, is relatively

longer and more robust and the lateral constriction of the common base is more pronounced than in *C. minor.*

Capromeryx minimus horn-cores differ from those of *C. mexicana* principally in the more reduced anterior prong and the more vertically situated posterior prong. They differ mainly from *C. minor* in the reduced anterior prong and the more slender, tapering posterior beam. They appear to differ from those referred by Frick (1937) to *C. furcifer* in the more reduced anterior prong. *C. gidleyi* is not figured by Frick (1937), but the measurements given for the posterior beam indicate a much larger species.

Discussion.—The genus *Capromeryx* has been considered the most likely candidate to fill the role as an ancestral form leading to the modern pronghorn. Hesse (1935) gave an excellent summary of the genus with a clear consideration of its relationships. There is good evidence that some one of the species of *Texoceros* may represent the ancestral form of *Antilocapra Americana.* However, the horn-core of *Texoceros* differs greatly from that of the pronghorn. It is difficult to imagine that it could be modified in the direction of *Antilocapra.* Since dental and other skeletal parts do not seem to debar *Texoceros* from an ancestral position it may be speculated that not all the species referred to this genus truly belong there. However, the question of the relationships of various Pliocene antelope-like genera with *Antilocapra* has been discussed by various authors and there is no new evidence to be presented on the subject at this time.

Considering *Capromeryx* as made up of the species enumerated in the introduction, it seems most improbable that it has any close relationship with the modern pronghorn. The horn-cores are totally unlike those of the modern pronghorn and it does not seem probable that they could be modified to the pronghorn type. In addition, *Capromeryx* and *Antilocapra* have been found associated in the McKittrick and Rancho La Brea Pleistocene deposits. It does not appear likely that this occurrence represents another example of an ancestral form existing contemporaneously with an off-shoot descendant.

MEASUREMENTS (in millimeters)

	Left Ramus W.T.M. No. 18 Type	Right Ramus W.T.M. No. 21	Left Horn-core W.T.M. No. 19	Left Horn-core W.T.M. No. 20
Dentition: (antero-posterior diameters)				
P/3	4.6			
P/4	5.0			
M/1	6.8			
M/2	8.2			
M/3	15.7			
P/3-M/3	40.0			
Dm/2		4.0		
Dm/3		5.0		
Dm/4		9.6		
M/1		9.0		
Dm/2-M/1		22.6		
Horn Cores:				
Height of posterior horn-cores*			74.0	86.0 e
Height of Anterior horn-core*			36.0	36.0 e
Antero-posterior diameter of horn-core measured at base			19.4	21.7
Transverse diameter of horn-core measured at base			10.5	10.3

*Measured from dorsal rim of orbit to distal end.
e Estimated.

Texas Technological College,
Lubbock, Texas.

REFERENCES

Chandler, A. C., 1916. *Notes on Capromeryx Material from the Pleistocene of Rancho La Brea*, Univ. of California Publ. Bull., Dept. Geol. Sci., Vol. 9, pp. 111-120, 4 Figs.

Frick, C., 1937. *The Horned Ruminants of North America*, Bull. Amer. Mus. Nat. Hist., Vol. 69, pp. 1-669.

Furlong, E. L., 1925. *Notes on the Occurrence of Mammalian Remains in the Pleistocene of Mexico, with a Description of a New*

Species, Capromeryx Mexicana, Univ. of Calif. Publ. Bull., Dept. Geol. Sci., Vol. 15, pp. 137-152, 11 Figs.

1930. *Capromeryx Minor Taylor from the McKittrick Pleistocene, California,* Carnegie Inst. Washington, Publ. No. 404, pp. 49-53, 2 Figs.

Hesse, C. J., 1935. *New Evidence on the Ancestry of Antilocapra Americana,* Jour. Mamm., Vol. 16, pp. 307-315, 5 Figs.

Matthew, W. D., 1902. *List of the Pleistocene Fauna from Hay Springs, Nebraska,* Bull. Amer. Mus. Nat. Hist., Vol. 16, pp. 317-322.

1924. *Third Contribution to the Snake Creek Fauna,* Bull. Amer. Mus. Nat. Hist., Vol. 50, pp. 59-210, 63 Figs.

Stirton, R. A., 1938. *Notes on Some Late Tertiary and Pleistocene Antilocaprids,* Jour. Mamm., Vol. 19, pp. 366-370.

Taylor, W. P., 1911. *A New Antelope from the Pleistocene of Rancho La Brea,* Univ. Calif. Publ. Bull., Dept. Geol. Sci., Vol. 6, pp. 191-197, 6 Figs.

VERTEBRATE PALEONTOLOGY IN TEXAS

By Curtis J. Hesse

This vast state in which we live is blessed with a great diversity of natural phenomena. Its climate, vegetation, wild-life, and topography offer many interesting leads to the student. As in these other fields, so it is with our geology; although the first scientific papers dealing with it were published one hundred years ago, only the broad outlines of our geologic map have been drawn.

In studying the thousands of square miles of rocks exposed within our borders many traces and remains of past life are found. These were preserved when the surrounding rocks were being deposited as muds, sands, and gravels. Such objects are fossils, and the collecting and study of them is the science of Paleontology.

Almost everyone is familiar with fossils of one sort or another, for there is scarcely a county in Texas that has not produced some fossil material. Indeed, certain of our fossil localities are known the world over. Fossils themselves may be divided into three groups, depending upon what type of life they represent. First are the plants; their leaves, stems, wood, seeds, and sometimes flowers are found preserved in the rocks. The study of fossil plants is called *paleobotany.* Second are the animals without backbones, such as sponges, corals, clams, snails, and insects. These are the most common of all fossils and the study of them is called *Invertebrate Paleontology.* Third, are the animals with a backbone, similar to those we see about us every day. This is the field with which we are primarily concerned in the following pages. It is called *Vertebrate Paleontology.*

The vertebrates are well known to all of us, they are: fishes, amphibia, reptiles, birds, and mammals. The *fishes* are so familiar that they need no characterization. The *Amphibia,* the bridge form between land and water, are animals of reptilian appearance but which in early life breathe by means of gills, go through a metamorphosis and then have air-breathing lungs. This once dominant group is represented today by the frogs, toads, and salamanders.

The reptiles represent one more step forward in that they breathe by means of lungs throughout life. We have all seen snakes, lizards, turtles, and crocodiles, the common reptiles of today. These are cold-blooded, scale-covered animals that are members of a once much more wide spread class. The *birds* are also familiar. They are derived from the reptiles and retain many reptilian characters. They are warm blooded, have feathers instead of scales, lay eggs, and usually can fly. The last, and now dominant group are the mammals. These are warm blooded, produce milk, and have hair. Since man is a member of this group, it is regarded as the most highly developed type animal.

With this brief survey of the kinds of vertebrate animals we may now turn to the great collections of fossils amassed in Museums to see what has been discovered in Texas by the pick and shovel of the paleontologist or his collector.

The Paleozoic

Throughout north central Texas, along the eastern edge of the Panhandle and to some extent in the Trans-Pecos region there is a great series of rocks known as the *Permian* (see Plate 21). These rocks were deposited partly in the seas and partly on the adjacent shores some 250 million years ago. One of the oldest and most important assemblages of vertebrate animals in the world has been found in the rocks of this ancient Permian shore. Some of the first of these strange creatures to be discovered were collected by Jacob Boll and sent by him to eastern institutions.

There are approximately 100 different kinds of fishes, amphibians, and reptiles known from these Texas localities. They are animals of estuaries, swamps, lagoons, alluvial plains, and open or dense woodlands. No traces of birds or mammals have been found, nor have many highly specialized reptiles (running, leaping, or flying forms) been discovered. These higher types, if evolved at this time, probably inhabited the higher interior lands.

The amphibia were at the peak of their evolution and the largest amphibians that ever lived, the Stegocephalia (*Stego*-covering roof; *cephalo*-head), were represented by about 25 species (see Plate 22 B). These animals were about five feet long, with a broad flat skull, and the general body proportions of an alligator. They were

evidently carnivorous, judging from their sharp recurved teeth and from numerous coprolites, (fossil excrement) supposed to have come from them containing bones of fishes and other small vertebrates. *Eryops* (see Plate 22 C), the form most common in Texas, was semi-aquatic. Although it had a heavy body, the forms of the muscle attachments of its bones suggest it was probably capable of quick movement. *Diplocaulus* (see Plate 22 D), although a smaller form, was none the less interesting. The skull of this form was shaped like an expanded A. The skull length along the side or wing was about 10 inches and the distance across the posterior tips of the sides was about 12 inches. The mouth, nares, and eyes were at the apex of the skull, and the slender weak body was attached immediately behind at the apex of the inner "V". Although it was long believed to be a legless form, small leg elements were later discovered, but neither the body nor legs of this amphibian were in proportion to the skull. This "arrow-shaped" animal evidently lived in the mud and slime of pools and streams, wriggling its way along. The amphibia were the dominant type of vertebrate in this and other Permian faunas, but since that far off time they have steadily declined in importance and are now represented only by the lowly salamanders, frogs, and toads.

Of the reptiles on this old shore, there is a greater variety, in some cases foreshadowing those groups which were to rule the world in the following geologic era. Of the 50 or so known kinds found here in Texas, none are more striking than the *Dimetrodon-Edaphosaurus* group (see Plate 22 A). These animals resembled in a general way the alligator. They were about six feet in length, with skulls a foot long. They carried sharp recurved teeth characteristic of carnivorous animals. The neural spines of the vertebrae were tremendously elongated, extending about three feet above the animal's back. For what purpose this great expanded dorsal "fin" could be used, it is difficult to imagine. It must have been a nuisance to the animal in getting around, and a drain on its vitality to grow it and keep it in repair.

Faunas similar in age to the Texas Permian have been found in New Mexico, Oklahoma, and scattered mid-continent localities. These are in turn related in age and to some extent in kind to groups of animals found in the Permian of Scotland, Russia, South

Africa, and China. The University of Chicago, the University of Michigan, and Harvard have the largest collections from Texas localities. This material has been extensively studied and described by Cope, Case, Williston, and Romer, and is considered by them to represent one of the most important fossil vertebrate faunas of the world. Recently, under a Works Progress Administration project, the Bureau of Economic Geology at the University of Texas has collected some of this material. It is the only large collection of this age in the possession of any Texas institution.

The Mesozoic

The following great subdivision of geologic time, the *Mesozoic* (see Plate 21), began approximately 200 million years ago and closed with the last retreat of the great inland seas more than 70 million years ago. This is commonly known as the Age of Reptiles, for throughout this span of time collections show them to have been the dominating forms. In Texas there is a great suite of rocks that were deposited in the era, containing both marine and fresh water beds. Although these rocks have been studied, their sequence worked out, and distribution plotted, no adequate attempt has been made to collect their vertebrate fauna. A fairly complete fauna is known from the Triassic, amphibians, crocodile-like Phytosaurus, and a few other reptiles having been found. It is indicative of about the same kind of environment as in the Permian. The Jurassic, which elsewhere contains the striking sauropodus dinosaur faunas, is not well represented in Texas. The main Jurassic deposits of this state are marine, and so far no vertebrates have been found in them. However parts of one dinosaur were found some years ago in Oklahoma.

The last and most widespread of the Mesozoic periods is the Cretaceous. It was the time of the final great invasion of the continent by shallow seas. Almost everywhere that extensive Cretaceous rocks are exposed, vertebrate fossils have been found. These rocks are rich in both marine and land forms, and a wealth of material has been collected from them in many parts of the world. From Texas exposures of the Cretaceous have come scattered specimens; a few

---

PLATE 21

Standard Geologic Time Scale, modified to show those formations most important in vertebrate paleontology of Texas.

THE SUBDIVISIONS OF GEOLOGIC TIME

■ WITH EMPHASIS ON THOSE OF IMPORTANCE IN VERTEBRATE PALEONTOLOGY IN TEXAS.

				AGE IN MILLIONS OF YEARS
CENOZOIC ERA	PLEISTOCENE (GLACIAL AGE)		MANY VERTEBRATE FOSSILS IN STATE. GLACIERS DID NOT REACH TEXAS. MAN PROBABLY APPEARED NEAR CLOSE OF AGE.	1
	TERTIARY	PLIOCENE	VERTEBRATE FAUNAS IN PANHANDLE, FROM OGALLALA FORMATION. CONSIDERABLE COLLECTING DONE IN THIS REGION SINCE 1934	6
		MIOCENE	VERTEBRATE FAUNAS IN GULF COAST ROCKS, FRAGMENTARY BUT SCIENTIFICALLY IMPORTANT COLLECTIONS FROM THERE.	12
		OLIGOCENE	FAIR EXPOSURES IN SOUTH TEXAS AND A FEW FOSSILS VERTEBRATES IN BIG BEND.	15
		EOCENE	EXTENSIVE EXPOSURES IN TEXAS, MANY INVERTEBRATES AND PLANTS, BUT NO VERTEBRATES OF NOTE.	25
MESOZOIC ERA	CRETACEOUS		WIDELY EXPOSED IN TEXAS, WITH EXTENSIVE MARINE INVERTEBRATE FAUNAS, FEW MARINE VERTEBRATE ANIMALS.	135
	JURASSIC		FEW EXPOSURES IN TEXAS, MOSTLY MARINE.	25
	TRIASSIC		GOOD EXPOSURES IN TEXAS PANHANDLE, ECT., WITH GOOD VERTEBRATE FAUNA, PHYTOSAUR, AMPHIBIANS, ETC.	35
PALEOZOIC ERA	PERMIAN		TEXAS PERMIAN VERTEBRATE FAUNAS KNOWN ALL OVER THE WORLD. GOOD EXPOSURES IN NORTH CENTRAL TEXAS, IN REGION KNOWN AS THE PERMIAN BASIN.	25
	PENNSYLVANIAN		THESE ROCKS FAIRLY WELL EXPOSED IN TEXAS FROM RED RIVER INTO SOUTH WEST PART OF STATE. INVERTEBRATE FOSSILS ONLY, ALSO A FEW PLANTS.	35
	MISSISSIPPIAN		SCATTERED EXPOSURES OF THESE SIX PERIODS IN LLANO UPLIFT AND IN WEST TEXAS. MANY INVERTEBRATE FAUNAS ARE KNOWN BUT NO VERTEBRATES HAVE, AS YET, BEEN FOUND. LAND PLANTS FIRST APPEAR IN SILURIAN TIMES, WITH LAND ANIMALS ALSO IN SILURIAN. THE EARLIEST BACKBONED ANIMALS (FISH) ARE FOUND IN THE DEVONIAN	40
	DEVONIAN			50
	SILURIAN			40
	ORDOVICIAN			80
	CAMBRIAN			70
PRE CAMBRIAN			OLDER ROCKS EXPOSED IN MANY PARTS OF THE WORLD, THOUGH NOT EXTENSIVE IN TEXAS. VERY FEW FOSSILS KNOWN FROM THIS ERA. I.D.G.	500

Plate 21

fish, one or two *Mosasaurs*, a fairly good Plesiosaur and other incomplete records, but nothing approaching the rich fauna of similar beds in Kansas.

A few fossil fishes here in the collection at A. & M. are of interest since they are forms related to those of the Cretaceous of the West Indies and Europe. A few hundred miles to the north in the Niobrara Chalk of Kansas (= Austin Chalk of Texas) is a large suite of fossil fishes yet many of the Texas forms are not represented there. It is possible that the Kansas fishes represent those of a near shore part of the ocean, while the Texas species are more of the open ocean types. The large, impressive *Xiphactinus audax* is recorded from both areas, both Oklahoma and Texas Universities have good specimens of this form discovered by Dr. J. W. Stovall.

Fragments of *Mosasaurs* or great sea lizards, have been found in many localities, mostly vertebrae, but the University of Texas has one good skull and other fairly complete specimens have been found. These large marine animals resembled, and are related to, the modern lizard. They had paddles instead of feet, and ranged in size from 10 to 50 feet. They were predaceous forms, feeding on fish, and in that far off day they must have been the rulers of the seas. One of the most interesting Cretaceous vertebrates is a nearly complete skeleton of a rare Plesiosaur (see Plate 23 B), found near Marlin, Texas. This is one of the rare types of plesiosaur, called *Trinacromerum*, it is a small form about 12 feet long, with a stout body. Its head was small but carried a long slender snout armed with sharp teeth, this, with its large flipper-like paddles made it a swift, dangerous animal. With these were great sea turtles, some as much as 10 feet across the shell, and most peculiar of all the Pterodactyl (*Pteranodon*) (Plate 23 A), a great toothless flying reptile with a wing spread of over 20 feet. Although complete skeletons of these winged reptiles have not been found in Texas, the only uncrushed bone of such a form was found here a few years ago. Since the bones of their skeletons were hollow as they are in birds, and are always as flat as this paper when found, great difficulty was experienced in identifying this uncrushed element when it was found. Nothing like it had been seen before. All these and other strange creatures have been found in the rocks of the Cretaceous seas.

In the past few years it has been noted that certain of the Cretaceous deposits in the Big Bend had dinosaur bones in them as well as marine forms. It is still too early to say much about the monstrous dinosaurs of this time in Texas. Mr. Strain of the College of Mines and Metallurgy at El Paso and Dr. J. W. Stovall, of the University of Oklahoma have both been collecting this material. They report many finds of leg bones and fragmentary parts of skeletons. The fauna will be, apparently, similar to one in Wyoming. So far Ceratopsian (Plate 23 D), or horned forms, have been discovered and Trachodont (Plate 23 C), or duckbilled types. The latter were apparently aquatic, living along the shore lines and feeding on plants. They were bi-pedal, and a long heavy tail enabled them to walk about in an upright position. Their skull with its bill some two feet long, does resemble that of a duck, and in all probability indicates some similarity of feeding habits. The American Museum of Natural History, New York City, has prospected in this region as well as Dr. Charles W. Gilmore of the U. S. National Museum, Washington, D. C. It remains to be seen just what Cretaceous fauna of the Big Bend region will contain.

For many years reptilian tracks have been known to occur in the Cretaceous rocks of Texas. Many of these are dinosaur tracks, even though they are not all large, for not all the dinosaurs were big animals. Some are without doubt those of other kinds of reptiles, possibly even of forms about which we know nothing. These tracks are found at many localities and always excite considerable local interest. Recently, Mr. Bird, of the American Museum of Natural History, found the first sauropodus dinosaur tracks that have ever been discovered near Texas. Another fine series of tracks was obtained by the University of Texas and the American Museum of Natural History, and moved to a shelter outside the Museum at Austin.

The Cenozoic

At the end of the Cretaceous most of the great reptilian orders became extinct, and their place in nature was taken over by the more adaptable, warm blooded mammals. Although the mammals had appeared in the Upper Triassic in other parts of the world, we have none of these early records in Texas. The *Cenozoic* (see Plate 21), or Age of Mammals, opened with the deposition of a series of rocks

called the Eocene. These rocks are well exposed in this state, extending in a broad band from the Louisiana-Arkansas border to the Rio Grande about Laredo. There are both marine and terrestrial beds in this extensive formation and invertebrate faunas have been known from the Eocene of Texas for many years. Shark teeth may be found at some localities, and a sword-fish rostrum has been recently discovered by H. B. Stenzel of the University of Texas. A few vertebrae of the great primitive whale, *Zueglodon,* were collected many years ago in San Angustine County. These were large, free swimming animals, with a long, slender snout, armed with sharp teeth. They retained the front paddles, and with their slender bodies must have been swift moving animals with habits similar to those of a whale. Complete skeletons of these animals found outside the state are from 50 to 70 feet long. Another interesting record about which we know very little is a series of 16 vertebrae discovered a few miles west of College Station in Burleson County. Dr. Kellogg of the U. S. National Museum believes that these vertebrae are those of a sirenian, an animal related to the living sea-cow. If we could find more of this or other similar specimens it would be of great interest, since little is known of the fossil history of this group of animals. Some years ago a single bone of a fossil crocodile was found in Falls County, but nowhere in Texas has the Eocene produced extensive or even fragmentary vertebrate material. Why this should be is not at all clear. Leaves, stumps, etc., all show that much of the area was land. So far as one can tell these formations are as favorable as any for the preservation of vertebrate fossils. Nor can one say that the fossil fields have not yet been discovered. These Eocene outcrops have been quite thoroughly explored, and hundreds of invertebrate localities are known.

With the next sub-division of the Cenozoic, the Oligocene, the story is much the same. Throughout the east and central Texas, rocks of this age are represented by a formation known as the Catahoula. It has produced one vertebrate fossil, a fragment of an upper jaw containing four teeth. It was found near Burton, in Washington County, and is a part of an extinct kind of rhinoceros known as *Caenopus.* On this slim record the dating of these rocks as Oligocene rests.

In the Big Bend region of the state are extensive lake deposits

made up of volcanic tuffs and other sediments. These beds lie above the Cretaceous in that region, so it has long been known that they represented some part of the Tertiary or Age of Mammals. In 1938, Dr. J. W. Stovall of the University of Oklahoma discovered a locality in these lake beds that contains fossil vertebrates. This interesting and important locality proves that part of these beds are Oligocene in age, and the nearest known Oligocene vertebrate faunas are almost 800 miles to the north! These faunas of the north are characteristic of the Dakota bad-lands and are found where these formations are exposed. They are called the White River, from the very productive areas along that stream. Mr. Stovall has collected about 10 different kinds of "White River" animals and we await with interest the results of his future investigations.

One of the most interesting and scientifically important of the fossil faunas of Texas is that of the Miocene, some 12 million years old. From the Sabine River near Burkeville, down to the Rio Grande is a band of clays and sandstones representing the deposits built up near the mouths of ancient rivers. In these old gravel bars and silts of the flood plain and delta are the bones of long extinct animals. These were first discovered in 1860, but it was not until 1914 that a collection was made for scientific study. C. L. Baker, now head of the Department of Geology at Texas A. & M. College, then geologist for the Southern Pacific Railway, made a small collection of this material from several localities, and the results of his work were published. This aroused the interest of the late Dr. Mark Francis of Texas A. & M. College, who although he was a veterinarian, collected fossils as a hobby, and he began to collect at two of the Miocene localities. By the time of his death in 1936, Dr. Francis and others had brought together a fairly large and comprehensive collection of these Miocene vertebrates. The fauna is now known to occur at several localities in East Texas. That the animals were washed in by streams is shown by the presence of catfish spines, ganoid scales, and otoliths (ear bones) of fishes. Although shark teeth are also found here, they are abraded and incom-

---

PLATE 22

Texas Permian Vertebrates. A. *Dimetrodon* the "Sail Fin" reptile. B. A Stegocephalion amphibian. C. *Eryops*, one of the common forms in the Texas Permian. D. *Diplocaulus*, one of the strange animals of the old Permian shore.

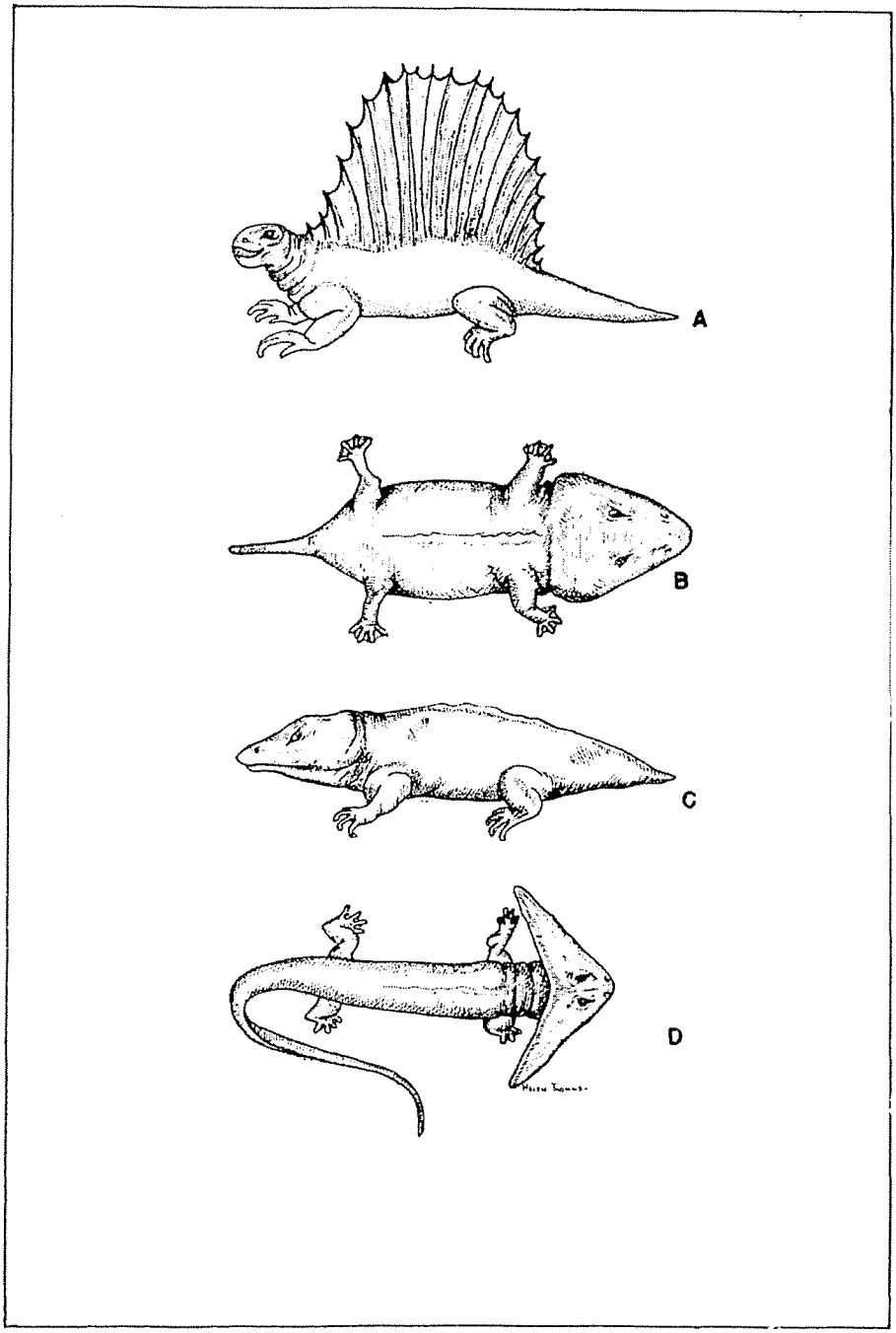


Plate 22

plete, so it is likely they are derived from the Eocene rocks that were being eroded to form the later deposits. It is not impossible, of course, that the Miocene sharks and rays came into the mouths of fresh water streams, as many of the modern forms do. From this formation, near Coldspring, San Jacinto County, comes the only Amphibian skull known from the Miocene rocks of the world. Indeed, it is one of two specimens that have been found in the entire Tertiary of North America. This small skull was found by Mrs. Claude Riley of Crockett, Texas, in 1938, and is being studied by Dr. Edward H. Taylor of the University of Kansas. Two species of turtles, a crocodile and a single snake vertebra make up the list of reptiles. The mammals of this collection are very interesting, since this is one of the most Southerly Miocene faunas. We can compare them with the faunas of similar age in different geographic regions such as Nebraska and Florida. The influence of latitude may thus be demonstrated. For example, in the southern fauna is a small horse called Miohippus, in the north it is known only from the Oligocene rocks where it is common. Here in the south it is a survivor, a carry-over from an earlier day living along with animals that have evolved far beyond it.

Another odd horse-like creature was *Hypohippus*, a side branch of the equine family. These were three-toed animals with browsing rather than grazing teeth. Along with these unusual forms is the true horse of that time, *Merychippus*. A complete skeleton of this form was recently found by Claude Riley of Conroe. It is now in the American Museum. One of the most striking animals of this fauna is *Prosynthetoceras francisi*, (Plate 24 A) an antelope. It had the usual pair of horns behind each eye socket, and in addition it carried a forked horn at the tip of the snout just back of the nostrils. Only six skulls of these strange beasts are known and all have come from Texas. In Miocene time it must have been a very common form, for many loose teeth and fragments of horn cores are in collection here at A. & M. College. It is interesting to note that prior to 1935 the very existence of such an animal was unsuspected. Another unusual animal of this fauna is the great Amphiocyonine dog, commonly called the bear-dog. The skeleton of this animal was similar to that of the dog, but the teeth were similar to those of a bear. This must have been a formidable animal; it was as large or

larger than a grizzly bear and capable of the same muscular achievements. The remainder of the fauna is made up of more normal mammals, but all are long extinct forms. There is a peccary, camel, dog, rhinoceros, and other forms similar to those found in the Miocene deposits to the north. Unfortunately, the general preservation of this fauna is not good. Most of the specimens are fragments and loose teeth. However, the finding of the horse skeleton by Mr. Riley suggests the possibility of better material to be found in the future.

The Pliocene deposits of Texas are well developed, covering most of the Panhandle, as well as a strip similar to the Miocene in the coastal region. In the latter area, some distance east of Beeville, the University of Texas has discovered a rich deposit of Pliocene bones in a quarry and several other productive localities. It is too early to say much about this fauna yet, but it appears to be one of the most important discoveries made within the state. Much of this collection is now being studied by Dr. Joseph T. Gregory of the University of Michigan, who was at the University of Texas at the time the collection was made. The *Pliocene* of the Panhandle stands close to the Permian in the wealth of material it has produced and in the number of good collecting localities. These beds were first worked by Cummins and Cope in the early 1890's, and the results of their investigations were published in the Fourth Annual Report of the Geological Survey of Texas. This is the first important paper to deal with the fossil vertebrates of Texas, and the first collection of any size to be made by a Texas institution. Later this region was worked by the American Museum of New York, and a large collection obtained. Local people made some collections, but not until 1928 did interest in this region revive. In that year C. L. Baker and associates, while working on the geology of Hemphill County discovered about 30 localities in that county where vertebrates could be obtained. The University of California worked these and other localities each summer from 1928 until 1933, obtaining much material. Denver Museum of Natural History and the Frick-American Museum parties have all worked in this region. Through the efforts of F. V. Studer of Amarillo and others a museum has been established at the West Texas State Teachers College at Canyon, and that institution is now working this field. The late Mr. C. Stuart John-

ston was most active in forwarding the paleontological work of this museum. His untimely death was a serious blow to the work in this area. However, Dr. A. McAlpin is now in charge of the paleontological work there so the area is not being neglected. Texas Technological College at Lubbock has recently established a museum and Mr. Ike Meade is in charge of their program. All this points toward a period of great activity in the Panhandle.

The fauna is a rich one and there are many localities from which it comes. It was preserved in stream channels, and is made up of those forms inhabiting the open grass lands as well as the stream-border types. It represents conditions similar to those of a few years back in that same area, where winding streams with their forested bottom lands were a meeting place of the plains-roving bison, antelope, and wild horse, as well as the forest dwelling deer, and elk all drawn together by a common need of water. The Pliocene animals were caught in quicksands, drowned at water holes, or died naturally and their bodies swept away in floods. Many modes of death suggest themselves for these skeletons. Today we find the bones in the channel deposits of those vanished rivers. There were three different kinds of horse, and they are the most common animal in the fauna. They must have roamed the plains in great herds, as did the bison of later day. These horses and the antelope called *Capromeryx* probably represent true plains types. The rhinoceros was fairly common, and the largest skull of any ancient or living rhinoceros was collected just nine miles east of Miami, Texas. There were two different kinds of rhinos present, a horned and a supposedly hornless form. The rhinos, and the several kinds of camels from these deposits, were probably inhabitants of the savanna-like bottoms, where they browsed on the trees and brush. The beaver, raccoon, badger, and deer-like animals, all found in these sands, suggest the more forested stream-border association. Carnivores were common, from the great bear-dogs, several kinds of wolves and foxes to the saber-tooth cat, a forerunner of the still larger *Smilodon* of the Pleistocene. Of course, there must have been many animals of which we have found no trace, nevertheless, the Pliocene of the Panhandle gives a fairly complete picture of the life of that day. The epoch seems to have been the last of the times when the great mammals held sway. Already it was beginning to

cool in the north, and some of the larger forms, as if worn out by the long evolution of their kind, were beginning to die out.

Three notable events marked the history of life on earth during the Pleistocene. First, the epoch was marked by the *encroachment of the continental ice sheet* that was to advance and retreat over the northern hemisphere for the next million years. Second, vast *changes in the geographic distribution of the mammals* were brought about, accompanied by the extinction of many forms. Third, at some time early in the epoch, probably in Southeast Asia, *man first appeared.* The great continental ice cap, such as Greenland now carries, made four major advances and retreats in North America. At the maximum of the advance, the ice cap extended as far south as Kansas, but did not reach any part of Texas. However it must have had great influence on the climate of this area. During the retreats, both the flora and fauna moved back into the glaciated area. At the maximum retreat of the ice, conditions were much the same as they are today, indeed some believe that we are living in an interglacial stage now.

The fauna of this epoch, as we know it, was a rich one. This is probably due to its being the latest of all fossil faunas, and therefore has suffered less from the vicissitudes of time. Specimens of this age are common, some deposits are incredibly rich. Within the glaciated area to the north the deposits of the four advances and retreats can be made out, thus dating any fauna found within them. Outside this area, in Texas for example, such a ready reference cannot be made. Our Pleistocene deposits are extremely difficult to date as to whether they are early or late, since we do not have a clear picture or the chronology of the fauna either in Texas or elsewhere in North America. We know that the horse became extinct here in North America during the Pleistocene, but when this occurred we are uncertain. It may be possible, in time, to build up a picture of this million year old epoch, with the time of extinction of the various forms worked out. This would be invaluable in dating

---

PLATE 23

Texas Cretaceous Vertebrates. A. *Pteranodon,* the great flying reptile. B. *Trinocromerum,* the short neck plesiosaur. C. *Trachodon,* the Duck-billed dinosaur. D. *Triceratops,* one of the horned dinosaurs.

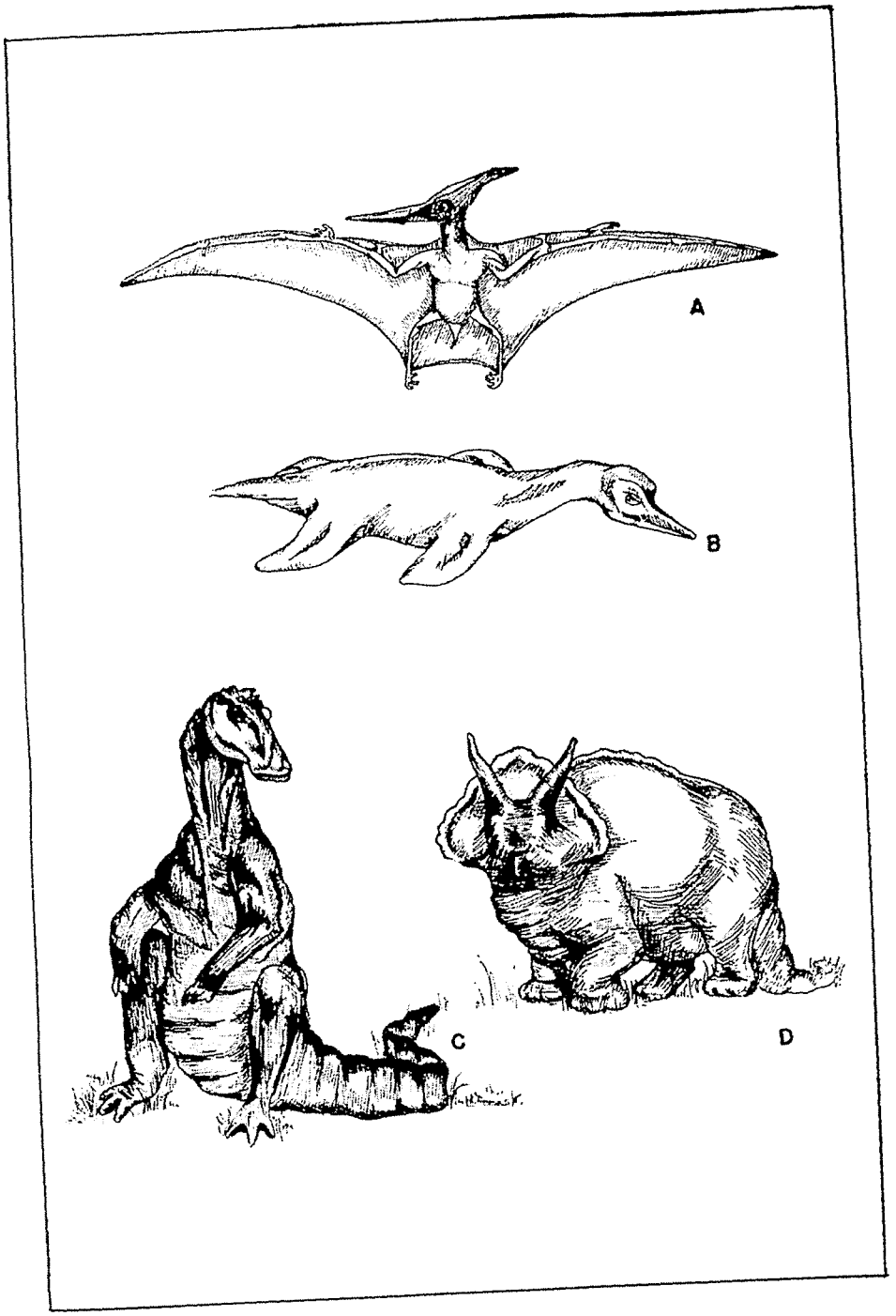


Plate 23

the nonglacial deposits. It has been done to some degree in Europe.

The most striking thing about the Pleistocene fauna is not unusual animals, but the vast changes in the distribution and extinction that have occurred. Elephants and the elephant-like Mastodons were very common in Texas, and their remains have been discovered in hundreds of places within our state. They probably lived up to comparatively recent time, at least until the first men reached this part of the world. The rhinoceros became extinct here at the close of the Pliocene, and I am aware of no record of them in the Pleistocene of the New World. The bison and its relatives made its first appearance in Pleistocene time. Possibly it was better adapted to the country, able to reproduce faster or to withstand the climate better than the horse which seems to have occupied the same environmental niche prior to its extinction here in North America. One of the bison, *B. latifrons*, was noted for its tremendous spread of horns. This animal is not well known. Less than five good skulls have been found, and never in association with good skeletons. The spread of the horn cores is seldom under six feet and often near seven. When one recalls that this represents but two-thirds of the span of the horns as they were in life, some idea of the great size may be obtained. The animal must have been heavily built, similar to an ox. With this form, and much more common, were bisons of approximately the same size as our living form.

With these bisons was a large camel, differing in certain details from the living forms, and slightly larger. This camel was fairly common throughout the Pleistocene and until recent times. Along with it, and much rarer, was a slender legged Llama-like form, first discovered only a few years ago and known in Texas from a few fragments. There were several different kinds of antelopes in the Pleistocene, including the living *Antilocapara americana*. Another form, *Tetrameryx* (see Plate 24 B) had four straight horns arising just back of the orbit. This animal was first discovered in the sand pits near Dallas, but it has proven to be fairly common in the Pleistocene of this and other states.

The great ground sloths, now extinct, are represented in almost every collection made in the Texas Pleistocene. Early in the spring of 1942 Dr. K. Hussey, of the University of Houston, was fortu-

nate enough to find most of the skeleton of one of these large creatures. It is called *Megatherium* and the specimen, from near Humble, Texas, is probably the best yet found in this country. These large, slow moving creatures were immigrants from South America, as were the Glyptodons. This latter group resembled very large Armadillos. Some of the "shells" measure as much as eight feet in length. Unfortunately, complete specimens of this, or any other fossil animal are hard to obtain, and it is represented in most collections only by fragments of the big carapace. With these animals was a large lion, the well known saber-toothed cat (*Trucifelis fatalis*), wolves, bears, pumas, and all the other elements making up a complete fauna.

As to the important question of man's first appearance on this continent, in fairness to all we must admit is as yet unanswered. That man was contemporary with certain animals now extinct has been fairly well established. The important question of when this was is still open to answer. According to the best evidence we can obtain the final retreat of the ice, which marked the close of the Pleistocene occurred approximately 25,000 years ago. No actual "fossil man" has been found in this country, that is, actual skeletons. Those that have been found in deposits which might be old, are similar to the Indian skeletons of a later date. Traces of man, artifacts, fire places, etc., have been discovered in deposits believed by some to be late Pleistocene. The entire literature of this field is a difficult one, the question shrouded in controversy, and unbending personalities present a distorted picture. As stated before, that man was contemporary with certain animals now extinct has been proven beyond reasonable doubt. Some of these animals, characteristic of the Pleistocene, may have lived on after the last retreat of the ice, up to a comparatively recent time. Since we have not, thus far, been able to build up a chronology of cultures here, comparable to that of Europe, the question becomes one of dating the finds by the beds in which they are found. These deposits, caves, lake beds, river terraces, and others are among the most difficult of

---

PLATE 24

A. *Synthetoceras francisi*, a Miocene antelope from east Texas. B. *Tetrameryx*, a four horned Pleistocene antelope. C. *Bootherium*, a rare musk-ox like animal of the Pleistocene.

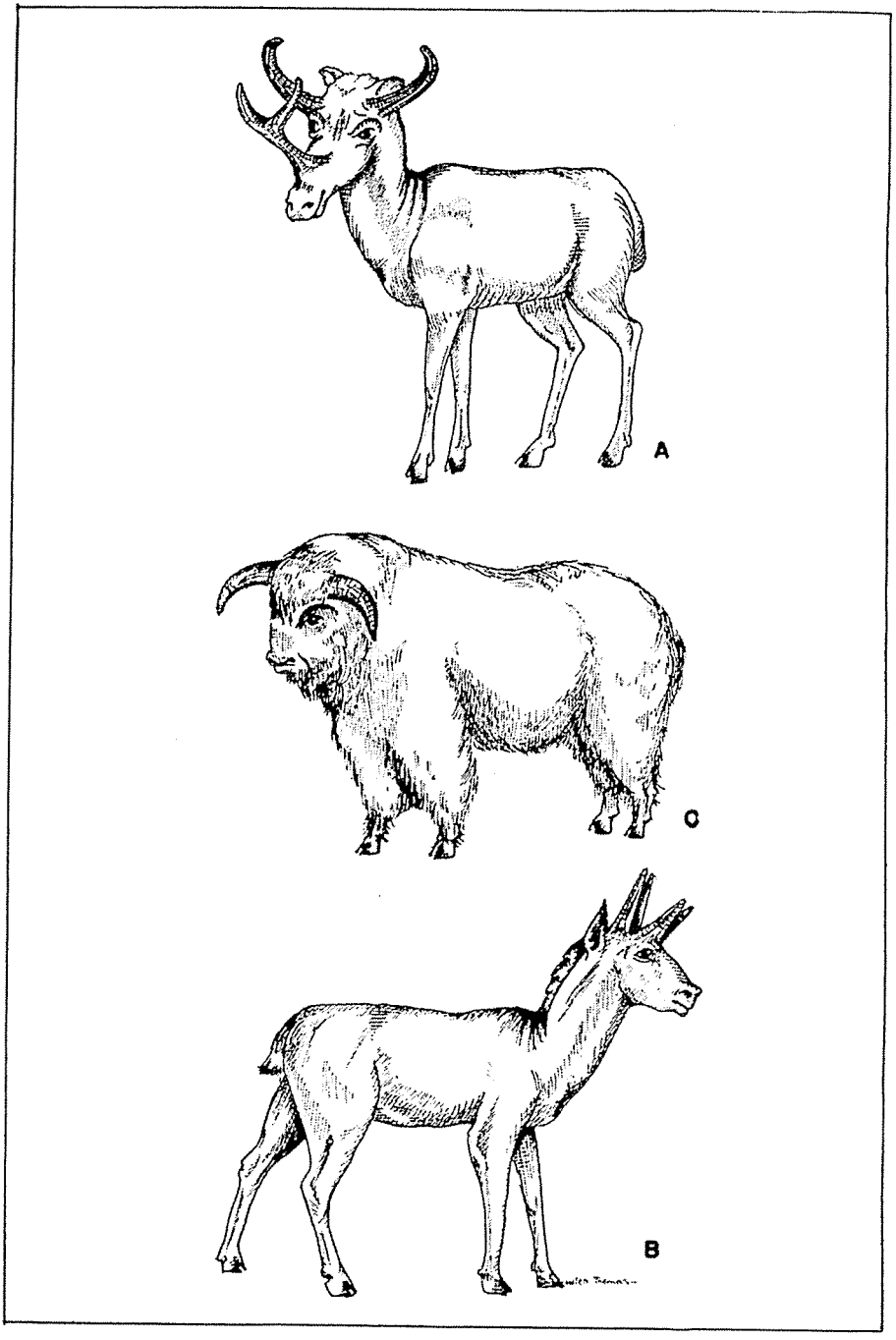


Plate 24

all formations to date, and especially since the dating must be quite exact to be of any value. Again we meet wide diversity of opinion among the geologists, a criterion selected by one man as the key of the age is considered worthless by another. In the last 15 years there has been a tremendous increase in interest in the problem and ten men are at work on it where one was prior to that time. The studies of the *Yuma* and *Folsom* cultures which began some 15 years ago also holds some promise of the development of a chronological culture pattern by means of which other finds may be dated. We must look to the future then, for the solution of this question and hope that Texas will be the scene of some of the important and definitive discoveries.

As mentioned early in this report, most of the work in the field of vertebrate paleontology in Texas has been done by institutions outside our state. This is also true of certain other related fields of science. The recent Centennial celebration in Texas suddenly made the people conscious of their history and possible future development of the state. In the wake of this celebration came the establishment of many museums, and through government aid extensive field programs. So at last Texas seems to be on the way toward the building of institutions that will preserve, within our own borders, relics of at least a part of our interesting background.

Assistant Curator of the Museum of the Agricultural and Mechanical College of Texas.
College Station, Texas

ANIMAL HOLE MOLDS IN THE PERMIAN

By Cyrus N. Ray

In a deeply gullied depression in Permian red clay and argillaceus shale, located nearly ten miles northwest of Abilene, Texas, an unusual fossil formation is exposed for a distance of more than two hundred feet across the bottom of the southern portion. The gullied area is about five hundred feet in diameter and drains to the north. On top of the north bank the formation is different and here is an outcrop of thinly laminated arenaceus shale which contains some Permian fossil imprints, ripple marks and a few holes which were bored vertically through the laminations.

This sandy laminated shale resembles the Castle Peak Permian shale which contains numerous animal tracks of various species, which were described by Roy L. Moodie (1) although the tracks seem not to occur here. Castle Peak is situated 20 miles by road farther up the same Mulberry Creek valley.

The writer will only attempt to describe the peculiar fossils of the southern end of the depression mentioned above. Here there is a bedding plane containing thousands of stone cylinders which lie vertically in the stratum. These vertically placed cylinders are exposed for a distance of 215 feet near the bottom of the depression. The vertical thickness of the layer of cylinders varies from twenty-two inches to three feet. The upper portion is eroded away and the formation once might have been much thicker. (See Plate 25).

The writer has explored the Abilene region during many years and has not previously found anything like this cylinder deposit.

The cylinders are rather uniform in size within certain limits. On measurement of cross sections the greater number fall within a diameter of between seven-eighths and one inch, although a few are so large as one and three-fourths inches in diameter, and some so small as five-sixteenths of an inch. The cylinders break off into various lengths wherever a crack has formed in the shale. A large

PLATE 25

Nos. 1, 2, 3. Three views of the Permian bedding plane which contains thousands of animal hole molds.

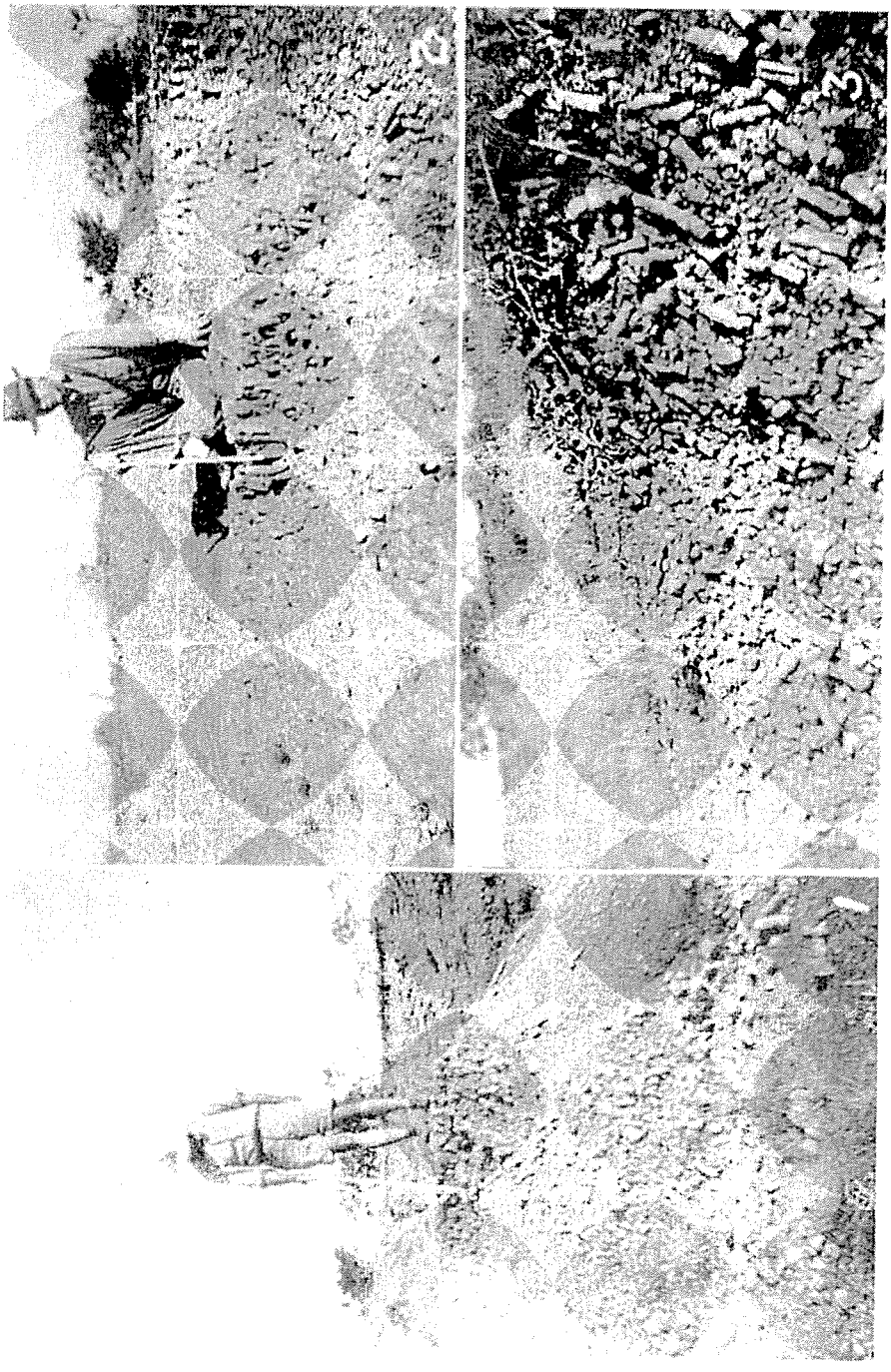


Plate 25

percentage of the broken off cylinders are between four and five inches in length although sections of all lengths up to ten and seven-eighths inches are found. The bedding plane is filled so thickly with columns that they crowd each other, and in many places little or no matrix remains between them. (See Plate 25). In other places they had penetrated masses of clay more thinly and this has turned to stone. It is in such places that one can best study the evidences of the manner in which the cylinders were formed. Many cylinders show that subsequent to their being formed as holes, and filling with mud, other holes were excavated beside them which removed enough of their filled substance to gutter out the sides of the original cylinders for many inches. (See Plate 26, Nos. 4-5-6). In some more than half of the original column has been removed. In very large cylinders one may see where a column of one-half inch diameter has been driven vertically down through the center of a much larger one. (See Plate 26, Nos. 11 and 15.) The diameters of all cross sections of any one column are about the same throughout its length, and this is true of even the longest which are three feet long in some parts of the formation.

Due to erosion the original tops of the columns can not be examined but the bottoms end at approximately the same level and there are no signs of the cylinders in the red clay below that general level.

The lower ends of the cylinders end abruptly in the stony matrix in blunt rounded ends of nearly the same size as the remainder of the columns. (See Plate 26, Nos. 8, 9, 10, 12, 13.) In large pieces of the stony matrix where the lower end pieces of cylinders have fallen out, the second finger of a large man will fit snugly into the ends of some of them. (See Plate 27, Nos. 1, 6, 7, 13, 14.) In other cases the cylinder ends have remained in the matrix and when removed these somewhat resemble the rounded ends of large bullets.

There are hard stone split matrices which show some longitudinal sections of the holes with the cylinders fallen out, and some in place; where the cylinders are out one can see innumerable circular scorings as though some animal had used its claws in excavating the holes. (See Plate 27, No. 3.) This left the insides of the holes roughly circularly scored and indented. It seems that then a smooth

lining of some substance, presumably mud, was applied to the walls of the holes. There is one cylinder, embedded in its original stony matrix, which shows on cross section an entire diameter of one and three-sixteenth inches and of this the outer lining showed a thickness of nearly one-fourth inch.

There are specimens which show very small pittings such as could have been made by an arthropod walking on moist clay.

Encrusted in the outside of many of the cylinders are fossil remains of only one kind. These are slightly curved, are slender and from three-eighths to one-half inch in length, and have a shallow groove lengthwise down the center. These organs always lie crosswise to the long axis of the cylinders. The fossils have an angular appearance resembling arthropod legs and in two cases there seem to be miniature hooks at the smaller ends reminiscent of those seen on a grasshopper's feet. Some have a resemblance to sections of the chitinous body shells of small crustaceans. One collection of the leg like fossils radiates from a common center in a manner somewhat resembling a crustacean's legs.

The stone of both cylinders and matrices is the same and is a very hard clay shale. The centers of the cylinders show no evidences of fossil remains, the organic remains are embedded in the outer surfaces of the cylinders in positions which evidently were just inside the linings.

Examination of the stone matrices from which the cylinders and their linings have fallen shows a manner of excavation reminiscent of that used by modern crayfish.

This site probably was the shore of a Permian body of water as

---

PLATE 26

ANIMAL HOLE MOLDS IN THE PERMIAN

Nos. 8, 9, 10, 12, and 13 are hole mold ends. Nos. 4, 5, and 6 were guttered by later bored holes. Nos. 11 and 15 show portions of smaller later holes driven into older molds.

PLATE 27

ANIMAL HOLE MOLDS IN THE PERMIAN

Nos. 1, 6, 7, 13, 14 show hole mold endings in matrix where molds have dropped out. No. 3 shows shale matrix with holes where molds have dropped out; the circular scorings produced in boring the holes are seen. Nos. 4, 5, 8, 10, 11, 12 are side guttered hole molds.

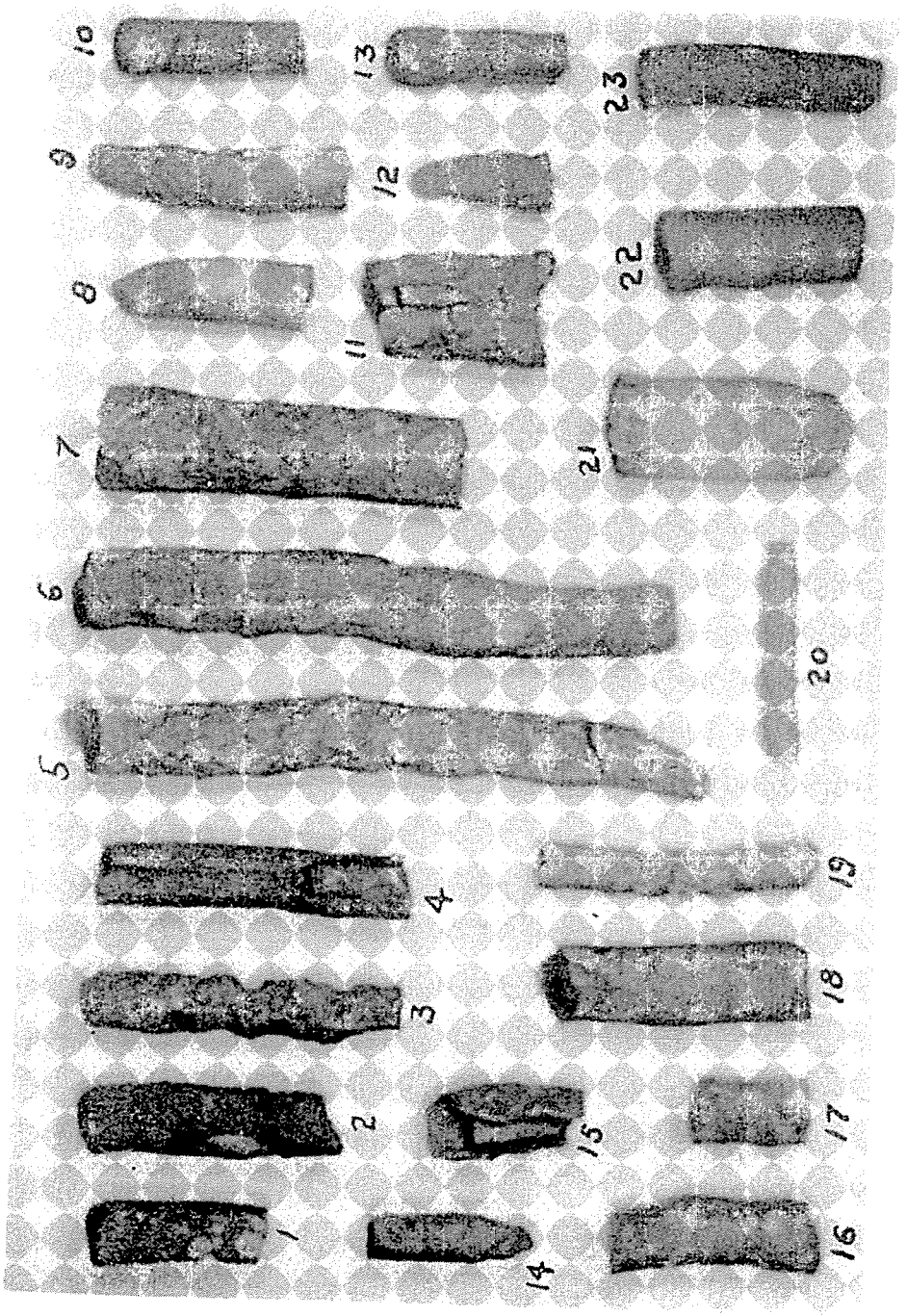


Plate 26

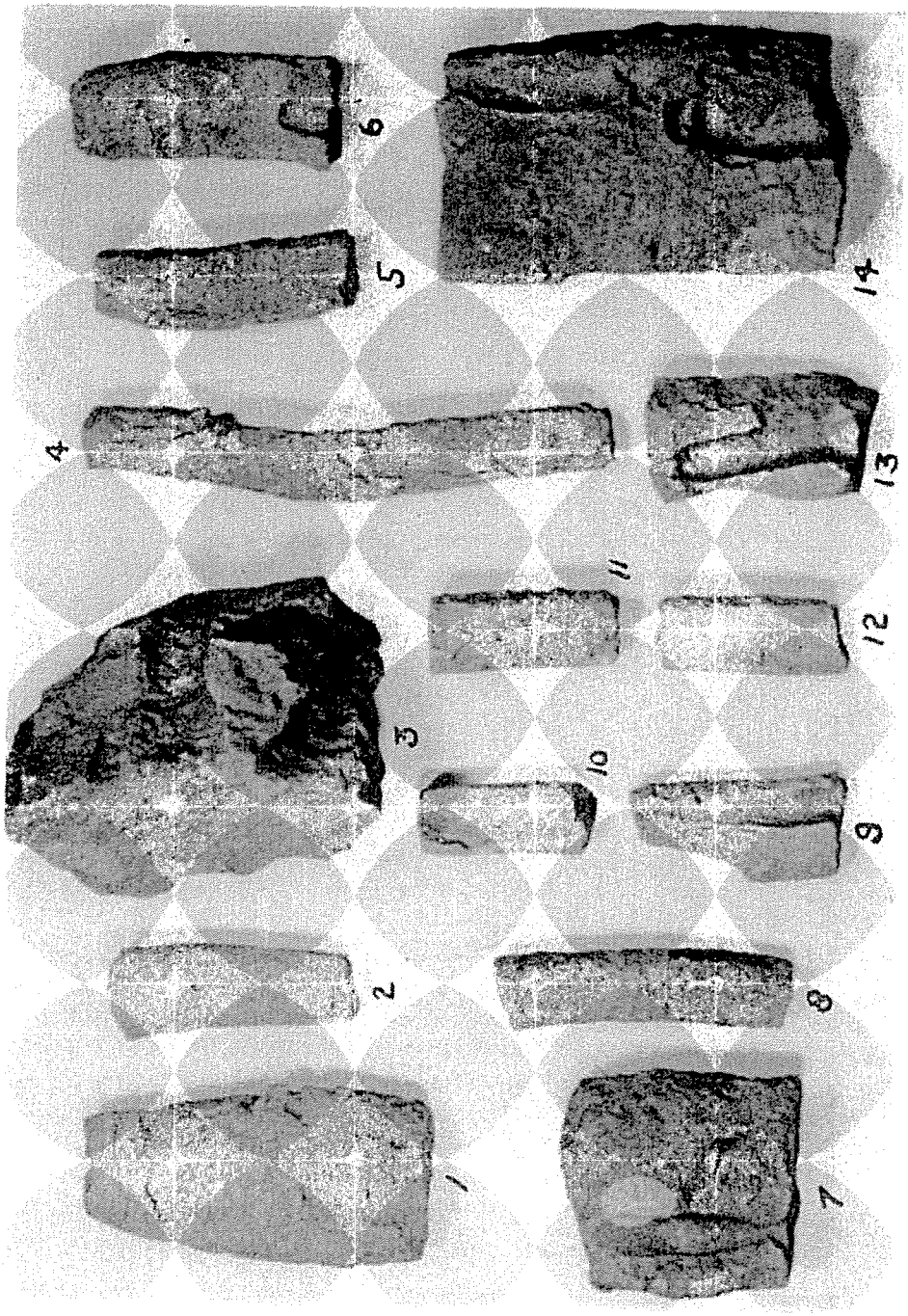


Plate 27

shown by the ripple marks and Permian fossils embedded in the sandy shale of the north portion.

Evidently some gregarious type of animal life lived on its mud flats in countless thousands, and bored its holes in the moist clay. Holes eventually filled with mud which later solidified into stone cylinders; and after the first dug holes filled, other holes were bored down beside or slanting against them and guttering their sides. Some smaller holes were bored straight down through the centers of older filled ones.

The animals died and their remains were left in the soft linings of the holes' sides and bottoms.

A small species of crab today bores holes in great numbers in the flat shorelines of quiet Texas bays and it may be that its far distant crustacean projenitors had similar habits.

Identification of the animal species which made the holes will have to await the attention of some one who has the requisite specialized knowledge.

Box 62, Abilene, Texas.

1. 1929, Moodie, Roy L., *Vertebrate Footprints From the Red Beds of Texas*, American Journal of Science, pp. 352-368, New Haven, Conn.

FORREST KIRKLAND

Forrest Kirkland, who died April 2, 1942, was born near Mist, Arkansas, November 24, 1892. He obtained his early education in Arkansas and his art training in Battle Creek, Michigan.

Mr. Kirkland was a very successful advertising artist in Dallas for many years.

In 1932 he became interested in geology as a hobby and collected many fossils and among them found a new species of fossil jellyfish which was named after him (Rhisostomoides kirklandi) by Dr. Kenneth E. Caster.

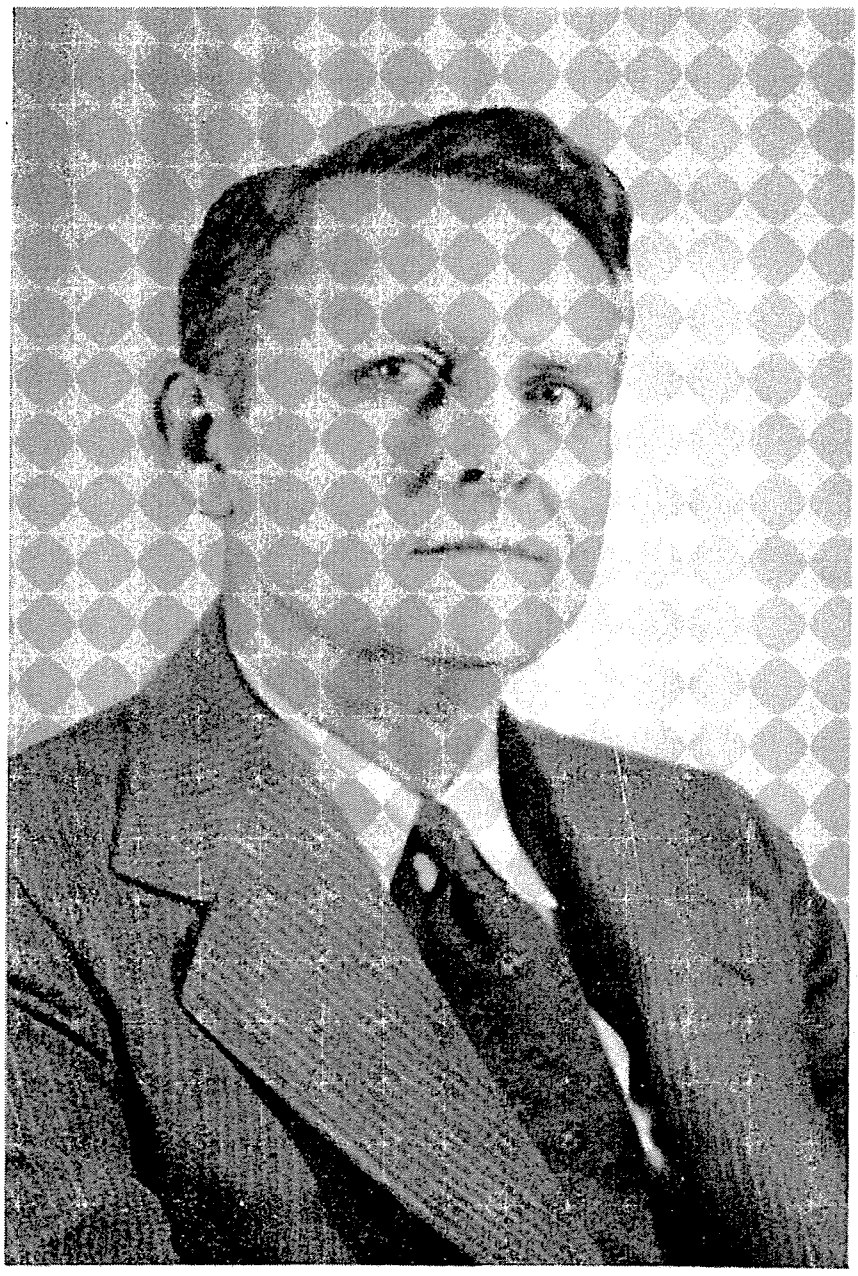
His collecting of fossils brought him into the region of Indian rock paintings and in 1933 after viewing the rock paintings at Paint Rock, Texas, he began to make exact copies of Indian paintings in colors. It was his intention eventually to publish a book of these paintings in colors. Annually since 1937 when The Bulletin published the first of the series Mr. Kirkland has prepared well written, beautifully illustrated, articles on Texas Indian pictographs and petroglyphs for publication therein.

His work was unique in that he was the first person to copy *every legible picture* in a cave or shelter to an *exact scale* and in *color.*

Mr. Kirkland was a member of the Dallas Art Association and organized and was President of the Dallas Archeological Society, Director in the West Texas Historical and Scientific Society, member of the Society for American Archaeology, American Association for the Advancement of Science, Regional Vice-President of the Texas Archeological and Paleontological Society, and Fellow of the Texas Academy of Science.

His work had won much recognition in American art circles, and his pictographs were shown at the Addison Gallery of American Art May 20-June 19, 1938, also at The Buffalo Museum of Science, Buffalo, N. Y., in 1940. The entire collection was shown at the Hall of State, Dallas Historical Museum, and the Dallas Museum of Fine Arts intends to show his works soon.

Texas art and science have both lost a master craftsman in Forrest Kirkland.



FORREST KIRKLAND

EMMETT MACON LANDERS

Emmett Macon Landers, long a member of the Texas Archeological and Paleontological Society, died on April 9, 1942. He was born at Jacksonville, Alabama, on December 14, 1889, and at the age of five came to Taylor County with his parents. He completed his undergraduate work at Hardin-Simmons University in 1914, and received the Master of Arts degree from that school in 1927. He taught in the public schools of Odessa and Abilene; served in the United States Army during the first World War; was educational director of the First Baptist Church of Abilene; and from 1926 until his death was a member of the faculty of Hardin-Simmons.

Mr. Landers was secretary of the West Texas Historical Association and was active in the work of the Texas Archeological and Paleontological Society. Genial, kindly, and ever considerate of others, he left behind a host of friends who grieve at his passing.

DR. JULIUS OLSEN

Dr. Julius Olsen, who died on September 15, 1942, was one of the founders of Texas Archeological and Paleontological Society in October, 1928, and had been elected First Vice-President of the Society each year since then until 1942, when he was elected Honorary First Vice-President for life.

He was born in Chicago, Illinois, May 5, 1873, obtained the B. S. degree in Bethany College in Lindsborg, Kansas, in 1898, and the Ph. D. degree in Yale in 1922, did graduate study in the University of Berlin in 1905, and Cambridge University in 1906. He married Clara Nelson of Norway, Kansas, December 25, 1902.

Dr. Olsen was Dean and Head of the Departments of physics and chemistry in Hardin-Simmons University 1910-26 and Head of Department of physics since 1926.

He was listed in Who's Who in America, and was one of the few Texas scientists listed in American Men of Science, was a Fellow of The A. A. A. S., a member of The American Physical Ass'n., and Ex-President of the Scholarship Society of the South, now known as Alpha Chi.

A man of diversified scientific and scholarly interests, keenly interested in astronomy, archeology and paleontology, and well versed in many other subjects.

He was a sincere Christian gentleman of the highest type, was forthright and plain spoken, and a hater of shams of all kinds.

Texas scholars and scientists have suffered an irreparable loss in his passing.

DR. JULIUS OLSEN

NEWS NOTES AND EDITORIALS

ANCIENT ARTIFACTS AND MAMMOTH'S TEETH OF THE McLEAN SITE

In July, 1938, the writer conducted Dr. Kirk Bryan and his assistant, Samuel Vaughan, Jr., to a location in the McLean Site where he had removed the teeth of a mammoth in 1935 with the assistance of Dr. E. H. Sellards and Otto O. Watts. (1). Subsequent heavy rains in 1938 had exposed more of the animal's bones in the hard alluvium, and in the margin of the hole where the teeth had been excavated the rains had also exposed the base of a Folsom point. (2) This Folsom blade was complete except for the small tip of the point and the blade was more than three inches long. The flint had been almost in contact with the mammoth's teeth. (3) The writer had collected Folsom, Yuma and Clear Fork artifacts from this site's gullied silts ever since 1929, but no satisfactory illustrations had been previously made of them. (4) The 1938 Bulletin article should have shown the Folsom point found with the Elephas Columbi skeleton (identified by Dr. E. H. Sellards and pictured in plates 35 and 36) but the writer found it to be impossible to get good pictures of the blade in Abilene. Dr. Kirk Bryan kindly had some pictures of the McLean Site flints made, which are shown herewith. Of these Plate (30) shows two views of a typical Clear Fork gouge found in gravel near another mammoth's skeleton at a locality situated about two miles from the McLean Site. Plate (30), No. (1) shows the gouged out face of this gouge. Plate (30), No. (2) shows the convex face of the same gouge.

Plate (31), Nos. (1) and (3) shows two faces of the mid-section of a fine Folsom blade found by Floyd V. Studer of Amarillo when the writer conducted him through the McLean Site in 1929. Plate (31), Nos. (2) and (4) show the two faces of a side scraper found by the writer, buried eight feet deep in the McLean Site silt in 1929. Plate (32), Nos. (1) and (3) show both faces of a channelled blade the writer found embedded in the alluvium of the McLean Site in 1929. Plate (32), Nos. (2) and (4) are of a dart point found on the McLean Site alluvium by the writer during Dr. Bryan's visit. Plate (33), Nos. (1) and (3) show the two faces of a channelled

point found by the writer on the McLean Site's alluvium during Dr. Bryan's visit. Plate (33), Nos. (2) and (4) show the two faces of a blade found on the McLean Site alluvium in 1929 by the writer. Plate (34), No. (1) shows the long Folsom blade which was found embedded in the McLean Site Durst Silt by Bryan, Ray and Vaughan where it had been almost in contact with a mammoth's teeth. (3) Plate (34), No. (2) shows a beautifully polished Yuma point found by the writer in the Durst Silt of the McLean Site during Dr. Bryan's visit. Plate (35) shows one of the mammoth's teeth found with the Folsom blade, approximately natural size. Plate (36) shows two teeth of the mammoth's skeleton found with the Folsom blade (approximately half natural size).

Some bones of other animals were also found in the McLean Site in 1938 and during previous years, but the writer has not thus far been able to obtain identifications of them for publication.

C. N. R.

1. *Folsom Sites,* Editorials, Vol. 7, 1935, Bulletin of Texas Archeological and Paleontological Society, page 128.

2. Cyrus N. Ray and Kirk Bryan, *Folsomoid Point Found in Alluvium Beside A Mammoth's Bones, Science,* Sept. 16, 1938.

3. Kirk Bryan, *Deep Sites Near Abilene, Texas,* Vol. 10, 1938, Bulletin of Texas Archeological and Paleontological Society.

4. Cyrus N. Ray, *Report on Some Recent Archeological Researches in the Abilene Section,* subhead *A Folsom Campsite,* Vol. 2, 1930. Bulletin of the Texas Archeological and Paleontological Society, Plate 10, Nos. 1, 2, 3, 4, 5, 6.

PLATE 30

Nos. 1, 2 show both faces of a typical Clear Fork gouge.

PLATE 31

Nos. 1 and 3 show both faces of a section of a fine Folsom blade, from McLean site. Nos. 2 and 4 show two sides of a Folsom side scraper from same site.

PLATE 32

Nos. 1 and 3 show both faces of a channelled blade from McLean site. Nos. 2 and 4 show both faces of a dart point found in same site.

PLATE 33

Nos. 1 and 3 show two faces of a channelled point from McLean site. Nos. 2 and 4 show both faces of another McLean site blade.

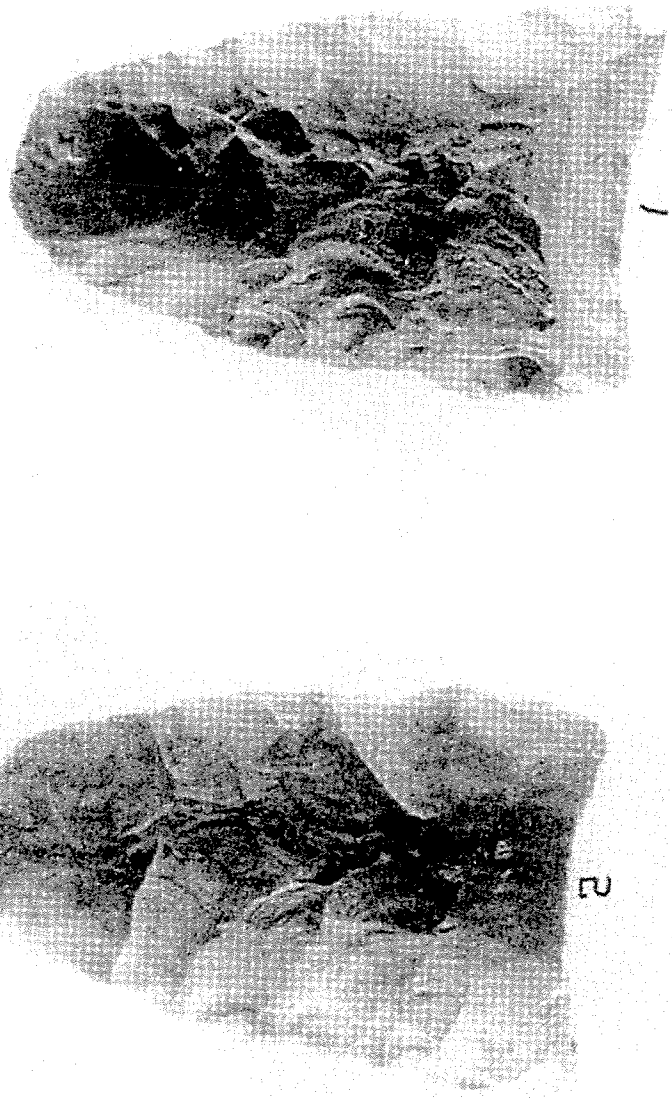


Plate 30

Plate 31

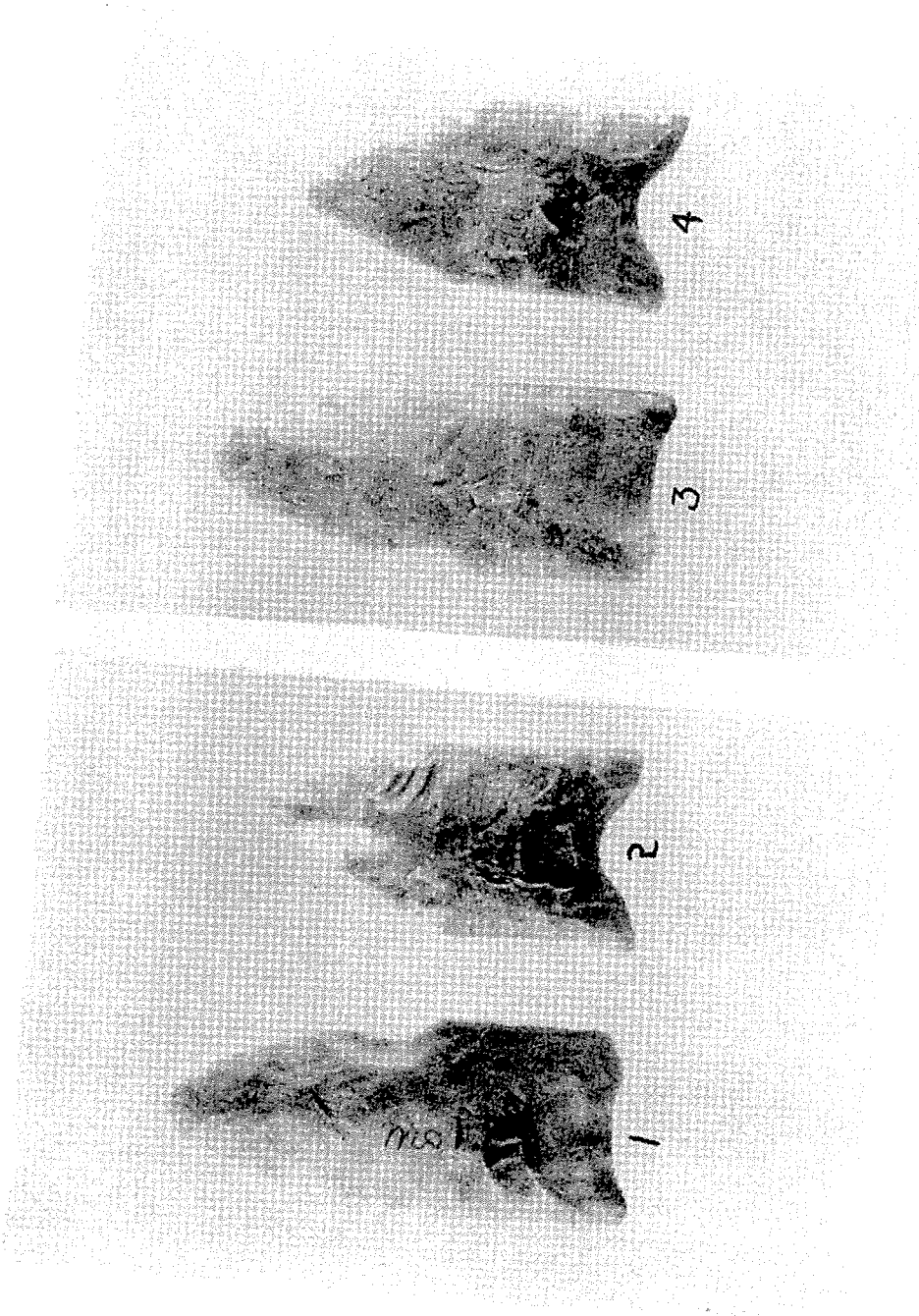


Plate 32

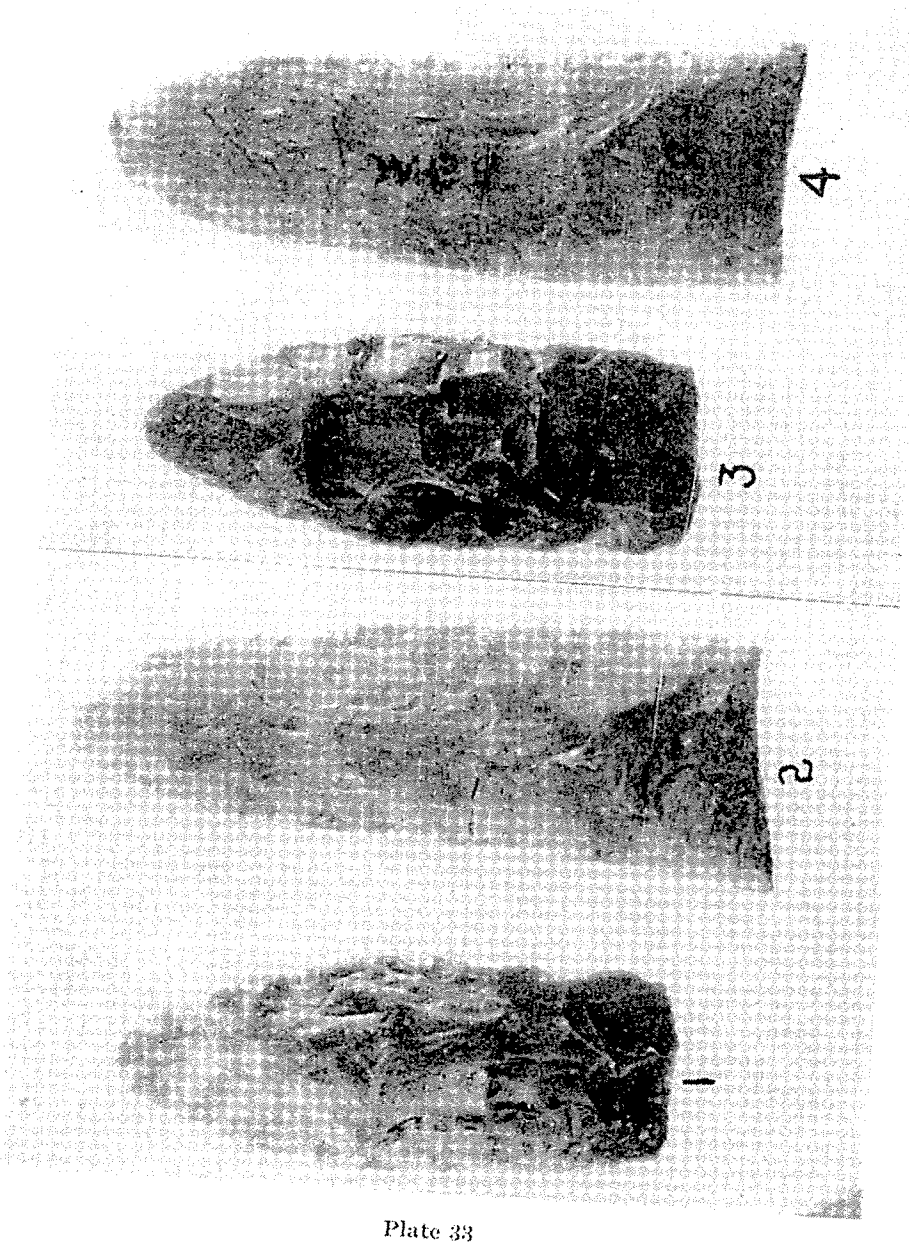


Plate 33

WHAT CAUSED THESE PERMIAN GROOVES?

In 1934 the writer found a series of parallel slickened grooves in a horizontally laid stratum of Permian limestone which forms the bed of Paint Creek near where it flows into the Clear Fork of the Brazos. The site is situated approximately thirty miles north of Albany, Texas, and is across the Brazos River west of the Matthews family ranch, known as "The Lamb's Head Ranch."

Paint Creek at the point mentioned flows approximately from west to east and is here floored by a horizontal bed of Permian limestone. In very dry periods the creek bed becomes entirely dry at this locality. The banks rise rather steeply on both sides, and on the north bank the limestone is covered by a bed of hard packed gravel. This coarse gravel is filled with various sized rounded or water worn stones; a large percentage of which are of igneous origin.

In Plate 37, No. 2 some of these rounded stones are shown.* The two large angular edged stones also pictured in No. 2 are loose blocks of the limestone composing the stream bed and came from a break in the stratum above, and have recently been washed down so as to lie on the gravel formation.

For a considerable distance the stream seems to have been cutting into the north bank and removing the gravel which overlies the stone, leaving the fresh surface of the Permian limestone exposed. On this fresh surface are a series of parallel grooves in the limestone which extend under the bed of gravel in the north bank.

This series of parallel grooves go under the bank in a northeastward direction or diagonally to the west-east direction of the present stream flow.

It has been the observation of the writer that water worn stone or wave ripple marks on limestone are rough in finish, and not polished and slickened so that they glisten in sunshine as these do.

The site is isolated and the writer has been able thus far to get only one geologist of note to see it. Unfortunately the site then had

---

*At the writer's request E. B. Sayles made the photographs, of the grooves shown in Plate (37), Nos. (1) and (2), when Sayles was being shown the site in 1934.

water in the grooves and the shine on the slickened grooves was not very noticeable, and the geologist termed them "ripple marks."

The appearance of the grooves is as though several extremely heavy objects had slid across the surface in parallel formation and in so doing had produced a series of slickened or highly polished grooves.

The polish has an appearance exactly like that produced by pushing a hard stone across a bed of damp firm clay.

The stream action flowing from west to east across the grooves which run north-eastward has entirely removed them in the center of the stream bed and the grooves are only to be seen along the north side where they have been exposed within recent years.

If heavy masses of ice formed during a Permian period of glaciation and moved across previously formed limestone, it seems that this might be a possible explanation of the slickened grooves. However nothing else suggesting such a theory has thus far been found.

The writer directs the attention of competent geologists to this unusual site, and would like to have a satisfactory explanation of it.

C. N. R.

PLATE 34

No. 1 shows a long Folsom blade found embedded in the alluvium of the McLean site with a mammoth's bones and teeth. This picture is much larger than the blade, which actually is 3 9/32 inches long by 1 1/16 inches across. No. 2 is also greatly enlarged in this picture. The actual size of this Yuma blade is 3 1/16 inches long by 1 1/8 inches wide. These pictures were enlarged to bring out the fracture marks more plainly. No. 2 seems to have been polished all over to remove most of the fracture marks.

PLATE 35

Shows one of the mammoth's teeth found with the Folsom blade in the McLean Site. Approximately natural size. (Photographs shown in Plates 35-36 by E. H. Sellards).

PLATE 36

Shows two teeth of the mammoth's skeleton found with the Folsom blade in the McLean Site. Approximately half natural size.

PLATE 37

Nos. 1 and 2 are two views of a series of highly polished parallel grooves in the top of a horizontal stratum of Permian limestone.

Plate 34

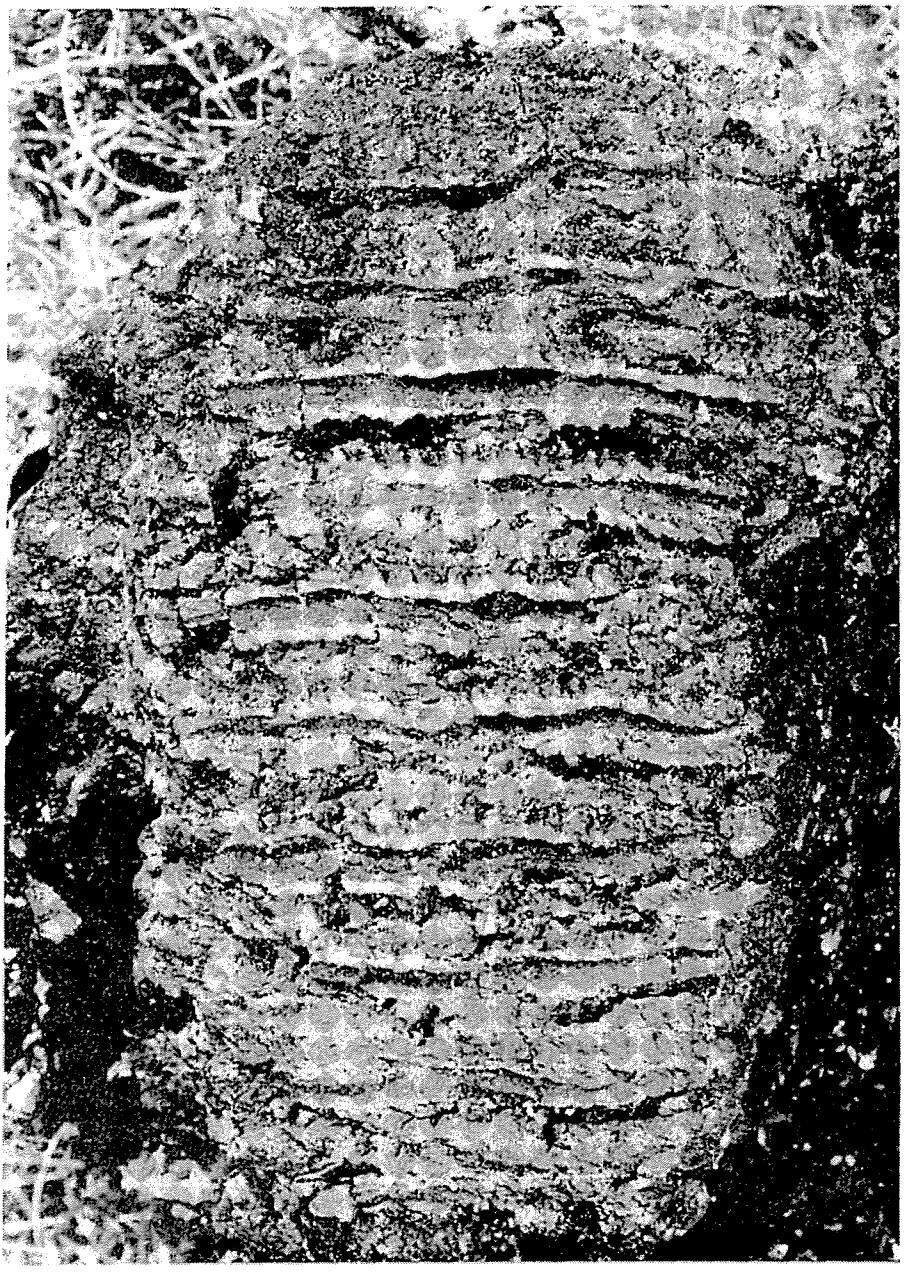
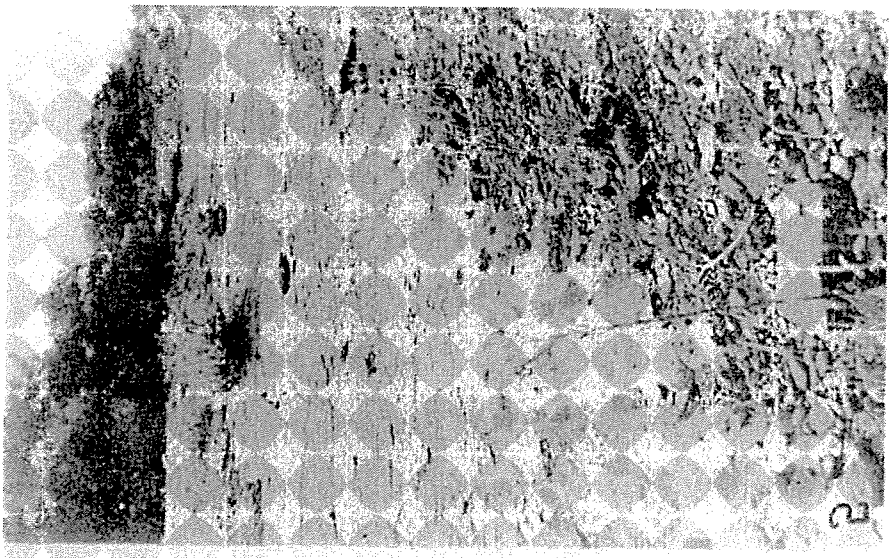


Plate 35

Plate 36



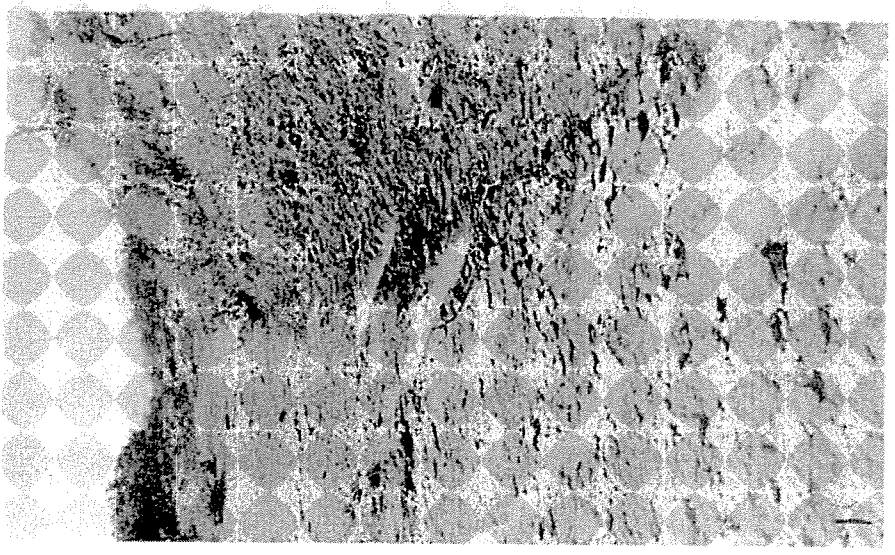


Plate 37

REPORT OF THE SECRETARY-TREASURER OF THE TEXAS ARCHEOLOGICAL AND PALEONTOLOGICAL SOCIETY

Report for the period from the annual meeting on October 25, 1941, to October 1, 1942:

RECEIPTS

Balance on October 25, 1941	$365.88
Fifty-six memberships, 1940-41	168.00
Fifty-nine memberships, 1941-1942	177.00
Sixty-eight Bulletin sales	204.00
Annual meeting collections	39.00
Total	$953.88

DISBURSEMENTS

Balance paid on 1941 printing bill	$315.65
Balance paid on cuts for 1941 Bulletin	102.00
Expenses for the annual meeting	29.00
Museum upkeep	5.70
Used from the Bridwell Excavation Fund	10.00
Typing expenses for the President	2.25
Stationery and office expenses for the Secretary-Treasurer	26.85
Total	$491.45
Bank balance on October 1, 1942	$462.43

Accounts Payable:

For 300 copies of 1942 Bulletin .....
For engravings in 1942 Bulletin .....

MEMBERSHIP LIST 1941-1942

HONORARY MEMBERS

Harold J. Cook, Cook Museum of Natural History .....Agate, Neb.
Albert G. Ingalls, Associate Editor,
Scientific American .....New York City, N. Y.
*Dr. Julius Olsen, Deceased .....

MEMBERS

Abilene Chamber of Commerce .....Abilene, Texas
Abilene Printing & Stationery Co. .....Abilene, Texas
American Museum of Natural History .....New York City, N. Y.
American Philosophical Society .....Philadelphia, Pa.
A. E. Anderson .....Brownsville, Texas
A. W. (Pete) Anderson .....Clovis, N. M.
Dr. K. H. Aynesworth, 601-602 Praetorian Bldg. .....Waco, Texas
Max W. Ball .....Box 156, Edmonton, Alberta, Canada
D. A. Bandeen, West Texas Chamber of Commerce ....Abilene, Texas
H. J. Bass .....Abilene, Texas
Baylor University Library .....Waco, Texas
Joe Benton .....Nocona, Texas
Dr. Kirk Bryan, Harvard University .....Cambridge, Mass.
John P. Byram .....Abilene, Texas
C. M. Caldwell .....Abilene, Texas
Price Campbell .....Abilene, Texas
T. N. Campbell, University of Texas, Dept. of
Anthropology .....Austin, Texas
Mrs. Elizabeth W. Crozer Campbell .....Twenty Nine Palms, Calif.
Sam Chamberlain .....Refugio, Texas
Cleveland Public Library .....Cleveland, Ohio
Columbia University Library .....New York City, N. Y.
Dr. Stewart Cooper .....Abilene, Texas
Cox, Hunter, Hall Agency .....Abilene, Texas
Col. M. L. Crimmins, 312 Genesco Road .....San Antonio, Texas
Dallas Public Library .....Dallas, Texas
J. Walter Davenport, Witte Memorial Museum ....San Antonio, Texas
E. C. DeMontel, 537 Harvey-Snider Bldg. .....Wichita Falls, Texas
Denver Art Museum .....Denver, Colo.

Ellis Douthit .....Abilene, Texas
William A. Duffen .....Baldwin, Md.
Duke University Library .....Durham, N. C.
George L. Edwards .....Box 57, Donna, Texas
Prof. Loren C. Eiseley, University of Kansas .....Lawrence, Kans.
Henry E. Elrod, 316 Petroleum Bldg. .....Houston, Texas
Field Museum of Natural History .....Chicago, Ill.
R. E. Forrester .....Moran, Texas
W. C. Fritz, Skelly Oil Co. .....Midland, Texas
W. S. Fulton, 170 Hillside Ave. .....Waterbury, Conn.
Judge O. C. Funderburk .....Eastland, Texas
Prof. J. Joe Finkelstein, University of Tennessee .....Knoxville, Tenn.
Gila Pueblo .....Globe, Ariz.
Powell Goodwin .....Archer City, Texas
C. W. Hanley, 2307 Fifth Ave. .....Fort Worth, Texas
R. K. Harris, 9024 Roanoak St. .....Dallas, Texas
R. W. Haynie .....Abilene, Texas
Mrs. Dwight B. Heard, Heard Museum .....Phoenix, Ariz.
Dr. T. W. Hedrick .....Abilene, Texas
Prof. Curtis J. Hesse, Texas A. & M. College ....College Station, Texas
Prof. Frank C. Hibben, Univ. of New Mexico ....Albuquerque, N. M.
Peter Hinsch, 2002 1st Ave. S. .....Fort Dodge, Iowa
Dr. T. L. Hodges .....Bismark, Ark.
Dr. W. C. Holden, Texas Technological College .....Lubbock, Texas
Houston Public Library .....Houston, Texas
J. C. Hunter .....Abilene, Texas
Instituto Panamericano de Geografia e Historia; Avenida del Ovservatorio Num. 192 .....Tacubaya D. F., Republica Mexicana
A. T. Jackson, University of Texas, 508 E. 46th St. .....Austin, Texas
Henry James .....Abilene, Texas
Morgan Jones .....Abilene, Texas
Percy Jones .....Abilene, Texas
Roland Jones .....Abilene, Texas
Harold M. Kautz .....Sterling City, Texas
*Forrest Kirkland, Deceased .....
Mrs. Forrest Kirkland .....Dallas, Texas
Laboratory of Anthropology .....Santa Fe, N. M.
*Prof. E. M. Landers, Deceased .....
R. B. Leach .....Abilene, Texas

Eli Lilly, 5807 Sunset Lane ..... Indianapolis, Ind.
Judge Harry J. Lemley ..... Hope, Ark.
La Retama Public Library ..... Corpus Christi, Texas
Mary Reed Library, University of Denver ..... Denver, Colo.
Dr. J. G. McAllister, Dept. of Anthropology,
University of Texas ..... Austin, Texas
Metropolitan Museum of Art Library ..... New York City, N. Y.
Museum of American Indian, Heye Foundation, New York City, N. Y.
The Newberry Library ..... Chicago, Ill.
New York Public Library ..... New York City, N. Y.
Northwestern University Library ..... Evanston, Ill.
Oklahoma A. & M. College Library ..... Stillwater, Okla.
Miss Magdalen Payne ..... Trent, Texas
Peabody Museum of Archeology and Ethnology,
Harvard University ..... Cambridge, Mass.
H. A. Pender ..... Abilene, Texas
Phillips Academy Library ..... Andover, Mass.
Judge Hermon C. Pipkin ..... Amarillo, Texas
Omar Radford ..... Abilene, Texas
Dr. Cyrus N. Ray, Box 62 ..... Abilene, Texas
Erik K. Reed, Box 461 ..... Santa Fe, N. M.
Rev. Henry Retzek, St. Alexius Church ..... West Union, Minn.
P. M. Rice ..... Hamilton, Texas
Dr. R. N. Richardson, Hardin-Simmons University .... Abilene, Texas
Thomas E. Roberts ..... Abilene, Texas
Rosenberg Library ..... Galveston, Texas
San Diego Scientific Library, Balboa Park ..... San Diego, Calif.
N. A. Sansteby, 535 Hoefner Ave. ..... Los Angeles, Calif.
E. B. Sayles, Gila Pueblo ..... Globe, Ariz.
Henry Sayles ..... Abilene, Texas
Dr. Ellis W. Shuler, Southern Methodist University .... Dallas, Texas
Judge O. L. Sims ..... Paint Rock, Texas
Dr. R. E. Smallwood, 144 Park Hill ..... Hot Springs, Ark.
Prof. Victor J. Smith, Sul Ross State College ..... Alpine, Texas
Smithsonian Institution ..... Washington, D. C.
Southern Methodist University Library ..... Dallas, Texas
Southwest Museum Library, Highland Park ..... Los Angeles, Calif.
Russell Stephens ..... Abilene, Texas
Floyd V. Studer, 635 Amarillo Bldg. ..... Amarillo, Texas

Mrs. Maud Durlin Sullivan, El Paso Public Library....El Paso, Texas
J. E. Swenson .....Stamford, Texas
Texas Technological College Library .....Lubbock, Texas
Texas Library and Historical Commission .....Austin, Texas
The Rice Institute Library .....Houston, Texas
Dr. Walter W. Taylor, Jr., Peabody Museum .....Cambridge, Mass.
Dr. R. H. Tull .....Abilene, Texas
Tyrrell Public Library .....Beaumont, Texas
University of Arizona Library .....Tucson, Ariz.
University of Arkansas Library .....Fayetteville, Ark.
University of California Library .....Berkeley, Calif.
University of Chicago Library .....Chicago, Ill.
University of Illinois Library .....Urbana, Ill.
University of Kansas Library .....Lawrence, Kans.
University of Michigan Library .....Ann Arbor, Mich.
University of Nebraska Library .....Lincoln, Neb.
University of New Mexico Library .....Albuquerque, N. M.
University of Oklahoma Library .....Norman, Okla.
University of Pennsylvania Museum .....Philadelphia, Pa.
University of Texas Library .....Austin, Texas
Vanderbilt University, Dr. L. C. Glenn, Dept. of Geology .....Nashville, Tenn.
W. J. Van London, 3126 Albans Road .....Houston, Texas
Waco Public Library .....Waco, Texas
P. H. Walser, 306 Robertson Ave. .....Bryan, Texas
Frank H. Watt, Box 1176 .....Waco, Texas
Dr. Otto O. Watts, Hardin-Simmons University .....Abilene, Texas
William C. Watts, 2111 23rd St. .....Lubbock, Texas
Dr. C. H. Webb, The Children's Clinic .....Shreveport, La.
C. L. West .....Hamilton, Texas
A. H. Witte .....Henrietta, Texas
Loyd D. Wolcott .....San Antonio, Texas
Lestor B. Wood, Phillips Petroleum Co. .....Houston, Texas
George T. Wright, 190 Bonham St. .....Paris, Texas
Yale University Library .....New Haven, Conn.

*Deceased

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.
