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Foreword

The Rise of Man

Through the various forms of life, from the lowest microscopic single-celled organisms of both the animal and vegetable kingdoms, up to their apices in the huge multiple-celled aggregations of life, such as the whale and the elephant on the one hand, and the higher multiple-celled forms of vegetation represented by the great oaks and elms on the other, runs the golden thread of life; a great mystery, as much a mystery today as when the first brutal prototype of man began to have glimmerings of wonder as to whence he came.

We know that certain attributes run through all of life's cellular structures, that these life cells are all built up of protoplasm, a complex jelly like substance, which always contains carbon, hydrogen, nitrogen, oxygen, and sulphur. This protoplasm is built up by plants alone and received as such by all animal life. It is reasonable to conclude therefore that plants were created first and that all of the vast tree of life has been built on this foundation.

Mendel's Law

Experimentation has shown that the Mendelian law of heredity operates in the same manner in both plant and animal life.

Paleontology unfolds for us the leaves of the book of life going back into the almost imponderable hundreds of millions of years.

We see in the hot ooze of the primordial seas a droplet of jelly charged and pulsating with life. Can it be that all that we know as life came from this? At any rate the rocks show successive stages of progression from some invisible beginning up to the culmination of all life in man.

The mind must be dull indeed which can see no wonder and romance in the records of the earth's progression. Who cannot visualize, for instance, the age of reptiles when strange vegetation covered the earth, and yet stranger beasts shook the earth with mighty tread, browsed from treetops; or when the echoes roared from hill to hill while savage reptiles, many times larger than elephants, charged in bloody combat, bellowing thunderously and slithering over and breaking down trees in their monstrous rage, while overhead hissed and flapped great satanic winged reptile dragons licking red tongues out of long fang filled jaws; the whole a picture more near to a real inferno than the morbid dream of any medieval monk.

Man's Slow Rise

Did man spring fully panoplied and equipped into the arena of life? Again paleontology and archeology show that his rise to civilization was slow and painful, and probably lasted a million years or more.

What physical attribute is there in man which distinguishes him from the lower animals? The answer is, the brain of man. And undoubtedly, the attribute of the brain of man which has made him what he is today is curiosity. When we examine the lower animals for evidences of this trait we find it most fully developed only among the order of primates. With all the rest of animal creation there seems to be little interest or curiosity concerning anything other than the most primitive fears and appetites. All of the order of primates, however, manifest almost human curiosity. Also mental tests have shown the higher forms of these to be next to man in intelligence.

Among men it has been shown that the most intelligent are those who maintain throughout life the curiosity of a little child.

In Unpromising Regions

Both historic records, and research into the prehistoric ruins of vanished civilizations, show that owing to some unseen force, civilizations

sprang up in the most unpromising regions, grew rapidly for a few thousands of years, and then when racial culture had reached its flowering, the hand that held high the torch that became the light of the world was stilled; the jungles' noxious growths covered its temples, the rattlesnake wriggled over its pavements, and the jaguar stalked through its stately mansions.

Other hands, if not indeed other races, had snatched the dying embers, and enkindled anew, the light of the world flamed yet again.

This has gone on for as yet an unknown number of thousands of years.

What is this unseen force which is behind today's as of all the vanished civilizations of the past? It is the writer's opinion that this divine flame or ferment is present in less than a thousandth part of the population of any race or people.

A nation's rulers have seldom been of this original thinker class, occasionally in the past this has been so, and genius flowering at the head of government for a few generations has produced wonderful civilizations.

One Class Led

In the Egyptian, Mayan, Incan and Aztec empires civilization flowered in the priestly class and died with them. The priests of Spain not only destroyed the cultured priests of the Mayan civilization, but also all of their literature and chronicle's, the cultural flowering of thousands of years. They left only the hewers of wood, and the drawers of water, and today the descendants of these wander stupidly among the glorious ruins produced by their past rulers, unable either to understand or to reproduce them. Some one has said that any civilization could be easily destroyed by destroying the small per cent of the population responsible for it. Today no one knows in which continent civilization is oldest.

C. N. R.

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LIST OF ILLUSTRATIONS

ARCHAEOLOGICAL INVESTIGATIONS ON BAYOU MACON IN ARKANSAS

By Harry J. Lemley and S. D. Dickinson

Progress has been made in recent years toward the establishment of an archaeological chronology for the lower Mississippi Valley area. Henry B. Collins, Jr., Jas. A. Ford and Moreau B. Chambers, the pioneers in this task, have approached the problem in Mississippi and Louisiana by way of "the historic method of attack," using potsherds found on known historic sites as a basis, and working backwards from the standpoint of time.

In 1925, Collins collected sherds from four historic Choctaw sites in Eastern Mississippi (1); in 1927-28-29, Ford and Chambers did a large amount of exploring in the Tunica area in Western Mississippi and collected sherds from the historic Haynes Bluff site on the Yazoo River; in 1930, Chambers explored and collected pottery from the historic Natchez site on the Fatherland plantation near Natchez, Mississippi; and in 1933 and succeeding years, Ford collected sherds from the historic Caddo site on the Wilkinson Place in Natchitoches Parish, Louisiana, and elsewhere in the Caddo area in that state. Upon the pottery collected by these gentlemen and certain vessels exhumed by Clarence B. Moore from sites in the area yielding trade objects, the determination of the historic Choctaw, Natchez, Tunica and Caddo pottery complexes is based.

In 1929, Collins, associated with Ford and Chambers, explored the prehistoric site on the Pepper Place near Deasonville, Mississippi, and found sherds of a coarse ground-potsherd tempered ware, a large per cent of which were either cord marked or painted (2), but found no sherds of the historic Choctaw, Tunica and Natchez complexes; Ford and Chambers, thereafter explored ten other prehistoric sites in Mississippi yielding a similar type of sherds; and from this evidence the prehistoric Deasonville complex was determined.

Along with the predominant cord marked and painted ware discovered at Deasonville, some sherds bearing a different type of decoration characterized by overhanging lines parallel to the rim, and resembling somewhat the pottery of the West and Northwest Florida coast, were found. These were of a style similar to sherds found by Ford and Chambers on prehistoric sites in Western Mississippi and Eastern Louisiana. This complex, the Coles Creek, Ford states was first recognized at a site on Coles Creek near Fayette, Mississippi (3). On the Coles Creek sites at least a few of the Deasonville sherds were found, and vice versa, thereby indicating that the two complexes were contemporaneous, at least in some areas.

Upon certain of the type sites of the prehistoric Deasonville and Coles Creek complexes a few sherds decorated either with "smooth bands outlined by incised grooves" with a roughened background, or by "deeply incised concentric and parallel lines closely spaced," were found. These were of the type of ware unearthed by Fowke (4) in 1926, and later by Setzler, at the prehistoric site near Marksville, Louisiana, Setzler having recognized in the meantime that the pottery exhumed by Fowke was of the Hopewell culture found in Southern Ohio and adjacent areas (5). To this complex of the Southern aspect of the Hopewellian phase the name of "Marksville" has been given. A few village sites, predominantly Marksville, have been explored by Ford in Louisiana.

In 1933, in excavating a deep midden on the Peck Place near Sicily Island, Louisiana, yielding sherds of the Deasonville, Coles Creek and Marksville complexes, Ford (6) secured evidence indicating that pottery of the Marksville complex was in use, at least by the people who made refuse deposits in a part of the midden, at an earlier period than that of the Deasonville and Coles Creek.

From the data obtained as a result of the explorations above mentioned, Ford in his "Outline of Louisiana and Mississippi Pottery Horizons" (7) has suggested a chronology of three pottery

sequences for Louisiana and Mississippi; the latest, Choctaw, Natchez, Tunica and Caddo complexes; the intermediate, Deasonville and Coles Creek; the oldest, Marksville. Accompanying his paper is a map showing the distribution of these pottery complexes within those parts of the states of Louisiana and Mississippi so far explored.

Incident to the problem of establishing a chronology is the determination of the area covered by each complex and the intrusion of other complexes therein.

The Caddo complex, as is well known, extends into Arkansas and Texas. Moore (8) and Harrington (9) found Caddo ware almost exclusively in the Red and Ouachita River Valleys in South central and southwest Arkansas, and Jackson (10) and Pearce (11) in a part of the Red River area of Northeast Texas. Pottery of the Coles Creek complex, but in some details suggestive of Marksville, was found by Lemley (12) in 1935 with burials at the prehistoric Crenshaw site on Red River, Miller County, Southwest Arkansas. In certain mounds on this site vertical stratigraphic evidence was obtained of occupancy by the Caddoes, and also by a pre-Caddo group who buried vessels of the Coles Creek complex with their dead. The relationships of this ware were discussed by Dickinson in Vol. 8 of this bulletin (13). No pottery of the Deasonville complex was discovered on the Crenshaw Place.

In 1934, the writers of this paper undertook a joint expedition into the Bayou Macon area in Southeast Arkansas, headed by S. D. Dickinson. Two months were devoted to the project. In mounds on various prehistoric sites in that section, shell tempered ware, believed to have been of a late prehistoric culture and resembling the pottery of the Tunica complex, was found with burials. In a few instances this ware was with vessels related to pottery of other types found elsewhere

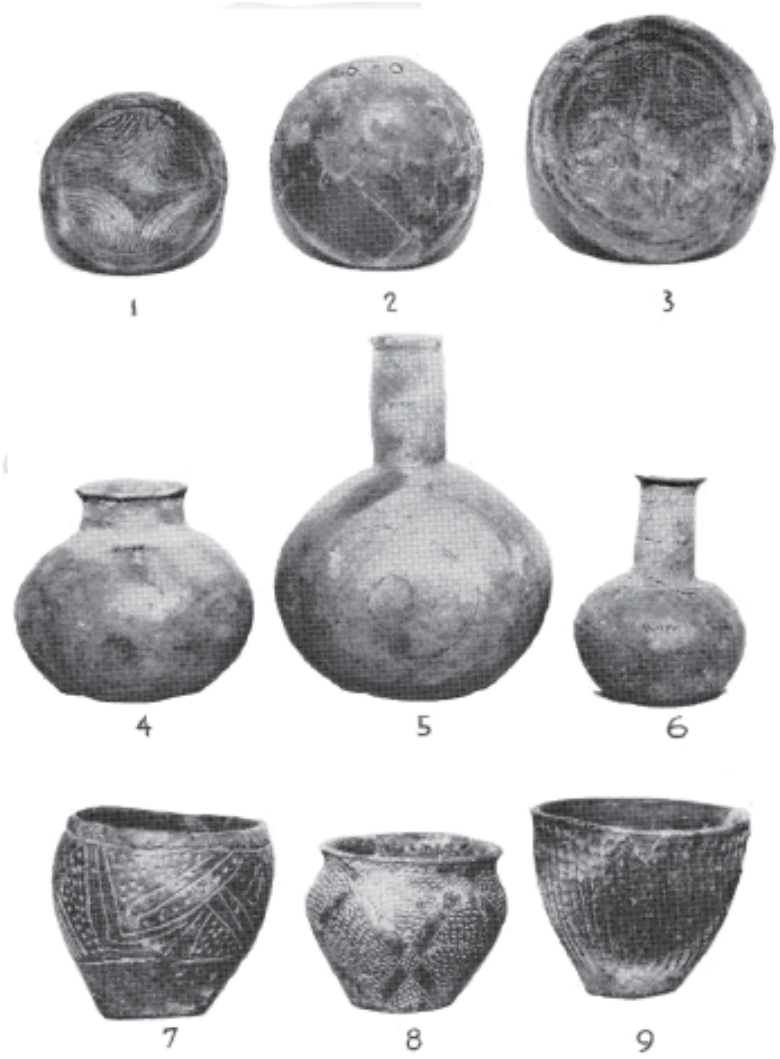

PLATE 1.

No. 1. Vessel V-1743, Mound Grimes Place.
No. 2. Clay Rattle, V-1183, Burial 13 Cemetery Jones Place, Hog Lake Site.
No. 3. Vessel V-1182, Burial 13 Cemetery Jones Place, Hog Lake Site.
No. 4. Vessel V-1181, Burial 13 Cemetery Jones Place, Hog Lake Site.
No. 5. Vessel V-1221, Mound Wolff Place, Rohwer Site.
No. 6. Vessel V-1174, Burial 2 Mound B Medley Place, Hog Lake Site.
No. 7. Vessel V-1223, Mound Brown Place, Rohwer Site.
No. 8. Vessel V-1222, Mound Brown Place, Rohwer Site.
No. 9. Vessel V-1136, Gibson Mound.

within the state of Arkansas. In middens and on the surface of certain of these sites, sherds of the Deasonville and a few of the Marksville complexes were found. Several entire vessels and other pottery objects of, or related to, the earlier complexes were exhumed.

In the hope that our work on the Bayou Macon may assist to a limited degree in the determination of the areas covered by the pottery complexes of Louisiana and Mississippi and at the same time contribute to the archaeology of Arkansas, this paper is presented.

Our interest in this particular section had been aroused by Mr. George P. Kelley, of Halley, Arkansas, who had previously shown us a number of pottery vessels unearthed by him in that locality. Our thanks are due to him and also to Mrs. Alma Brown, of Rohwer, Arkansas, for many courtesies shown the expedition. We are indebted to Mr. James A. Ford, of Louisiana State University, for assistance in the classification of the pottery found by us, and for the loan of type collections of sherds of the Marksville, Coles Creek and Deasonville complexes used for comparison purposes, and especially for permission to study a copy of his comprehensive manuscript now being published by the Louisiana Department of Conservation as its "Anthropological Study No. 2," entitled "Analysis of Indian Village Site Collections from Louisiana and Mississippi." We are also indebted to Mr. Frank M. Setzler, Acting Head Curator of the Department of Anthropology, Smithsonian Institution, for assistance through correspondence in classifying the sherds of the Marksville complex and related objects found by us; and to Dr. P. F. Titterington, of St. Louis, Missouri, for X-Rays and photographs of our material made by him.

The Bayou Macon is a sluggish stream located between Bayou Bartholemew and the Mississippi River. It heads in Desha County, Arkansas, about six miles east of Winchester and flows south through Southeastern Arkansas and Northeastern Louisiana, emptying into the Tensas River.

The French explorers who came into this area during the latter part of the 18th century found no permanent Indian settlements between the Quawpaw village at the mouth of the Arkansas River, Arkansas, and the Taensa towns on Lake St. Joseph, Louisiana, but encountered the Korea tribe of the Tunica group, whose settlements were on the Yazoo River in Mississippi, hunting and making salt in the upper Bayou Macon region (14), and, according to Swanton's ethnological map of the Indian tribes of the lower Mississippi valley (15), the area under consideration in this report belongs to Tunica territory. Moore (16) explored most of that part of the bayou lying within the state of Louisiana, and Ford collected sherds on the Neal Place (referred to by Moore as the Jackson Place) in West Carroll Parish, Louisiana, but no detailed report, to our knowledge, has heretofore been made on that part of the stream situated within the state of Arkansas. Moore's work in Southeastern Arkansas was done on Bayou Bartholemew (17) and the Saline (18) and Mississippi Rivers (19).

Hog Lake Site

Mr. Kelley had found burials on Hog Lake, an old channel of Bayou Macon, near Halley, Arkansas, and, as a consequence, our investigation began there. This site, showing evidences of aboriginal occupancy for three quarters of a mile along the east side of the lake and including three mounds, is located in Chicot County, Arkansas, just south of the Desha County line, mostly in Sec. 4, Twp. 14 S., R. 2 W., but extending a short distance north into Sec. 33, Twp. 13 S., R. 2 W. The properties upon which the site is located belonged at the time to ex-Governor Harvey Parnell, Webster Medley, colored, and Laura Jones, colored, the Medley place being in the NW¼ of NE¼ of Sec. 4, the Jones place in the NW¼ of SE¼ of the same section, and the Parnell plantation covering the remainder of the site, and surrounding the two smaller tracts.

Evidences of Older Culture On Site

Over the surface of the greater part of the Hog Lake Site fragments of pots and bowls (but none of bottles) of a rather thick, heavy, grit tempered ware were in evidence. Most of these sherds were of undecorated brown and dark gray pottery, having

either a plain or a notched rim; a few were plain except for a rather indistinct undecorated band encircling the rim and outlined below by a faint line; many of them bore the cord marked decoration of the Deasonville complex; a very few, the typical decorations of the Marksville complex; one of the sherds had deeply incised overhanging lines parallel to the rim (Coles Creek); and several of the undecorated rim sherds bore projections or lugs. A few of the sherds were covered both inside and out with a light red slip. These potsherds of the older complexes from the Hog Lake site were similar in most details to those found by us on other sites hereinafter mentioned, and their types are discussed more fully in our classification of the sherds from the Alma Brown place, *infra*.

The most abundant surface remains on the entire site were on the Parnell plantation south of the Medley line, but extensive digging here uncovered but one burial, a poorly preserved one found just beneath the surface. The plow had apparently destroyed the remaining burials at this point. This skeleton, an adult, measured 5' and was extended on its back with head to the northwest and arms crossed on its breast. No furniture was found with the burial. A number of Deasonville sherds were found in the digging around the skeleton, but none of the later complex. About 50' northwest of the burial was a refuse pit. A number of cord marked Deasonville sherds were in this pit and at the bottom of it were the remains of a large square bottomed pot, V-1177, of heavy, plain dark gray-brown, grit tempered ware, which has since been restored (catalog, rather than field numbers of artifacts, are given). This vessel probably belongs to the Deasonville complex, since sherds of that complex only were found in the trash pit.

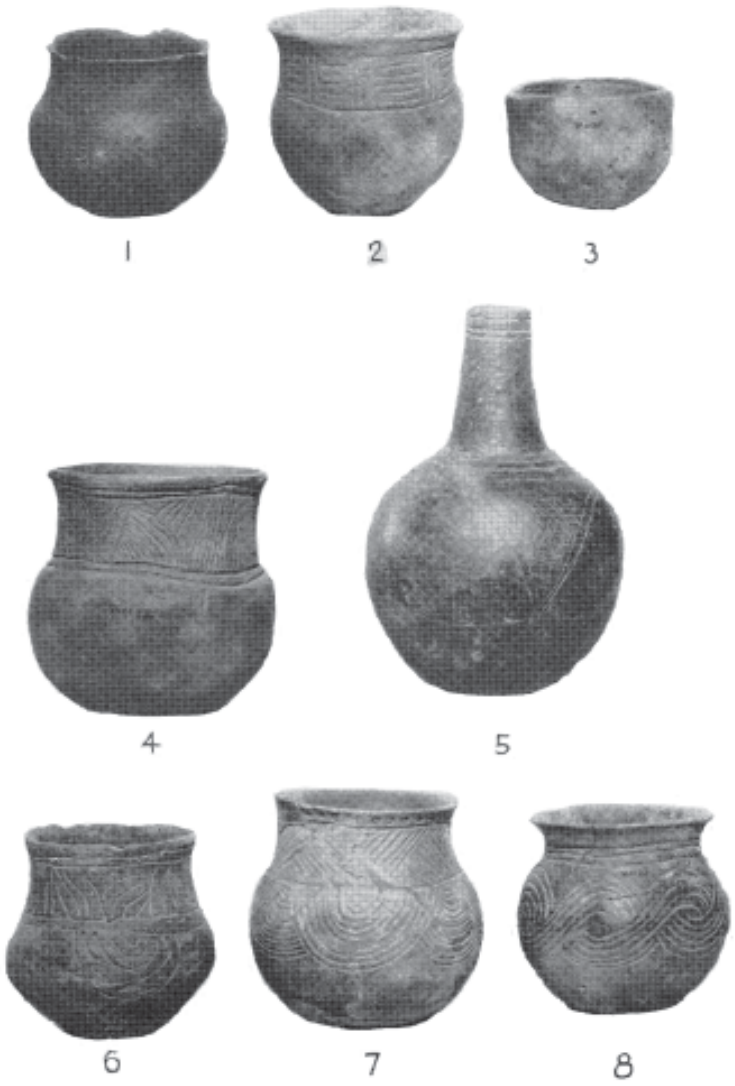

PLATE 2.

No. 1. Vessel V-1138, Burial 4, Cemetery, Westlake Place.
No. 2. Vessel V-1180, Burial 3, Cemetery, Jones Place, Hog Lake Site.
No. 3. Vessel V-1176, Burial 11 Mound B, Medley Place, Hog Lake Site.
No. 4. Vessel V-1184, Burial 14, Cemetery, Jones Place, Hog Lake Site.
No. 5. Vessel V-1178, Burial 1, Cemetery, Jones Place, Hog Lake Site.
No. 6. Vessel V-1176, Burial 8 Mound B, Medley Place, Hog Lake Site.
No. 7. Vessel V-1172 near Burial 9 Mound B, Medley Place, Hog Lake Site.
No. 8. Vessel V-1135, Burial 1 Mound B, Medley Place, Hog Lake Site.

A house site, the hard packed, irregularly shaped floor of which measured 11' x 7 ½' was discovered about 200 yards south of the burial referred to. At the time of the destruction of the dwelling the walls had collapsed and had fallen on the floor. The plastering was 4" in thickness. Immediately south of the house were the remains of rotted poles. There was no evidence of a fireplace within the dwelling, neither could any opening be seen. Cord marked and plain heavy sherds were found around the sides and beneath the floor, but none of the later complex. Similar sherds were also found in a small mound on the Parnell plantation north of the Medley line, but no burials.

EVIDENCES OF LATER CULTURE ON SITE

In two mounds on the Medley Place and in cemeteries on the Jones and Parnell Places, burials, which we believe to be Tunican, were found.

Mounds, Medley Place
Mound "A"

Mound "A", roughly circular, approximately 45' in diameter and 4' high, was badly damaged. Its base was a low natural elevation. It had been dug into by Mr. Kelley. He reported that he found a number of burials, all bunched with the exception of one, which was flexed, that but few pottery vessels and no stone artifacts were with the burials, and that the pottery was in all instances near the skull. He noted the absence of lower jaws in the bunched burials. The pottery discovered by him is of the general type found by us with burials on the Medley Place. Mr. Kelley courteously presented us with one of the finest specimens, V-370, a tall graceful vase of porous yellow clay with a short flaring neck, the body of which is decorated with incised interlocking scrolls and the neck with three deeply incised encircling lines. This mound was completely explored by us but yielded nothing other than a skull without a lower mandible, and numerous other bones. The fact that no lower jaw bone was found with this skull appears significant in view of Mr. Kelley's observation. We know of no other discoveries in this area of the absence of lower mandibles from burials, but Ray reports finding with stone slab cist burials in the Abilene, Texas, region, six skulls from which the lower jaws had been removed, the remaining bones, including all of the upper jaws, being present. Five of these burials were found in his "Roberts Covered Mound, 3" (20) and the remaining one in his "Alexander Covered Mound, 1" (21).

The sherds gathered throughout the digging in this mound were shell tempered and of Tunica ware. We secured a vessel, V-1093, from Medley, which he stated was plowed up on the mound in the spring of 1933. It is a small pot of heavy polished black ware, the rim of which is decorated with a band of closely spaced horizontal lines formed by brushing with fibers.

Mound "B"

Mound "B", situated about 300' northwest of Mound "A" and directly on the bank of Hog Lake, was approximately 50' x 30' and 10' high, and was composed of a mixture of sand and clay. It had evidently been used for domiciliary purposes since pieces of plaster from an aboriginal house and the remains of beams were found in the course of our digging. This mound was of service during the flood of 1927, and permission to excavate was given only on condition that the sides be not disturbed; hence, the summit plateau only was explored. This area was packed and had the appearance of not having been dug into except in one place near the southern end, where Mr. Kelley had made a small excavation and found an "L"-shaped pipe. Directly beneath the surface was a layer of black soil, and all of the burials found by us were in this layer, at depths of from 2" to 8".

Burial No. 1 was an adult, extended on its back with head to the west. At the left of the skull was a medium sized urn, V-1135, of porous yellow-brown ware, decorated with crude incised interlocking scrolls broken by horizontal, parallel lines.

Burial No. 2 was an adult, extended, with head to the north. Its skull was about 7" southwest of that of No. 1. Against the left side of the skull a plain water bottle, V-1174, of yellow ware having a short, wide neck, was found.

Burial No. 3, directly under the torso of No. 2 with a thin layer of soil between, was an adult extended with head toward the northeast. At the top of the skull was a medium sized bottle, V-1134, of yellow ware, decorated with a well executed design based on the interlocking scroll, and having a short, wide neck.

Burial No. 4, a skull with no other bones and pointing south, was approximately 1 ½' west of the right tibia of No. 2; no furniture.

Deposit of Bones. Just under the surface about 1 ½' south of No. 2 was a deposit of bones, principally tibiae and femora; presumably, bunched burials. Nearby was a portion of a small undecorated bowl.

Burial No. 5, a flexed skeleton, headed south and facing west, was discovered 12 ½' south-southwest of No. 2. These were the only skeletal remains found in the mound which were fairly well preserved. No furniture.

Burial No. 6, a skull headed south and facing west with no other bones, was found 6" west of the cranium of No. 5. No offerings.

Burial No. 7, an adult extended with head to the south, had been placed directly above Nos. 5 and 6. At the left side of the skull was a small globular pot, V-1173, of thin yellow ware, plain except for a band of incised diagonal lines around the rim.

Burial No. 8, the upper part of a skull consisting of parts of the frontal, parietal and occipital bones, was 2 ½' east of No. 5 and headed south. On its west side was a medium sized globular pot, V-1175, of thin, dark brown ware, decorated with incised continuous interlocking scrolls. Three parallel incised lines encircled the base of the rim. In our collection is a vessel from the Saline River, Ashley County, Arkansas, having an identical decorative pattern.

Burial No. 9, about 15" southwest of No. 8 was a skull without other bones, on its side, facing west. Directly against its face was a beautiful water bottle, V-1170, of yellow paste, tempered with a high percentage of shell. The neck was painted red and the body bears a design composed of red and white interlocking scrolls arranged in a somewhat swastika-like manner. This vessel resembles in color and design, but not in shape, certain tall, wide necked bottles found on the St. Francis and Mississippi Rivers in Northeastern Arkansas, and, in that its decoration is based on the scroll, is not unlike the short, small necked, red and white painted bottles of the Arkansas River area. With this bottle was part of a small bowl of dark brown ware, the rim of which is decorated with a band of incised, nested triangles enclosing parallel diagonal lines.

Two feet northwest of burial No. 9 an urn of thin yellow ware, V-1172, was discovered. The design is composed of concentric semicircles, or festoons, on the body of the vessel, and a nested triangular pattern, with punctate units, about the rim.

Burials Nos. 10 and 11. Ten inches south of the bottle in No. 8 was a skull pointed south. About 7" east of this skull was another similarly placed. No other bones were with these skulls. At the east side of the latter skull was a medium sized, undecorated cooking pot, V-1176, of porous, thin, black ware, having a conical base. Spots of soot were on the sides.

In the general digging in the summit plateau of Mound "B", a number of sherds of the Deasonville complex were found. The manner in which these were scattered indicated that, in the course of the building of the mound, some dirt had been gathered from the trash pits of the people of the older culture.

Cemetery, Jones Place

On the Jones place in the southern part of the Hog Lake site, an orderly cemetery of the later culture was found. The burials were directly under the surface, the bones in poor condition and, in several instances, damaged by the plow. All of the burials except No. 2 were headed south of west, were parallel, fairly uniformly spaced, and averaged about two feet apart. Except where otherwise noted, the skeletons were extended on their backs.

Burial No. 1 included an adult, 5' 4", and an adolescent measuring 3' 2" with the skull of the

adolescent partially on the right shoulder of the adult. At the north side of the feet of the adult, were numerous bones, including femora, tibiae, lower mandibles, ribs and vertebrae. At the left of the adult's skull was a rather large, shell tempered urn, V-1178, of dark gray-brown ware, below the rim of which is a wide encircling band of incised nested triangles containing parallel diagonal lines. The carapace of a terrapin was found in this vessel. At the left of the adult's skull was a rather large semi-globular bowl of yellow ware, plain except for shallow, widely spaced notches on the rim. Just south of the skull of the adolescent was the lower part of a water bottle of plain, porous, dark gray ware, the remainder of which had been destroyed by the plow.

Burial No. 2, the lower extremities of which were found 2' northwest of the skull of the adult in No. 1, was an adult headed northwest. The skull had been partially destroyed by the plow. No artifacts.

Burial No. 3 measured 5' 7". At the top of the skull were a small, crudely made elbow pipe of plain yellow clay and a medium sized urn, V-1180, of dark, gray-brown ware, decorated with an incised rectilinear design composed of parallel horizontal lines, cut into groups by parallel vertical lines.

Burial No. 4 included an adult extended, measuring 5' 2", and a bunched burial, consisting of leg and arm bones which were placed to the left of the lower extremities of the former. At the top of the skull of the extended skeleton was a bottle of plain yellow ware.

Burial No. 5 measured 5' 11". No artifacts.

Burial No. 6 was 5' 9" in length. Beneath the skull on the right side was a crudely made bone pin, 5 1/8" long, and a small oval piece of shell; presumably ornaments for the hair.

PLATE 3.

No. 1. Vessel V-1139, Burial 1 Cemetery, Westlake Place.
No. 2. Vessel V-1177, Refuse Heap, Parnell Place, Hog Lake Site.
No. 3. Vessel V-370, Mound A, Medley Place, Hog Lake Site.
No. 4. Vessel V-1170, Burial 9 Mound B, Medley Place, Hog Lake Site.
No. 5. Vessel V-1173, Burial 7 Mound B, Medley Place, Hog Lake Site.
No. 6. Vessel V-1134, Burial 3 Mound B, Medley Place, Hog Lake Site.
No. 7. Vessel V-1093, Mound A, Medley Place, Hog Lake Site.

Burial No. 7 was in a grave 5' long. A skull, face downward, and headed south of west was at one end. The remainder of the grave contained a number of arm and leg bones. No offerings.

Burial No. 8 was bunched and contained two skulls and a number of other bones. No furniture.

Burial No. 9 contained an adult in a poor state of preservation. At the right of the skull was a badly crushed vessel, the paste of which was so poor that its nature could not be determined. Just below the chin, in fragments, was an elbow pipe of gray-brown ware.

Burial No. 10 contained two adult skeletons, side by side. The skull of skeleton "a" had been removed and placed at the feet of "b". A crushed water bottle of poor ware was at the top of the skull of "b".

Burial No. 11, an adult, had been partially destroyed by the plow. No artifacts.

Burial No. 12 was an adult. At the top of the skull was a small water bottle of a poor grade of yellow ware with a wide, short neck, undecorated except for a raised encircling ridge at the base of the neck, reminiscent of certain vessels found on the Mississippi and St. Francis Rivers in Northeastern Arkansas.

Burial No. 13, the richest in the cemetery, contained the skeleton of an adult, extended. At the right of the skull was another cranium, that of an adolescent. Of the latter, no other bones were found. On the abdomen of the adult, the bones of a very young baby could be traced; also upon the abdomen was a small bowl placed over a rattle of pottery, containing pellets. The bowl, V-1182, is saucer-shaped, of reddish-brown ware, and has on its exterior a narrow, incised, encircling line just below the rim. The interior bears an incised design composed of a band encircling the rim within which four groups of concentric semi-circles, or festoons, are arranged. The rattle, V-1183, is of brown ware and has two perforations for suspension. It was formed by joining two shallow, semi-globular bowls at the rims, and sealing the juncture with clay. Its sole decoration consists of closely spaced notches around the edge of the juncture referred to. A small undecorated water bottle of yellow ware, V-1181, with a tall, straight neck and flaring rim, had been placed at the left of the skull of the adult.

Burial No. 14 contained three skeletons damaged and disarranged by the plow. With these was a large bottle, V-1184, of polished, hard, dark gray-brown ware, the form of which resembles certain bottles found in the Caddo area in Southwest Arkansas. The body is decorated with a three pointed engraved figure arranged symmetrically about the neck and containing cross hatching; crudely engraved lines connect the points of this figure. The neck has three encircling lines at the rim and a like number at the base.

Cemetery, Parnell Place

On the Parnell plantation, directly west of the Jones line, a cemetery, also considerably damaged by the plow, was discovered.

Burial No. 1, an adult extended, with head to the northwest, measured 5' 5", and was found just below plow depth. At the right elbow was an offering of the following objects: a large stemmed arrow head of red jasper, a red jasper drill, a lump of oxide of iron, a large claw, and some teeth of a small animal.

Burial No. 2, a badly decayed skull, was found 2 ½' southwest of No. 1 and headed northwest; no artifacts.

Burials Nos. 3 and 4 had been struck by the plow and the leg bones alone remained. These remains were parallel to those of No. 1.

Burial No. 5, just below plow depth, contained two adults placed side by side, parallel to and about 2' south of the leg bones of No. 4. Skeleton "a", measuring 5', was extended on back, headed northwest, with face turned toward "b". The latter, measuring 4' 9", was extended on its right side, headed southeast, with knees slightly flexed and touching the right arm of "a". In this inverted position, the skull of "a" faced the feet of "b", and vice versa. No artifacts.

Burial No. 6 contained an adult extended, parallel to and about 9' southwest of No. 5, and was headed northwest. It had been struck by the plow. A flint chipping outfit was at the left of the skull. This kit consisted of 3 pieces of sandstone, 2 bone tools used in flaking, 2 antler tips, 2 poorly wrought arrow-heads, 24 pieces of jasper, 2 hammer stones, a piece of slate, and a conglomerate. A refuse pit containing sherds of the later complex was discovered between burials Nos. 5 and 6.

Surface Finds

In addition to sherds of the earlier and later complexes, the following objects were found on the surface of the Hog Lake site:

Medley Place: A large, unfinished plummet of hematite, having neither groove nor perforation, 3 3/8" long; half of a rather flat, deeply hollowed out boatstone of brown quartzitic sandstone; and a small celt of green stone, 2 ½" in length.

Jones Place: An "L"-shaped pipe of yellow ware, decorated with two lines of punctations about the rim of the bowl.

Parnell Place: A crude boatstone of gray sandstone, 3" in length, and having a flat base; a small celt of polished green stone 2 ½" in length; a small rectangular pendant made from a shell tempered potsherd; 2 crudely made objects of clay resembling those found by Moore at Poverty Point on Bayou Macon in Louisiana (22). In digging test holes on the *Parnell Place:* a medium sized pipe of dark brown clay, somewhat "L"-shaped with a well defined base, was found.

A few large and medium sized stemmed arrow-heads of jasper and novaculite, some with and others without barbs, were found at various places on the site. Similar arrow-heads were on the surface of the other sites on Bayou Macon which were investigated by us. No glass beads or other objects that might indicate European contact were discovered on this or any of the other sites referred to.

Bellaire Mound

At Bellaire, on the Parnell Plantation, about three-quarters of a mile west of the Hog Lake site, is a mound approximately 80' in diameter and 12' high. This mound had been previously dug into and was badly damaged. A day was spent in digging into parts of the tumulus for the purpose of ascertaining whether it had been used by the people of the older or later culture. A few sherds of Tunica ware only were found. This site was formerly a part of a plantation owned by Mrs. James A. Anderson. About the year 1886, and during the Anderson tenure, a large rectangular stone effigy pipe was found on the place. The specimen remained in Mrs. Anderson's family until 1931, when her daughter, Mrs. Sue Levinson, kindly permitted us to add it to our collection. This pipe, P-117, of polished cream colored felsite, represents some feline beast which is sometimes found modeled on pottery vessels of the Mississippi and St. Francis areas of Northeast Arkansas. The stylistic treatment of the creature would indicate an association with a mythological concept. For example, the tail, which is in relief, encircles both the wide aperture where the pipe stem was inserted and the bowl, terminating near a lightly engraved circle just back of the ears. Two stone effigy pipes resembling this specimen, one of them most strikingly, were found near Mound "M" at Moundville, Alabama, about 1860, and are illustrated by Moore (23). One of these is in the Peabody Museum at Cambridge. The other was acquired by General Thruston, and is described and illustrated by him (24). He states that it represents a panther. Moore, himself found a similar pipe near Mound "R" at Moundville, and gives two views (25). The last mentioned pipe is also figured by Moorehead (26) and by West (27). McGuire (28) describes and illustrates a somewhat similar specimen from Hot Springs, Arkansas. One of the group of five stone effigy pipes from Selsertown Plateau, Mississippi, in the Milwaukee Public Museum (catalog No. 16209), depicts a crouching animal showing its teeth in a threatening manner. It is figured and described by Brown (29) and illustrated by West (30) Ford, in his forthcoming monograph, before referred to, illustrates a large effigy pipe, of clay however, from the Pocohontas

Mound, in the Big Black River valley of Mississippi, which was explored by him and Chambers and yielded early Tunica ware. Although, this pipe depicts a man kneeling, it is of the same general Muskhogean type as those under discussion. In this connection, it is also of interest to note that in the Smith mound, in the same valley, Ford and Chambers found with early Tunica ware a red and white quadrilateral square bottomed vessel, having terraced sides, similar in shape to one found by Moore, (31) at Moundville.

Westlake Place

We also investigated a site situated at the mouth of Lost Chain, a stream emptying into Bayou Macon in Desha County, Arkansas, upon which site there are two mounds. The eastern part of the site, including one of the mounds, is on the farm of Lizzie Wilson, who refused permission to excavate. This mound was about 40' in diameter and 3' high and had been washed by the 1927 flood. Sherds of the later complex were found on its surface. The rest of the site, with the remaining mound, is on the Westlake place situated in the E½ of NE¼, Sec. 29, Twp. 13 S., R. 2 West. This mound, measuring approximately 35' in diameter and 2' in height, was completely explored by us. The following described burials were found; all of the burials, with the exception of the bunched burial later referred to, were extended on their backs at depths averaging about 2 ½'; the bones in all instances were in poor condition:

Burial No. 1, measuring 5', was in the center of the mound, headed west. At the right of the skull was a cooking pot, V-1139, of heavy plain dark gray-brown ware, with a circular opening, square bottom and rudimentary feet.

Burial No. 2, 4' east of No. 1 and headed west, was 4' in length no artifacts.

Burial No. 3, about 11" north of No. 1, included two adults headed north, side by side, respectively 6' and 5' in length, and a bunched burial. The bunched burial was placed to the right of the leg bones of the shorter skeleton. No offerings.

Burial No. 4, about 3' northeast of No. 3 and headed east, was 5' in length. At the left of the skull was a small, crude, semi-globular bowl, V-1138, of thick, grit tempered, light brown ware, having two holes placed oppositely at the rim.

Considerable digging in the field failed to disclose other burials. Many sherds of the Deasonville and a few of the Marksville complex were found on the surface of the Westlake place. A polished, red jasper knife with a curved blade, 3" in length, was found on the surface of the Wilson place.

Gibson Mound

An investigation was made of a small mound in the woods on the Henry Gibson place, situated near Bayou Macon in the W½ of NE¼ of Sec. 21, Twp. 13 S., R. 2 West, Desha County, Arkansas. This mound, approximately 58' in diameter and 5' high, had been partially explored by Mr. Kelley. He reported having found in the center several bunched burials, with pottery. The vessels discovered by him are of the Tunica complex. Undisturbed parts of the mound were dug into by us. Certain artifacts, but no burials, were found.

In the northeastern part of the mound, 6" under the surface, was a pot, V-1136, having certain Coles Creek characteristics. This vessel is of heavy, brown, grit tempered ware and has a circular opening and a square bottom. It is decorated with a wide encircling -band enclosed in incised horizontal lines. Within this band is a design composed of diagonal lines forming irregular triangular figures, with interspaces filled with punctations formed by a blunt pointed tool inserted at an angle. In the southeastern part of the mound, at a depth of about 2', were three vessels: a large, shallow undecorated bowl of thin, yellow ware; part of a smaller bowl of plain, dark gray pottery; and a semi-globular bowl of porous yellow paste, upon one side of the rim of which is a triangular projection similar in shape to the conventionalized tails appearing on effigy bowls found farther north in the Mississippi valley. The opposite side of the rim is missing but doubtless it contained the head of the effigy. On the north side

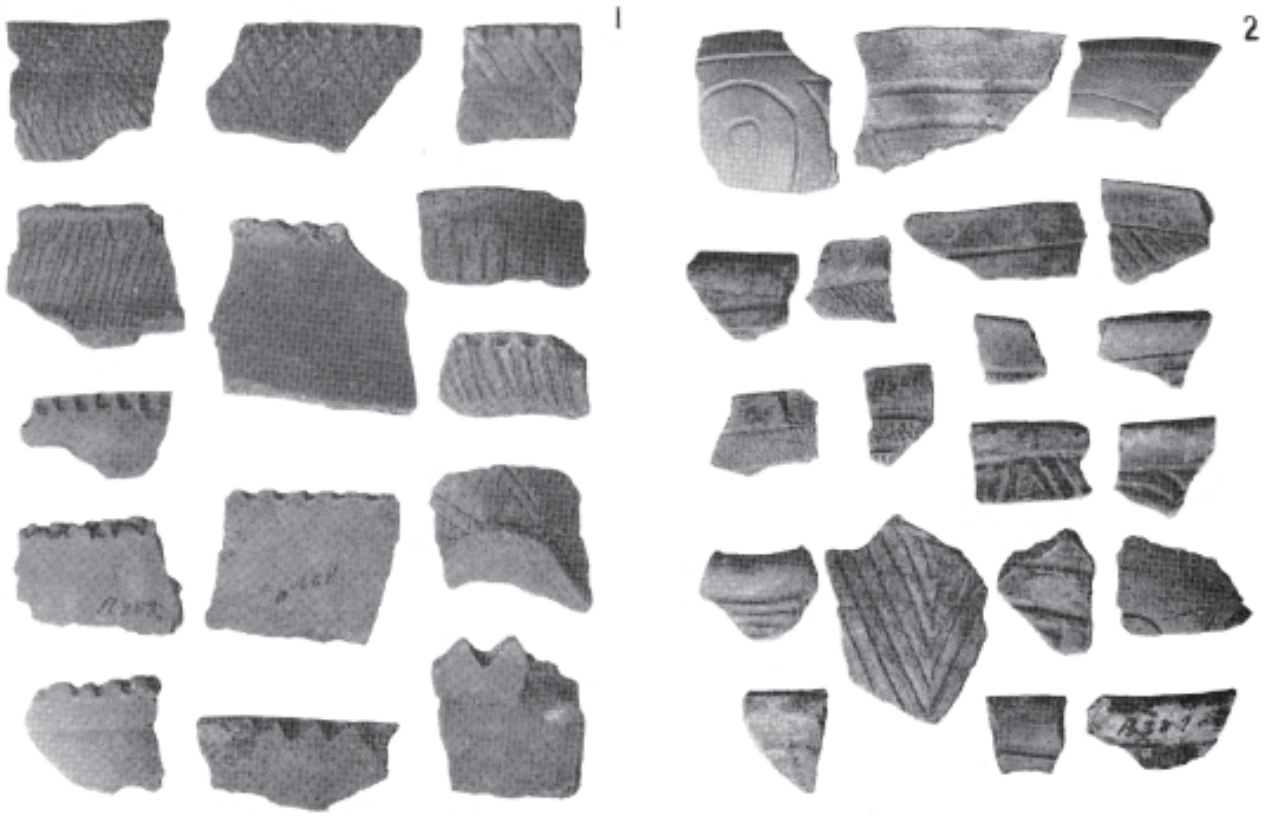

PLATE 4.

No. 1. Sherds of the Deasonville Complex, from the Rohwer Site. No. 2. Sherds of the Marksville Complex, from the Hog Lake, "Westlake and Rohwer Sites.

of the mound and also at a depth of about 2' was a small shallow, broken bowl of dark gray ware, over which 13 slightly worked, rather large, pebbles of yellow jasper had been placed. A few flakes in each instance had been struck from the pebbles.

This mound had the appearance of being a natural formation. The soil was homogeneous and contained no sherds, charcoal or debris.

Mr. Kelley also did some digging in a mound on the W. E. Grimes farm, about three-quarters of a mile south of the Westlake place, and found burials with Tunica ware. He presented us with one of the vessels, V-1743, a small, round, slightly concave platter of porous gray-brown ware, comparatively heavy and thick walled. Its interior bears an incised "all over" pattern composed of two concentric circles enclosing herringbone patterns irregularly spaced and separated by wider incised lines. The exterior is decorated by two encircling lines below the rim.

Rohwer Site

There is a group of six mounds on Boggy Bayou near Rohwer in Desha County, Arkansas. Boggy Bayou was formerly a tributary of Bayou Macon but its course has been changed by a channel dug in recent years. Four of the mounds are on the plantation of Mrs. Alma Brown, situated in the S½ of Sec. 11, Twp. 11 S., R. 2 W. The remainder are on adjoining lands belonging to Mr. R. H. Wolff. These mounds are composed of sand and have been plowed over for many years.

The northernmost mound on the Wolff place measured 130' north and south by 100' east and west, and the southernmost 116' north and south by 101' east and west. These mounds were partially explored by us. In both instances, modern burials were found, and the work was abandoned. In the northernmost mound on the northeastern side, and at a depth of 4', a large water bottle, V-1221, was discovered just beyond the limits of a modern grave.

This vessel, of yellow ware, is decorated with three sets of widely spaced incised concentric circles, and, in design, but not in the composition and texture of the ware, resembles certain Caddo bottles found on the upper Ouachita River in Arkansas. Sherds of the later complex were found in and around the Wolff mounds.

The four mounds on the Brown place, all of which are roughly circular, are approximately 119', 90', 85' and 25' in diameter. The time that we could devote to our investigation had about expired, and no attempt was made to explore these mounds. Some digging however, was done in the two smaller ones, which were but a few feet apart and may, at one time, have been one mound. The smallest yielded 2 vessels and no burials. On its northeastern side at a depth of 1 ½' was a badly crushed, friable square bottomed pot, having a circular opening and decorated below the rim with a wide encircling band of nested triangles containing parallel lines. About 2' east of this vessel was a medium sized pot, V-1223, of heavy ware, modeled in the shape of an inverted truncated cone and decorated with closely spaced parallel vertical ridges made by pinching the wet clay between the finger tips. Remains of a light red slip are upon both the interior and exterior of this vessel. A number of test holes were made in the other mound last referred to, and on its eastern side at a depth of about 2' an urn, with no evidence of a burial, was discovered. This vessel, V-1222, is of thin, polished brown ware, and is decorated throughout with diagonal intersecting bands forming diamond shaped figures, with a background of punctations.

About 1 ½' west of the vessel was an interesting and unusual clay object, U-159. This specimen of well baked, buff colored clay, is square in shape, 2 7/8" wide and 1 1/8" thick at the center, with slightly rounded comers. It is convex on each side, and on both faces is a rectilinear design of deeply incised chevrons. As Mr. Setzler states with regard to this specimen, the decoration is comparable to the decoration on pottery vessels from the Marksville site in central Louisiana, and consists of a type which he has termed "closely spaced incised line technique" (32). This object and a large fragment of a somewhat similar one, U-160, found by us in a shallow refuse pit on the Brown place containing sherds of the Deasonville complex, remain unclassified. An illustration of both is given. Specimen U-160 is similar in size and material to U-159, but is more rounded. It is 7/8" thickness, and is flat on one side and slightly convex on the other. It also is well baked and contains on both sides deeply incised, but carelessly executed, decorations resembling each other in design. But for the fact that no stamped ware was found on Bayou Macon, we might classify these as pottery stamps. It has been suggested that they may have been used as gaming discs. Clay discs resembling these were found by de Booy in the Salado caves of Eastern Santo Domingo (33). The similarity between our specimen U-159 and those illustrated in his Figure 27 (op. cit. p. 95) is striking. The designs, which are incised in both instances, appear to be practically the same. In certain of his discs, including those just referred to, both sides bear the same decoration, as is the case with ours. In others, however, there is an incised design on one side and a small animal effigy in low relief (op. cit., pi. IX), on the other, within the body of which is a hollow space forming a receptacle for pebbles. De Booy classifies all of these discs as stamps, and suggests that those containing pebbles served both as stamps and as rattles.

Prior to the making of our limited investigation of the mounds referred to, considerable digging was done in that part of the village site lying between the Brown mounds and Boggy Bayou. Here a small cemetery, much damaged by the plow, was discovered. All of the skeletons except three had been practically destroyed. Two of the remaining ones were adults extended on backs, headed west of north with no offerings. The remaining skeleton, an adult headed northwest and flexed on the right side, was somewhat damaged. At the left of the skull was a plain, shallow, circular bowl of dark gray, grit tempered ware, 5 ¾" in diameter. With the bowl were 5 slender bone needles, circular in cross section and ranging from 5 ½" to 5 7/8" in length, and the sharpened tip of an antler.

Sherds of the earlier culture, all from pots and bowls but none from bottles, were found in this cemetery and in shallow refuse heaps nearby and on the surface of the area mentioned. The unusual clay object, U-160, above described, was discovered in one of these middens. These sherds, which are of the same general types as those of the older culture found on the Hog Lake and other sites investigated by us, are not only capable of being classified into complexes, but also to some extent into sub-types. For such a classification we have selected 406, being all of those saved from the Brown place except undecorated body sherds, which were plentifully distributed over the area.

Sherds of the Deasonville Complex

Cord Marked Sherds: Of the sherds mentioned, 250 are cord marked; 211 of these are body sherds. The cord marks vary in width from slightly less than 1 mm. to 2 mm., and were applied in some instances in vertical or diagonal parallel lines and in others crosswise, forming large and small rectangular figures. The colors are mostly brown, some gray. In all cases, practically the entire vessel with the exception of the bottom was decorated.

The cord marked rim sherds fall into four classes: (a) plain, of which there are 9, (b) notched, 7, (c) banded, 7, and (d) banded and notched, 9. In "a" the cord marking extends upward to an undecorated rim lip; in "b" the rim is identical with "a" except that the lip is notched (the notches in some cases appearing on the outer edge only, in others extending across the lip); in "c" a raised band varying from 5/8" to 1 1/2" in width encircles the rim (this band having been formed in most instances by purposely failing to smooth out completely the last coil of clay); and in "d" the rim is identical with "c" except that the lip is notched. The rims range from 5 mm. to 1 cm. in thickness; the body sherds from 6 mm. to 1 cm. Parts of the bottoms of 7 cord marked vessels were found. All of these bottoms are square and the cord marks extend almost completely to the base; thickness of bottoms, 11 to 13 mm.

Plain Rim Sherds: Sixty-three of the rim sherds are undecorated; thickness from 5 mm. to 12 mm. Six have red slips; otherwise the colors are browns and grays.

PLATE 5.
No. 1. Pipe No. P. 117 from Bellaire, side view. No. 2. Pipe No. P. 117, front view.

Banded, But Otherwise Undecorated Rim Sherds: There are 19 of these. A plain band, formed by failure to completely smooth out the last layer of clay, encircles the rim; thickness from 7 to 9 mm.; colors, grays and browns. Five have red slips.

Notched, But Otherwise Undecorated Rim Sherds: Of these there are 44; thickness from 5 to 12 mm.; colors, browns and grays, Two have red slips.

Notched and Banded, But Otherwise Undecorated Rim Sherds: Three of the sherds have both the notched rim and the encircling band above referred to; color, brown; thickness, 7 to 9 mm.

Many plain, square bottoms of this ware were found; thickness 7 mm. to 2 cm. In rim profiles, texture and general appearance no distinction is noted between the pottery that is cord marked and that which is not. As will have been noted, the styles of decoration, other than cord marking, are the same. Hence, it would appear that all of the types above mentioned are of the Deasonville complex.

Sherds of the Marksville Complex

Fourteen sherds of the Marksville complex were found on the Brown site. Both of Setzler's types are represented. This pottery is of finer texture, is better fired and is superior to the other ware of the older culture found on Bayou Macon. The colors are brown, of varying shades, and gray; thickness of rims, from 6 mm. to 9 mm. in all instances, with one exception in which the thickness is 1 1/2 cm.

Coles Creek Complex

One sherd that especially appears to be of the Coles Creek complex was found on the site. It has two deeply incised parallel lines below the rim and a faint encircling line on the lip; color, dark gray, rim thickness 7 mm. There is some resemblance between the sherds which we have classified as "banded but otherwise undecorated rim sherds" and the Coles Creek, in that a plain band outlined by a line below encircles their rims. This line, however, is not incised, and we believe that the sherds in question belong to the Deasonville complex. Twelve sherds of the coarse ware of the older culture, having lugs or projections on their rims, were found on the site. Two of these have triangular lugs, somewhat resembling those found on Coles Creek vessels. The remainder do not.

Conclusions

Two ceramic sequences in point of time are indicated by the pottery from Bayou Macon in Arkansas. We have classified the later horizon as Tunican for the reason that the vessels as a whole more nearly resemble those of the Tunica complex

PLATE 6

No. 1. Clay Object V-160, Refuse Pit, Brown Place, Rohwer Site.

No. 2. Clay Object V-159, Mound Brown Place, Rohwer Site.

No. 3. Pipe P. 117, another view of this unusual pipe.

than any other. Ford, in his analysis now being published, lists the following among others as characteristics of Tunica ware: (a) in vessel shapes: bottles, shallow concave bowls, beakers and effigy vessels; (b) in paste: shell tempered and light porous gray or black ware; (c) in pottery decorations: small ridges raised by pinching, "U" shaped festoons of incised lines, herringbone design, scrolls formed by numerous lines, interior decorations of straight lines, and brush markings made with bundles of fibers. These characteristics are in evidence on some of the entire vessels found by us. On the other hand, a number of the distinguishable features of Tunica pottery found elsewhere are missing, such as pots with handles, knobs, Decorated outflaring lips, and fairly hard gray or brown ware; and, as has been seen, Caddo and other outside influences are manifest. On the whole, our vessels of the later period, with the exception of those showing such influences, appear to be more nearly akin to the pottery found by Ford and Chambers on the Dupree, Gross, Smith and Pocohontas sites in the Big Black River Valley of Mississippi than any other. The burial customs of the two peoples are also similar. In Big Black Valley, Ford and Chambers (as detailed in Ford's analysis referred to) found skull burials with the usual burial furniture but lacking the rest of the bones, burials extended on their backs, and flexed burials. Our assignment of the ware to the Tunica complex is based mainly upon the foregoing considerations.

One time horizon only is indicated by the pottery of the earlier complexes. We found no evidence on Bayou Macon which would tend to show that the different types of this ware were the products of separate peoples. X-rays of the several types of sherds were made by Dr. P. F. Titterington, of St. Louis, Missouri. He reported that all of the sherds contain pieces of gravel; that dark streaks appear in all of the pictures, due probably to poor puddling of the paste; that he was unable to determine different characteristics for the groups of sherds; and that from an x-ray standpoint all could have been made by the same people.

Our Marksville sherds are almost identical in decoration with those found on the Marksville site. Apparently the Coles Creek complex did not manifest itself as the Deasonville complex did in this region. Only two sherds that might be definitely classified as Coles Creek were found during the entire stay on Bayou Macon. These are of one Coles Creek type of decoration only, that is "incised encircling lines parallel to the rim." In one of these sherds the lines are not "overhanging." The vessel V-1136 from the Gibson Mound has characteristics of this complex, but it is by no means typically Coles Creek.

The sherds we have assigned to the Deasonville complex differ in some respects but resemble in others the ware found by Chambers at Deasonville. A number of our plain and cord marked rim sherds display notches and a raised encircling band; none such are illustrated by him. Collins found red and white painted ware at Deasonville. We collected some red slipped sherds (one of Ford's "marker" types of the Deasonville complex) but no painted specimens. Ford says that the pottery found at the Deasonville site is slightly typical of the complex to which that name has been given, and notes that red and white painted ware has not always been found associated with the cord marked pottery of this complex. Collins found sherds bearing lugs and handles, but these appendages were restricted to shell tempered vessels decorated with punctations or incised lines. We have seen illustrations only of Collins' pottery and have not had the opportunity to examine any of the actual ware itself. However, we have compared our cord marked sherds from Bayou Macon with the collections of cord marked sherds of the Deasonville complex loaned us by Mr. Ford and in texture, colors, vessel shapes as indicated by the sherds, and in the application of the cords to the clay, the pottery is practically the same. Cord marked sherds have not been heretofore reported from Arkansas; hence, the influence of no complex other than Deasonville is indicated.

The complexion of the first pottery horizon appears to be predominately Deasonville plus a small amount of the Marksville ware.

The Bayou Macon area in Arkansas is important from an archaeological standpoint. Unfortunately, floods and the plow have destroyed most of the

evidence. Due to the comparatively short length of time that we could devote to the project, our investigation there was necessarily limited. An intensive exploration of the sites and mounds in the area should be made before further damage ensues.

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May 1, 1937.

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EXCAVATION OF MURRAH CAVE

BY W. C. HOLDEN

Murrah Cave is located in Val Verde County, on the lower Pecos River, approximately fifteen miles from the Rio Grande as the crow flies, and some twenty-five or thirty miles as the river winds. The Pecos, in this vicinity, makes a number of horse-shoe bends which have diameters ranging from three-quarters of a mile to two miles. The cave is in the east bank, facing west, of one of these bends whose circular side is to the east. The river in this region has cut several hundred feet through the Comanchean limestone. The east bank, on the outside curve, is practically perpendicular, with overhanging ledges here and there, and some debris, and very steep, near the base.

A number of caves of varying sizes are found in this bank, but Murrah Cave, the largest of them all, is the only one with evidence of prehistoric occupation. It is located approximately two hundred feet above the water level of the river, and sixty feet from the top of the cliff. It extends back into the cliff one hundred and twenty-four feet, is twenty-four feet wide at its mouth, thirty-five feet wide at a distance of forty-five feet from the entrance, thirty-seven feet wide at sixty feet from the entrance, and forty-five feet wide at one hundred feet from the entrance. Toward the back it narrows down abruptly to a passage-way only a few feet wide which extends some twenty-four feet farther. The floor has only a slight dip downward for fifty feet where the decline becomes approximately thirty percent to the rear. The ceiling in the mouth of the cave is nine feet and six inches from the floor. It is almost level for about eighty feet back where it begins tilting downward. Toward the rear it is approximately twenty-five feet from the floor. Human occupation was confined largely to the comparatively level stretch of floor in the front fifty feet. Behind this the bats have lived, and the guano is from two to three feet deep. (See Plate 7).

The existence of the cave was first reported to the Department of History and Anthropology by Mr. Wylie Puckett who trapped and fished in the vicinity for a number of years just at the turn of the century. In March, 1936, Mr. W. G. McMillan and the writer, accompanied by Mr. Puckett, visited the cave for two days. A survey convinced us that the site was rich in materials and had been molested very little. Permission was granted by Mr. Jim Murrah, the owner, to excavate the place.

We began planning an expedition for March, 1937. This season was selected as a time when rattlesnakes would not be so active as later in the spring, and when the weather would be neither too hot nor too cold. As it happened, both predictions turned out contrary to plans; we killed a rattler under foot while eating supper one night, and two days and nights we nearly froze, while one day was as hot as in May.

The expedition was sent out under the auspices of the West Texas Museum which, in turn, is under the joint control of Texas Technological College and the West Texas Museum Association. The sponsors who financed the expedition were Mr. W. G. McMillan, Dr. C. J. Wagner, Mr. H. L. Allen, and the writer.[1] These gentlemen, with the exception of Mr. Allen, accompanied the party. In addition was Mr. W. L. Pearson, electrical engineer, and six students: Henry Clay Bailey III, Clifford Gibbs, Barney McCasland, Gordon Moore, Jim Huffman, and Winston Reeves. Mr. Reeves, a photographer of considerable skill, made an excellent series of pictures. The writer made the tenth member of the expedition. Dr. John Clark, field paleontologist of Texas Technological College, visited the site for a short time.[2]

The inaccessibility of Murrah Cave made it necessary to camp on a high rocky point several hundred feet above the river, and a mile from the cave. All the equipment for the cave, including the wheelbarrows, had to be carried on our backs down a deep canyon, up over a high ridge, down another steep decline, and along a narrow ledge high on the face of the cliff. Water from the river was far too brackish to be used; consequently, water for the camp had to be hauled five miles from Sullivan's

well over a road which did not exist. In the camp, not a single tent stake could be driven. It was necessary to tie the tents to cacti, lechuguilla, juagilla, sotol, and the other scant shrubs of desert vegetation.

The cave was well located from the viewpoint of defense and esthetic outlook. It is not possible to see the entrance from any direction until one is within thirty feet of it except from the ridge far across the Pecos valley. A large rock partially conceals the view from that direction. The west bank of the river slopes upward at a ten to twenty per cent grade. In order for a person to get sufficient elevation to see the cave from that side of the river, he would be so far away he could not detect the cave's entrance without field glasses. One can be along the water's edge below and cannot see from that place any evidence of the cave's existence. On the other hand, one standing in the cave has a marvelous view across the Pecos. Out on the ledge in front, one can look down and see large catfish swimming along the bottom of the greenish waters of the Pecos.

The ash heap in the forward fifty feet of the cave varied from eighteen inches to fifty-two inches in thickness. The ashes were light, dry, and dusty. It was necessary for members of the party to wear respirators while working. Without a respirator, one would choke up in a few moments.

The heap was worked in three levels. The first two levels were worked over the entire area. When it became evident that we would be unable to finish the entire heap during our allotted time, we made two trenches to the floor, one along each side of the cave. The trenches constituted the third level, and gave us a representative sample of the bottom layer. Materials from these levels were carefully kept segregated in order to determine whether or not any kind of cultural change had taken place from the bottom to the top. When we returned to the Museum, we laid out all materials according to class and layers. A careful study failed to indicate any cultural change whatever in the flint, bone, and wood items. The types and percentages of the bottom layer were approximately those of the other two. Only two items of stratigraphy were exceptions to the rule. The top layer contained much more fiber bed matting than did the others. In a small area, eighteen inches from the surface, was a four-inch layer of wind-blown dust distinctly stratified. This would seem to indicate an interruption in the occupation. Either the occupants were gone for some time during normal weather conditions, or the absence was for a shorter period during a widespread, severe drought when dust storms ravaged the region. It has been suggested

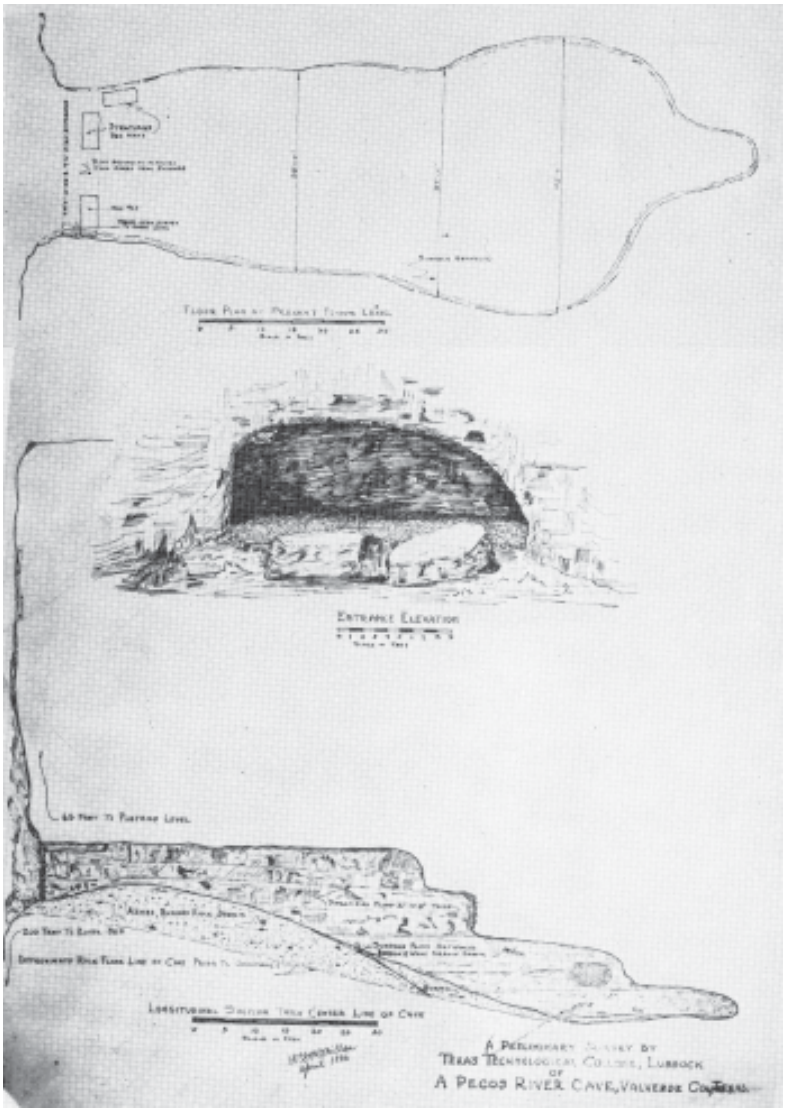

PLATE 7.
Map of Murrah Cave. See text.

		WHOLE		BROKEN	
No. on Plate 8A	Type No.	Proj. Points	Percentage	Proj. Points	Percentage
1,2	1	91	.23	104	.30
3	2	39	.10	33	.10
4	3	48	.12	14	.04
5, 6	4	98	.25	144	.39
7, 8	5	16	.04	5	.05
9, 10	6	21	.05	27	.07
11	7	21	.05	26	.07
12	8	45	.12	8	.02
13, 14, 15, 16	9	16	.04	0	.00
Total		395	1.00	361	1.00

that this stratum might have been deposited during the great protracted drought beginning in the Southwest about 1275.

Inasmuch as we were unable to detect any cultural changes in the stratigraphy, and in order to keep this preliminary report from becoming unduly long, we shall lump the layers together and give the results by way of a summary.

All of the deposits removed were screened. The ashes were sifted through the quarter-inch mesh screen into wheelbarrows and dumped from the mouth of the cave into the river below.

Projectile Points

A total of 395 whole projectile points and 361 broken ones were found. Of the broken points, only the bases, or butts, were counted. Because of the fact that the point end of a broken flint artifact may be either an arrow point, a spear point, or a knife, all such pieces have been placed in a special category below.

We found that all the projectile points tall under nine types, with some possible sub-type variations. Pearce and Jackson, who excavated a rock shelter of what appears to be the same culture in Val Verde County some thirty to forty miles from Murrah Cave, also classified their projectile points under nine types.[3] In a general way, our classification coincides with that of Pearce and Jackson. We could have easily grouped our points under their types. However, we treated the spiral points as a separate type, while they placed them under their type number 1.[4] On the other hand, we combine Pearce and Jackson's types 3 and 5 under our type 8.

The types and number of points, with percentages, are given as follows (see table above):

We did not find an irregular distribution of the points by layers, as did Pearce and Jackson, but rather a geographical distribution. Fully fifty per cent of projectile points came from within two feet of the walls of the cave on either side. A few of all types had been blunted by resharpening.

Knives

We secured 190 whole knives and a larger number of broken ones. The broken knives will be included below under uncatalogued flint artifacts. The whole specimens varied in length from one and three-eights inches to four and one-half inches, the average being two and one-half inches long and one and one-half inches wide. Some of the knives show exceedingly fine workmanship. No corner-tang specimens were found. (See plate 8B, and pictures 5, 6, 7, and 8).

Scrapers

The number of scrapers was small compared with other flint artifacts. Only 29 were found, and these are crude, irregular in size, and follow no single clearly defined type. (See plate 9B, pictures 8, 9, and 10).

Gouges

Gouges were more plentiful, a total of 61 whole specimens being secured. Some of them were skillfully fashioned; others were crude. The number includes several specimens which are clearly combination tools: each tool a combined gouge and knife. (See plate 8B, pictures 1 and 3).

Fist Axes

Of fist axes, there were 58. These vary in length from two and one-half inches to four inches. There is considerable variation in shape and technique. None show evidence of having had handles. (See plate 8B, picture 2).

Flint Awls

Four whole awls and two broken ones were secured. One of the whole awls had a corner-tang. (See plate 9B, pictures 1, 2, 3, and 6).

War-Club Spikes

It is problematical whether any war spikes were found. Two specimens may have been spikes, or they may have been the points of broken awls. (See plate 9B, pictures 4 and 5).

Bone Crushers

Eight bone crushers were secured. These showed signs of much battering on their blunted points and edges.

Uncatalogued Flint Artifacts

There were found 1,562 flint objects which were not catalogued. This number included broken projectile points other than bases, knives, scrapers, gouges, fist axes, awls, and other unclassified items. Many of these broken specimens are of excellent shape and workmanship.

Pebbles

A considerable number of pebbles were found throughout the deposit. Some 29 specimens show evidence of having been used for rubbing. One pebble has incised marks on it. These, however, do not make any symbol or design.

Stone Objects

Eighteen manos were secured, but no metate was found. This is singular in that Pearce and Jackson got thirty-two in their rockshelter. One abrading or sharpening stone turned up.

On the sifting screen we found a round, black stone with a sub-luster, about the size of a large marble. From its appearance one might infer it was

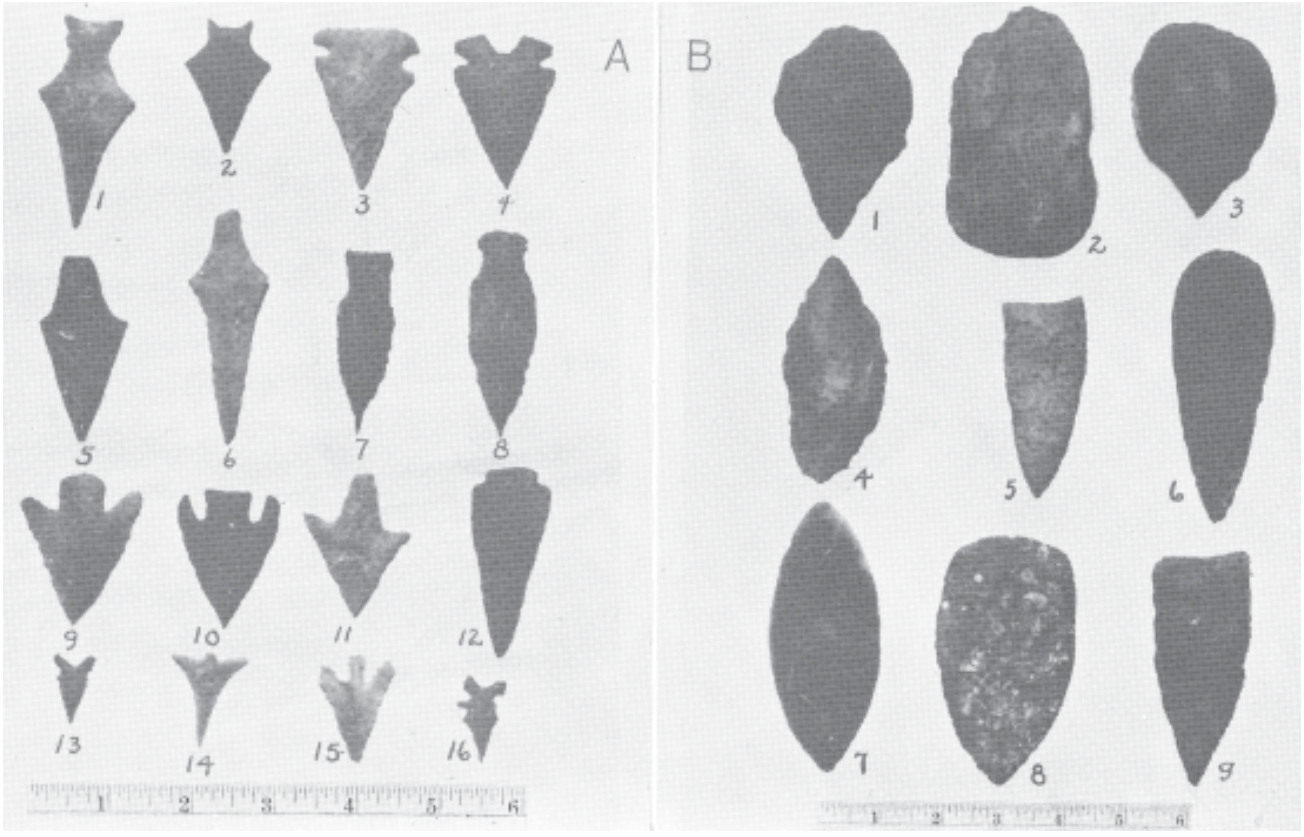

PLATE 8.
A. Flint artifacts from Murrah Cave. B. Flint artifacts from Murrah Cave; see text.

something highly prized by the prehistoric inhabitants of the cave. Professor W. I. Robinson, Mineralogist of the Department of Geology, Texas Technological College, examined the specimen, found it to be non-magnetic, yet it gives a red iron nitrate stain when touched with nitric acid. Its specific gravity is 3.7. By grinding it with an abrasive, it gives off a yellow powder. Professor Robinson is of the opinion that the specimen is limonite. He suggested that the fact a yellow pigment could be obtained from a black mineral was surprising enough to be regarded as magic by the aborigines. (See plate 9A, picture 13. The highlight in the picture makes the black metallic ball appear as a bead).

Bone Tools

Twenty-six bone awls were obtained. These ranged in length from six inches to one and one-fourth inches, and in width from one inch to one-quarter inch. Six of the number had been charred until black and the surface polished. This gave them a luster. (See plate 9A, pictures 4, 5, 6, 7, and 12; numbers 4 and 12 are typical of the polished ones with a luster).

Two bone chisel-like implements were found. One is three inches long, one and one-half inches at the base, and one-halt inch at the pointed end. The other, one and three-eighths inches long, is the broken point of a longer implement.

Twelve antler pressure flakers were secured. These varied in length from five and one-half inches to one and one-half inches. (See plate 9A, pictures 1, 2, 3, and 7).

Twenty-one points, or prongs, of deer horn were obtained. These vary in length from five inches to one inch. Several of them are polished on the pointed end, indicating that they were used as gouges or for flaking.

Beads

Seventeen long bone beads of the types shown in plate 9A, pictures 9, 10, and 11, were secured. Only one round, flat bead turned up. (See plate 9A, picture 8).

Human Jaw

No burials were found, however, it is possible that some may be found in the area still to be excavated. The only evidence of human bones was an articular end of a lower jaw. It is significant that this fragment was charred. This might denote one of three facts: attempts at cremation, cannibalism, or carelessness in handling of skeletal material by the ancients.

Paint

Forty-one specimens of a red clay paint were secured, the most of them were either on, or in the vicinity of the loin cloth mentioned below. Associated with the red clay were a number of pieces of soft, chalky limestone which, no doubt, supplied the cave-dweller with the white he needed. A piece of bituminous limestone gave him his black. This specimen is one and one-half inches long and about one-half inch in diameter.

Cordage

A total of one hundred and eighteen pieces of cordage was secured, aside from pieces containing knots. These varied in size from fine pieces of string no larger than a small fishing line to rope a quarter of an inch in diameter. Fibers from lechuguilla, sotol, and Spanish dagger seemed to have been used. Three pieces have one strand, one hundred and twelve pieces have two strands, and three pieces have four strands. An examination of the two-strand pieces shows that in ten of them the fibers within the strands are twisted in a counter-clockwise direction, while the strands are twisted in a clockwise direction. The reverse is true of the other 102 pieces; the fibers are twisted clockwise, while the strands are counter-clockwise. (See plate 12A, pictures 16, 18, and 20).

Cordage Knots

Of a total of forty-eight cordage knots, twenty-five are larkshead, seventeen square, and six overhand. (See plate 12A, pictures 16 and 21).

Netting

Three pieces of netting came to light. One was charred so badly it could not be photographed, nor

PLATE 9.

A. Deer antler flakers, bone awls and beads, from Murrah Cave. See text. B. Flint drills and scrapers, from Murrah Cave.

could its knots be studied. Another with a two and one-half inch mesh is shown in plate 12B, picture 5. It has larkshead knots, such as is illustrated by Pearce and Jackson, *A Prehistoric Rock Shelter in Val Verde County, Texas*, page 95. The third piece is shown in plate 12B, picture 8.

Skin-Wrapped Cords

Three skin-wrapped cords were found. (See plate 12A, picture 17). Pearce and Jackson suggest that these were probably used for blanket weaving or as tassel adornments of clothing.

Leaf and Fiber Knots

A considerable use was made of leaves, split leaves, or fibers, in the tying of bundles. The blades of sotol, lechuguilla, Spanish dagger, and sacahuiste (*Nolina texana Watson*) were used. Of 155 knots, 109 are square knots; the others were not classified. (See plate 12A, pictures 1, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13, 14 and 15). The specimen shown on plate 12A, picture 12, is quite a mystery. It consists of a net made of hundreds of fibers tied together with square knots. Through the center of the net is a lechuguilla blade bent double, with the two ends tied together at the bottom. The specimen is five and one-half inches long, and has a fan-like appearance. As yet we are at a loss as to its use. Dr. R. A. Studhalter suggested it might have been a strainer. It might also have been an ornament for the hair.

Basketry

Twenty-seven fragments of baskets came from the cave. The six, or perhaps seven, types of weaves are shown in plate 10B. The number of weaves here represented are not as large as reported by Pearce and Jackson, or by Setzler.[5]

Sandals

Four whole sandals and twenty-nine fragments were secured. The whole ones have a linear measure of seven and one-half, nine, nine and one-half, and ten inches, respectively; and are all approximately the same width: four inches. Two of them are shown in plate 10A, pictures 3 and 4. The materials and construction of these sandals seems to be identical with those described by Pearce and Jackson.[6]

Skins

The loin cloth shown in plate 11A is ten ‘inches wide and seventeen inches long, not including the fringe which is seven inches. The material is of soft buckskin and is in a good state of preservation. The piece at the bottom has been sewed on with thread made of fiber. On one of the strings of the fringe are two beads, and another bead is on a string to itself. It was found fifteen inches below the surface, lying neatly folded on a bundle of Mormon tea. On top of the cloth were seven chunks of red paint.

Four fragments of tanned buckskin were found near the bottom. These vary in size from two to four inches square. One of them has a lechuguilla string tied in a corner.

There are four fragments of buckskin thongs, two straight and two twisted. One of the straight pieces consist of two pieces tied together with a neat, square knot.

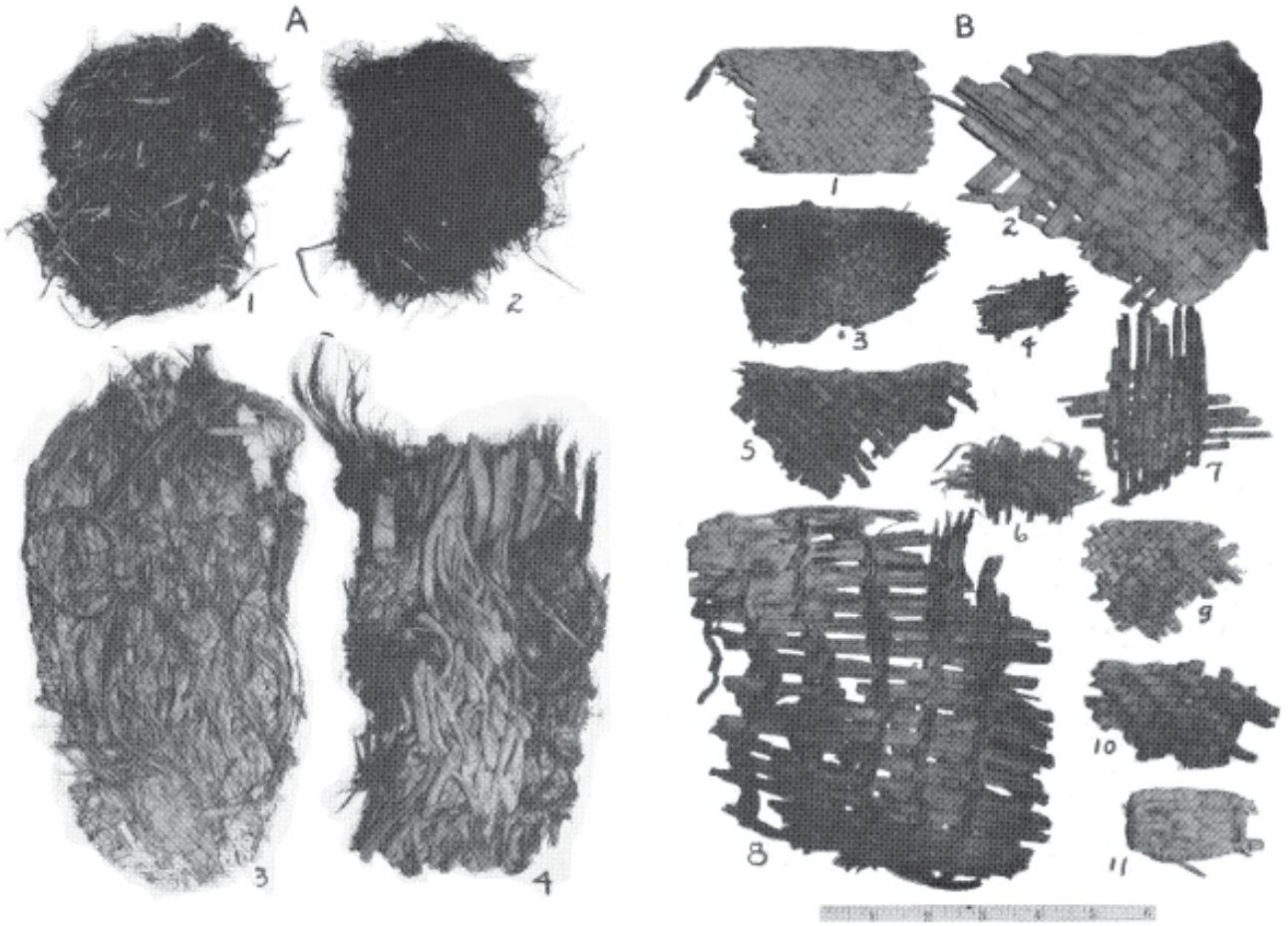

PLATE 10.
A. Sandals and mats, from Murrah Cave. B. Basketry from the cave. See text.

Twelve twisted strips of skins with the fur on indicated they might have been used for blanket weaving. Both rabbit and cat fur seems to have been used. (See plate 12B, picture 3). Two squirrel tails were probably used as tassels.

Feathers

Twenty-nine hawk and eagle feathers give rise to speculations as to whether they were used in the hair, in blankets, or were just the remains of birds used for food. It is probable, however, that they were used as some form of adornment.

Bed Mats

Approximately twenty-five sleeping mats were found either on the surface or within fifteen inches of the surface. At the time of our visit to the cave in March, 1936, two of these mats, almost intact, were clearly visible on the ash deposit. They were approximately two and one-half feet wide and six feet long. They were made of a heterogeneous mass of grass and yucca fibers and averaged about three inches thick. The mass of fibers had become mixed and packed with ashes and was rather hard and rigid. When a portion of this bedding was thrown on the screen, the ashes quickly sifted out, leaving the fiber mass light and fluffy. For samples of bedding fibers, see plate 10A, pictures 1 and 2.

Reed Artifacts

Thirty-five reed artifacts, most of them broken, were found. They vary in width from three-sixteenths to one-half inches. The larger ones were projectile shafts. One of these had been reinforced by inserting a piece of solid wood three-sixteenths of an inch in diameter into the hollow interior of the reed, and then securely wrapping the exterior of the reed with sinew. This wrapping is an exceedingly fine piece of workmanship. (See plate 11B, picture 1).

Several short pieces of reed, cut squarely at the ends, indicated they may have been used for beads.

Wooden Artifacts

Six upright stakes were found near the surface. Four of these seemed to have formed a unit, each being at the comer of a quadrangle about two feet square. The other two stakes were isolated and seemed not to have any definite relationship with any other stakes. The lengths of the six ranged from twelve to eighteen inches, and their diameter from one and one-half to one and three-fourths inches. The only explanation we could think of was that they were used as racks for drying or for cooking purposes. Pearce and Jackson found similar stakes in their rock shelter in Val Verde County. Ten other pieces of wood with diameters about equal to those mentioned above, but the lengths varying from six to twenty inches, were found but not in upright position. They may have been used as stakes, but had been broken, or knocked over and lost in the ashes. All of them had been cut while green with hint axes. The method of severing seems to have been to cut the limb on either side about a fourth or a third of the distance and then twist the piece off. The upper end of the piece shown in plate 11B, picture 10, shows the cutting and twisting method of severance.

A wooden shovel, six and one-half inches long and two and one-fourth inches wide, was found twenty-four inches from the surface. (See plate 11B, picture 7).

A broken piece of what was probably a rabbit stick, or perhaps an atlatl, was found at the same level. This specimen is one inch wide, one-half inch thick, and has four grooves down each side. (See plate 11B, picture 11).

Another fragment of wood, six inches long, one inch wide, and one-half inch thick, has twenty-one cross-wise grooves on the lower two inches of one end, and four length-wise grooves extending the rest of the distance. (See plate 11B, picture 8).

Ten sticks, probably hide-stretchers, slightly curved and pointed on each end, varied in length from eight to nineteen inches. (See plate 11B, picture 16).

One wooden fore-shaft, probably used to reinforce a reed main-shaft, is shown in plate 11B, picture 14.

Only one wooden arrowshaft was found. It had the bark peeled off, but was unpolished. (See plate 11B, picture 2).

Of fire-making implements, four hearth-sticks (plate 11B, pictures 6 and 12), five drills, and one drill-cap were found.

Two awl-like sticks of five and six inches, respectively, in length came from the upper level. The pointed end of each is polished. One of the specimens is shown in plate 11B, picture 5.

An unidentified spliced stick is shown in plate 11B, picture 13. Also unidentified is specimen 9 in plate 11B. It has a well-defined groove around the main prong, just below the crook. Thirty-seven other sticks or segments of shafts, of varying sizes and lengths, are likewise unidentified.

Food

The ancient cave-dwellers were hunters of small game. Of the 623 bones found, only four were from animals larger than deer. These four, which consisted of two heel bones and two broken pieces of femur, were from buffalo. Of the small game, Dr. John dark and Professor W. F. Landwer[7] have identified the following: raccoon, jack-rabbit, cotton-tail rabbit, ring-tail cat, badger, kit-fox or "swift," coyote, wolf, deer, antelope, turtle, terrapin, rat, squirrel, coatimondi, ocelot, several kinds of fish, and several kinds of birds. Snail shells, both charred and uncharred, were abundant throughout the deposit. The same was true of mussel shells of which several species were found. Especially noticeable was a large type which

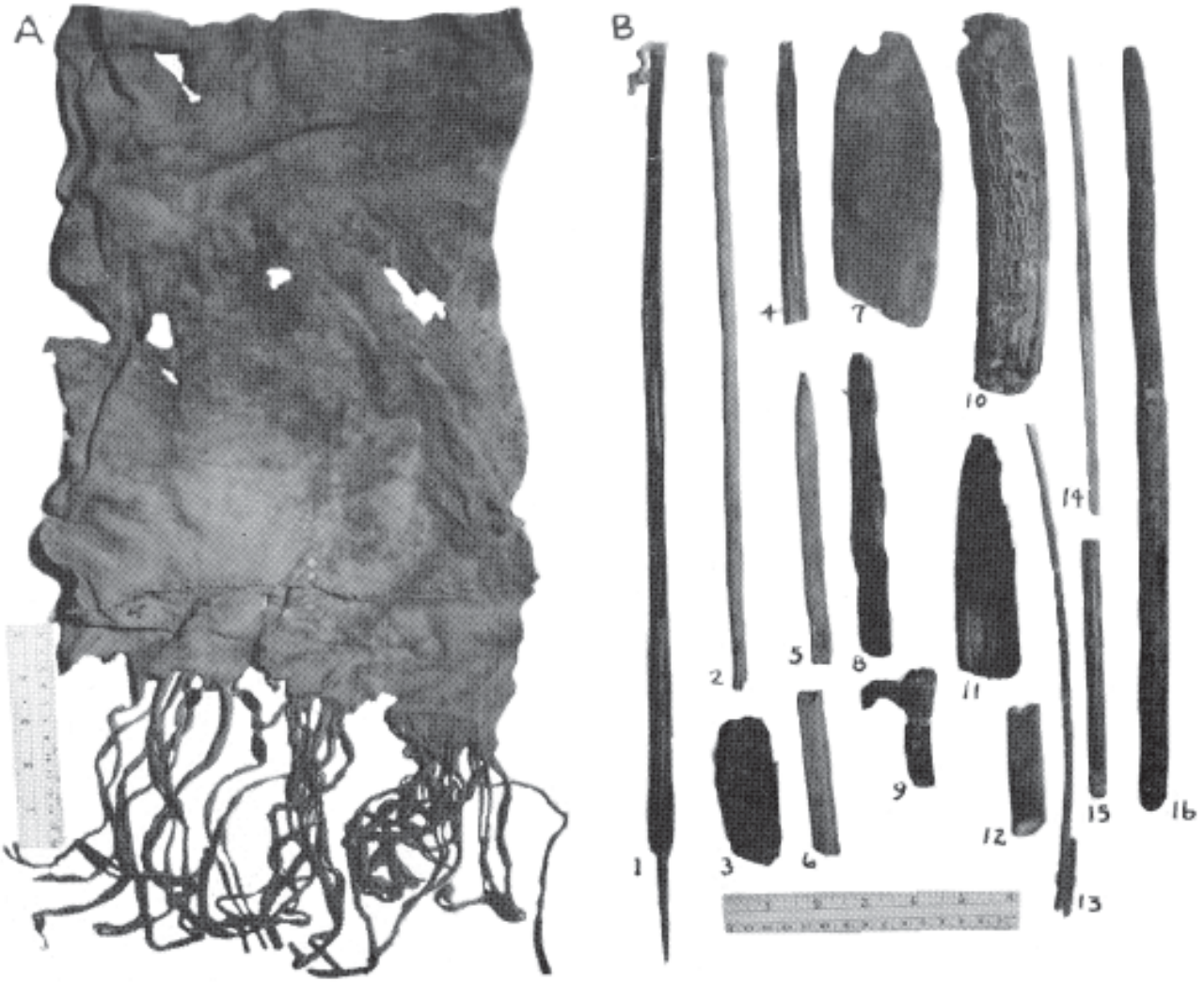

PLATE 11

A. An Indian's loin cloth from Murrah Cave. See text. B. Bone and wood artifacts from Murrah Cave.

measured from four to four and one-half inches in length. A large mummified rat was found on a narrow ledge of the wall just below the ash level. Several fragments of horned toads (*Phrynosoma cornutum*) were secured at various depths.

Of vegetal foods, sotol (*Dasylirion texanum Scheele*) was the most abundant.[8] The crowns were found throughout the deposit. Next in importance were lechuguilla quids. Thousands of them appeared on the sifting screens.

Juagilla (Wá-hé-ya) beans seemed to have been an important item of food. One and one-half pounds of these beans were sifted from the ashes. They are larger than mesquite beans, are dark brown in color, and have a hard, smooth surface.

A considerable number of dried prickly pears (*Opuntia*) were found. A piece of human dung consisting entirely of prickly pear seeds adhered together.

Mesquite beans (*Prosopis glandulosa*) were fairly well distributed through the deposit.

Several hundred small western walnuts (*Juglans rupestris*), most of them parched, were found fairly evenly distributed through the ask heap.

A considerable number of Texas laurel or coral beans (*Sophora secundiflora*), seeds, and pods were found. The seeds, when unburned, are a coral red; however, a majority of those secured were parched. In view of the fact that the seeds are poisonous, one wonders at their presence in the cave. Pearce and Jackson give a plausible explanation.[9]

That the prehistoric cave dwellers liked a little seasoning with their food is attested by the presence of a number of small wild onions.

A few acorns, most of them parched, were found. Three species of grass seeds (as yet unidentified) were found.

Of considerable interest was a bundle of Mormon tea, or teamster's tea (*Ephedra*), found associated with the loin cloth shown on plate 11A. The buckskin apron was on the bundle of Mormon tea brush. The plant is known to have been used by some American Indian groups in the treatment of venereal diseases. Dr. Studhalter wondered if this could be the explanation for the association of the cloth with the bundle of tea brush.

No evidence of domesticated plants, such as corn, squash, or melons, was found.

Other Botanical Specimens

A number of branches of desert willow (*Chilopsis linearis*) came from a depth of eighteen inches. In approximately the same level was a bundle of needle grass (*Aristida*).

Needles

Perhaps the most intriguing objects found were two needle or spine containers. Each was made of a bundle of soft fibers wrapped cross-wise with fiber thongs. One (Plate 12B, picture 6) contained ten fish-hook cactus spines. These may have been used as fishhooks or as needles. The other bundle contained four straight cactus spines (Plate 12B, picture 7). Both bundles are examples of exceedingly delicate workmanship.

Conclusion

All the evidence indicates that the inhabitants of Murrah Cave were prehistoric. Nothing was found to indicate they had ever come in contact with European civilization. If the last persons to live in the cave left before the arrival of the white race, one may surmise from the amount of ashes that the first inhabitants date back a considerable period before the beginning of historic time. The people had primarily a sotol culture, and were entirely without pottery. Their skill lay in the making of cordage and exquisite flint artifacts.

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(1) The expedition is Indebted to Mr. H. L. Allen for the donation of a field unit of electrical lighting apparatus, and for the loan of an electrical engineer. Through Mr. Alien, the Texas-New Mexico Utilities Company provided the expedition with a truck.

(2) The expedition is grateful to Mr. and Mrs. Denny Sullivan, whose ranch house served as a sort of base for the camp, for numerous favors. Mrs. Sullivan, a former Anthropology student of Texas Technological College, was extremely helpful because of her knowledge of surface sites in the vicinity.

(3) Professor J. E. Pearce and Mr. A. T. Jackson of the Department of Anthropology, University of Texas, published the results of their work In an admirable and exhaustive manner in 1933, "A Prehistoric Rock Shelter in Val Verde County, Texas," University of Texas Bulletin, Bureau of Research in Social Sciences Study No. 6, Anthropological Papers, Vol. I, No. 3.

(4) See Pearce and Jackson's report, Plate XII (a).

(5) F. M. Setzler, "Prehistoric Cave Dwellers of Texas," Explorations and field work of the Smithsonian Institution in 1932.

(6) Op. Cit., pp. 96-103.

(7) Professor M. F. Landwer Is Associate Professor of Biology, Texas Technological College.

(8) We are Indebted to Dr. R. A. Studhalter and Dr. E. L. Reed of the Department of Biology, Texas Technological College, for Identifying the botanical specimens.

(9) Pearce and Jackson, "A Prehistoric Rock Shelter in Val Verde County, Texas," p. 131.

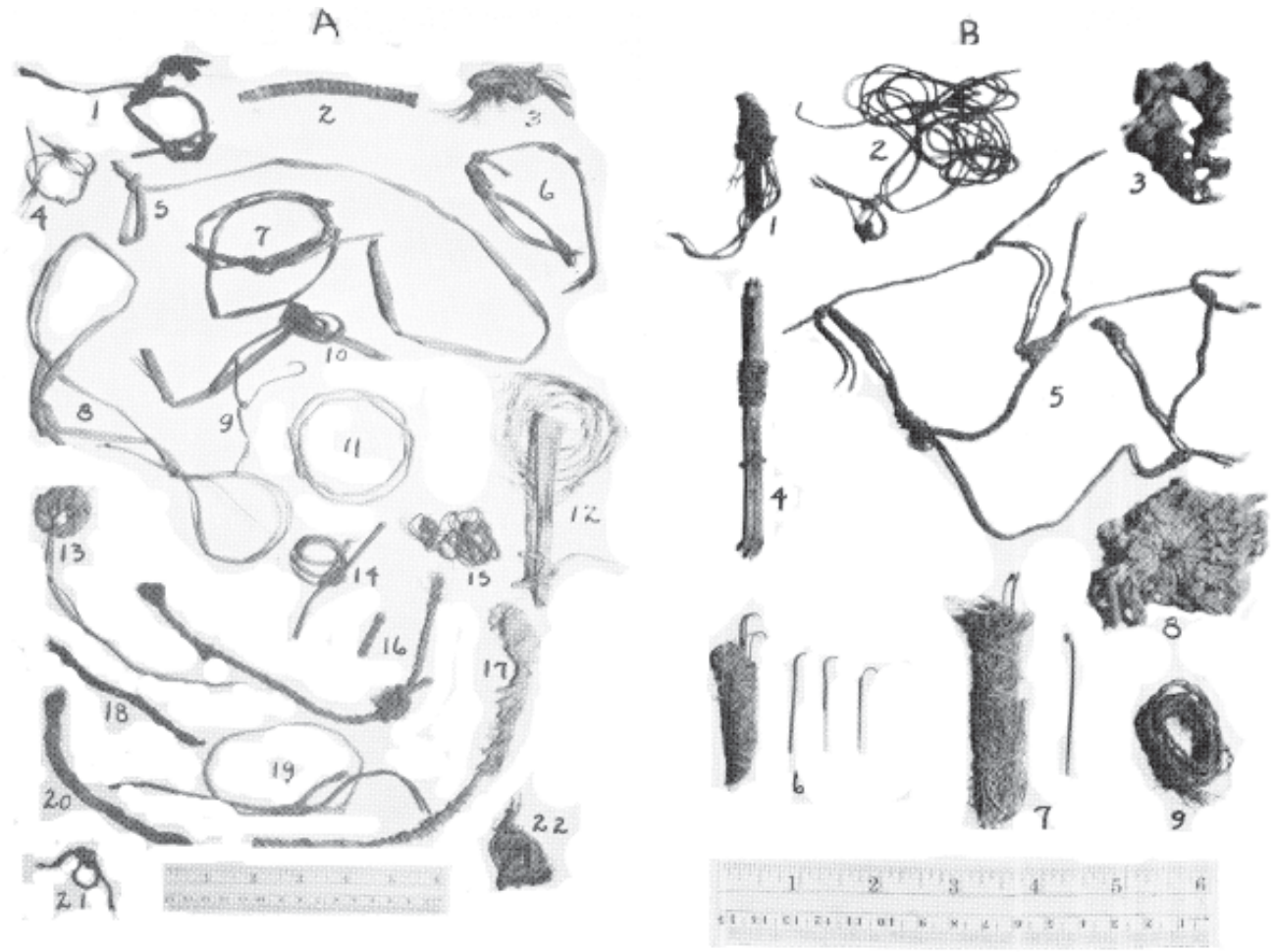

PLATE 12.

A. Cordage from Murrah Cave. See text. B. Cordage and; cactus fish hook bundles. See text.

FOLSOM AND YUMA POINTS AS KNOWN TODAY

By E. B. Renaud, Ph. D.

In order to render this subject clear for both professional and amateur archaeologists it may be best to begin by giving descriptive definitions of these beautiful stone points which have, in recent years, attracted so much attention and caused many discussions.

Let us start with the *Folsom points*, the first type to be found or recognized as distinct from ordinary Indian weapon points. Besides, as they are more highly specialized, their characteristics can be better described. A Folsom point is a *pointed blade* with either nearly parallel or convex edges and a base rarely straight but often concave and even "squarish" or "wavy." The flaking, generally fine, is done by the pressure method. The most distinctive characteristic is a *longitudinal groove* beginning at the base and extending upward toward the tip of the point, the length and width of this groove or channel varying with the specimens and being usually seen on both faces of the blade, resulting in a *bi-concave cross section*. A look at the plate will make this description, necessarily long and detailed, much more clear. To avoid possible confusion it should be remarked that a Folsom point never has any stem nor barbs such as are found in many cases on spear heads or lance points, so called "buffalo points," or arrowheads. The Folsom points were thus designated because the first typical specimens of the kind were found, or, at least, recognized, in the course of paleontological excavations conducted by the Colorado Museum of Natural History of Denver, near the little town of Folsom, east of Raton, in northeast New Mexico, during the seasons of 1926 and 1927.

Soon after, a certain number of beautiful points, but without the characteristic lengthwise groove of the typical Folsom points, although displaying other elements in common, were found on the Western Plains and were wrongly named "Folsom points." I first called attention to their differences and later named that new group by the generic term of *Yuma points*. This was to avoid confusion and to establish a clear difference between the real Folsom points and similar ones, on the one hand, and, on the other hand, the finely flaked points of various types, but not "fluted" or "grooved." The name Yuma came from Yuma County in northeast Colorado, where the largest number of these specimens and the greater variety of types had so far been found. The selection of the terms Folsom and Yuma is, therefore, in the best archaeological tradition which generally gives to a class of artifacts or to a culture or a cultural phase the name of the first or more famous site, or of the nearby town, or of the region where principally found.

Yuma points are *pointed blades* with faces finely *flaked by pressure*, and edges either parallel or convex, or with sub-triangular form, the base being straight or concave, rarely convex; some have a *stem*, but never any barbs.

If we compare *Yuma* and *Folsom* points we will at once notice that they have in common, in most cases, an unusually fine pressure flaking over both faces and often with marginal retouch and not infrequently the lower section of the lateral edges, near the base, ground smooth, probably to avoid cutting the sinew employed in holding fast the stone point at the extremity of the wooden shaft. The surface flaking is frequently narrow and ribbon like, forming rows of skillfully made shallow grooves, running parallel to each other and often obliquely to the edge, across part and sometimes all the width of the blade according to specimens. This is less noticeable on Folsom points as the longitudinal groove, typical of that class, has removed an extensive portion of the original surface of the blade. However, the flaking is not equally good on all specimens and some either show the lack of skill of some workers, or haste in making the artifacts, or decadence in workmanship in some regions or in some phase of the culture, or also possibly material of less quality.

Besides this common trait in pressure flaking technique and its frequent excellence, the Yuma and Folsom points share in two blade shapes, the one with parallel edges (Type 1) and the other with more or less convex sides (Type 2). They also have in common some points with straight bases, and many with concave bases. However, the "squarish" and the "wavy" base types are reserved to the Folsom points and the convex bases rare on Yuma points are never seen on Folsom specimens, as far as I know. And, whereas the stemmed type is one of the Yuma complex, the longitudinal groove is the strict and distinct feature of the Folsom points.

By the way, the term point is used here to designate a "pointed blade" as already described, and refers, principally, to the shape without prejudice of the use or destination of the artifacts. By reason of their form and size, and still more convincingly due to the fact that they were several times found in close connection with bones of animals, it seems obvious that they must have been used as *weapon points* for hunting and in war. But this purpose need not be exclusive as some blades would make efficient knives, others could function as side scrapers, and a few are pointed enough to be occasionally used as borers. Unfortunately, at the beginning, some persons untrained in archaeology called Folsom and even Yuma points "arrowheads." It clearly seems that most of those specimens are too large and too heavy to he properly shot as arrowheads with the ordinary Indian bow, except, possibly, the smallest Folsom points. Moreover, if the Yuma-Folsom weapon points really are as old as claimed by some scientists worthy of our confidence, they obviously cannot be arrowheads, as the invention or introduction of the bow and arrow in America, according to present evidence, seems much more recent. On the other hand, judging from their shape, size and antiquity, the Folsom and Yuma points can more logically be considered as heads or points for *darts, assagis* or *javelins*, or even *lance* or *spear*, some of these weapons being held firmly in hand by their shafts, others being thrown by hand or otherwise.

The *types of Yuma points* being more numerous than those of the Folsom class, we must come back to the definition previously given in order to discuss the different varieties. My typology of the Yuma point was, at first, purely empirical, that is to say, only based on the observation of shapes so far found. Happily the relatively small group of specimens then on hand turned out to contain practically all varieties ever discovered. Thus, as early as my first paper published in January, 1931, was I able to establish a descriptive terminology and a basic typology, which has endured to date, with only the addition of a sub-type of stemmed point later recognized. The definition of the Yuma points proposed at the Symposium of the Antiquity of Man, held at Philadelphia, last March on the occasion of the 125th anniversary of the founding of the Academy of Natural Sciences, practically is a summary description of the types which I have presented in several papers. Let us pass them rapidly in review.

First, the *blade types*: Type 1 has straight or nearly straight and parallel edges. Type 2 has more or less convex sides, with base from slightly narrower than the maximum breadth of the blade to base very narrow or constricted, thus forming respectively sub-type 2-a and sub-type 2-b. Type 3 comprises the elongated, sharp tipped, triangular points of sub-type 3-a and the much more rare points of sub-type 3-b with a squarish base, broader than the blade. Some implements of this last variety seem to have been used as alternate scrapers and possibly borers; in other words they may be more exactly called tools than weapon points. In the same manner, as already suggested, artifacts of types 1 and 2 could make serviceable knife blades when properly hafted for that purpose. Type 4 is reserved for stemmed points. It is divided into two styles: sub-type 4-a, lanceolate points with a stem rather narrow and fairly thick, and with rounded shoulders, whereas sub-type 4-b is a blade of type 1 or 2 with a stem of same thickness and surface flaking, in most cases, as the body of the point and only a few millimeters narrower.

All points of types 1, 2, and 4, have a lenticular or bi-convex *cross-section*. Points of type 3, being narrower, are often thicker in order to give enough strength to the elongated sharp blade, and they tend

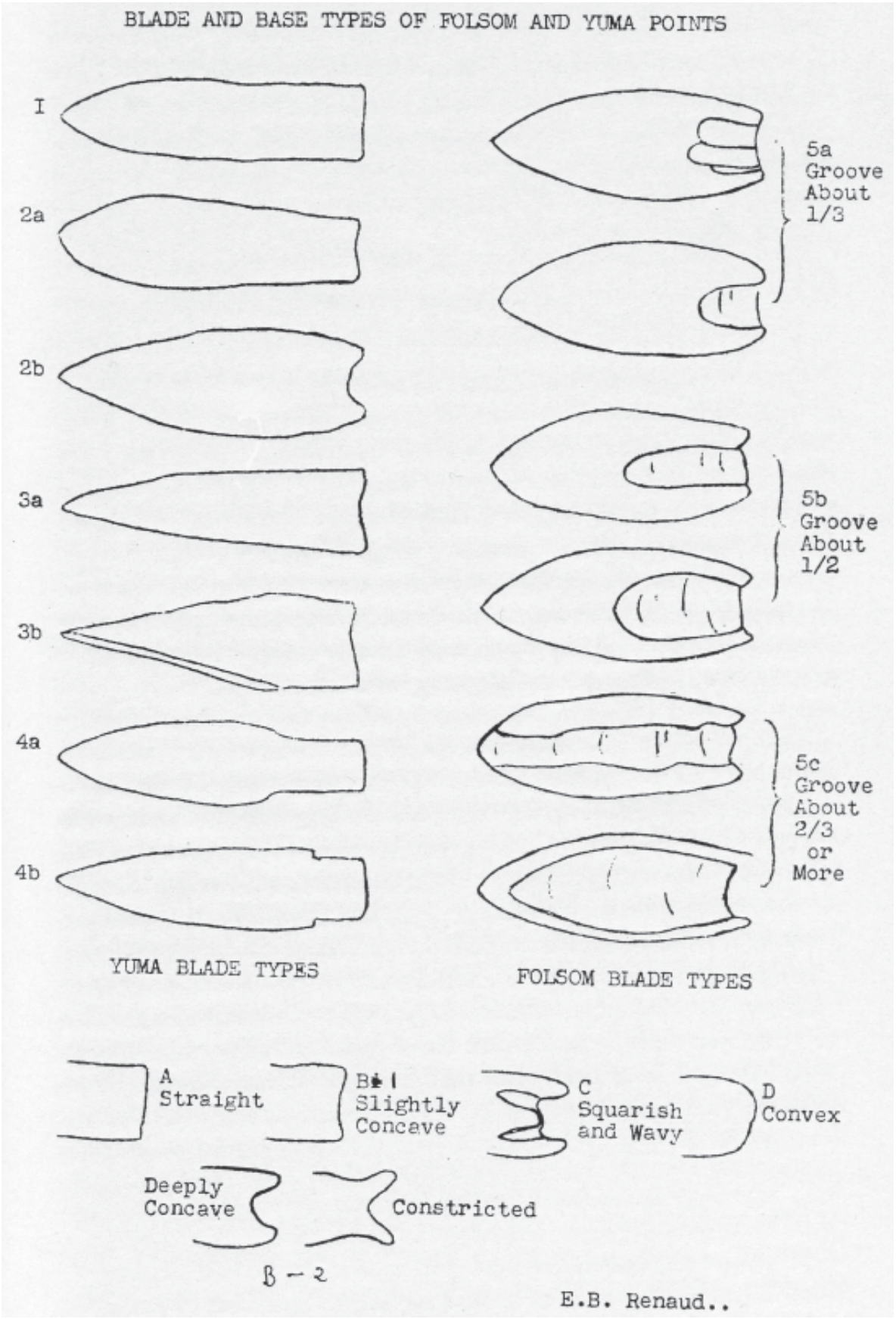

PLATE 13.
Blade and Base Types of Folsom and Yuma Points.

to develop a dorsal ridge, lengthwise along the middle part of the two faces. This lateral contraction coupled with the median thickening causes the cross-section to assume a lozengic shape. On the contrary, as already said, the typical Folsom point owing to the removal of a broad and relatively deep spall on both faces has a bi-convex cross section with lateral ridges.

Not much can be added to the *typology* of the *Folsom points* as it has been stated in the definition that it is a pointed blade with either fairly straight and parallel or with convex edges. The tip is often more rounded as in types 1 and 2 than truly sharp, and never acute as in type 3. The only thing to discuss is the characteristic grooving. In any fairly extensive series one will at once notice the variety of length, breadth and regularity of the longitudinal groove. Although most of the specimens are "fluted" on both faces, a few have only one lengthwise groove. In some cases it appears obvious that the first spall removed went deeper than anticipated and left the blade too thin to attempt flaking a second one off the other face. Other times the reason is not obvious. On some pieces the grooves are neither as long nor as broad on both faces, and, the same as on other specimens. They are irregular in shape and direction, not following the long axis of the blade, they are "wavy" in depth and contour like a poorly struck flake. Only in the best points, and such pieces are not rare, do we see the grooves skillfully made very nearly similar in shape and dimensions on both faces of the blade. In such cases the fluting extends almost to the tip of the point and the edges of the groove are parallel, or nearly so, with the sides of the blades and thus they form a lateral ridge with a gentle slope both ways, toward the sharp edge of the point and the central groove.

If one arranges a series of Folsom specimens, designated as type 5 in our scheme of classification, according to the *length of the longitudinal groove*, sub-types can be established for the sake of convenience in describing these points and their characteristic "channel." Some Yuma points, it might be remarked at the start, display a thinning of the base by means of marginal retouch or small flakes removed apparently to facilitate hafting. The same reason seems to have inspired the ancient artifact maker to strike off the base line, usually concave, of some Folsom points a few narrow and more or less long flakes on one or both faces, or else one broader, scale-like flake. This would be a natural extension of the previously noted practice of thinning the base. Such specimens will be pooled into our sub-type 5-a, with flakes or grooves not exceeding about one-third of the length of the blade. Then there is a group of points with grooves more or less irregular in shape and proportions, some broad from even the base line, others and more numerous ones, a narrower start and a progressive broadening, but in either case not longer than approximately one-half the total length of the piece. This, which seems to mark an advance in the skill or daring of the prehistoric weapon maker, may be termed sub-type 5-b. Sub-type 5-c is reserved to points with a channel or groove covering at least two-thirds of the length of the blade; a few are even longer and in some instances the workman overshot his mark and the flake removed goes from base line to tip of the point, making it very thin. In fact, if the first flaking off of the blades from the base was in order to help in mounting it on a shaft, the increase in the length and breadth of the spall must have been done to reduce weight. Finally, the Folsom man, having fully mastered the art of producing this daring fluting, manufactured elegant points, shapely and light, but the excess in removing a long and broad spall weakened his weapon point. This is proved by the large number of fragments found, either tips or the portion of the basal section held by the shaft end. Such things could not stand the impact when the point struck its aim. It may be in search of a remedy to this fragility that the Folsom points of that beautiful sub-type 5-c are smaller than most other Yuma and Folsom types, even reaching such a short size, although often relatively broad, that they could be used as missiles shot with a bow.

Several facts postulate a close *relation*, between *Yuma and Folsom points*. First, they both were made by means of the same skillful pressure method. Second, they have in common the shapes of types 1 and 2, and the straight and more often concave base forms. Third, the thinning of the base seen on

many Yuma artifacts seems to be the starting point of the increasingly more daring and skillful flaking of a longitudinal groove becoming the main characteristic of the Folsom points without which it often could not be distinguished from a Yuma specimen. Every step of the progressive evolution from a plain Yuma of type 1 or 2 to a fully developed Folsom of our sub-type 5-c can be followed on specimens of a representative collection. Fourth, on points with only one groove the other face has the same appearance of flaking as a Yuma blade; on specimens with short and irregular grooves, the rest of both faces is again such as seen on Yuma points; a couple of pieces with a single groove showed a "hinge fracture" which spoiled the work and explains why the specimen was left unfinished and rejected. On a Yuma point an unsuccessful attempt had been made to remove a spall in order to fashion it into a Folsom point. Finally, at several sites, attentive observers collected finished Folsom artifacts and the spall which had been struck off in order to produce the characteristic longitudinal groove. When placed back on the piece, it filled the channel; the Folsom point was again a Yuma point. Nothing could prove more conclusively the morphological and probably cultural relation of the two types. It also clearly suggests that the simpler and generalized Yuma must have preceded, as a type and as an individual point, the more highly specialized Folsom point. It does not preclude the possibility of their coexistence in the same culture or even in time in two cultural phases of different distributions, one remaining with Yuma only and the other evolving the Folsom type. Further field work is needed to establish their actual chronological relation. It can be settled by uncovering Yuma and Folsom specimens together in clearly stratified sites; also in comparing the species of animals whose bones are seen in close association with the different types of points. Then and only then, after the correct interpretation of facts has been made, will we be able objectively to accept or reject the conclusions suggested by typological observations.

It is a bad practice in taxonomy to multiply uselessly the number of types and their subdivisions. It causes confusion for the amateur and annoying complexity for the field and the museum men. A classification must be simple, logical and objective; it must overlook individual variations and small local peculiarities. To create as many types as there are possibilities of combination of blade types with base types is undesirable in its impractical multiplicity and unwarranted by the very small number of specimens for each of the numerous classes. However, it may be interesting to note the *association of base types* with *blade types*.

On the basis of the inspection of 348 Yuma and 119 Folsom points the following percentage of base types were observed. It was found that these Yuma points had 31.03 per cent base type A, or straight, 36.49 per cent base sub-type B-1 or slightly concave and 29.02 per cent sub-type B-2 or deeply concave, with only 3.44 per cent of D type or convex. The Folsom points showed the small percentage of 4.20 with a straight base; then 20.16 per cent, with slightly concave bases, but the large proportion of 63.86 per cent with deeply concave bases and 11.7 per cent of concave bases with a squarish or wavy line. In other terms pooling together all concave base forms we have 65.51 per cent for Yumas and the enormous percentage of 95.78 for Folsoms which makes it truly typical for those points.

Going a step further we may inquire as to the association of base types with point types and sub-types. On the basis of our records of past years we have following figures. Blade type 1, with parallel sides, 11 straight and 30 concave bases; type 2, with convex edges, 48 straight, 133 concave and five convex bases; type 3, or triangular points, 15 straight, 52 concave and 4 convex bases; sub-type 4-a, or lanceolate points with narrow stem, 6 straight and 5 concave bases; and sub-type 4-b, or blades with a broad stem, 28 straight, 18 concave and 3 convex bases. For the Folsom points we have: sub-type 5-a, with very short groove, 43 concave base and 6 squarish or wavy; sub-type 5-b, with medium groove, 1 straight, 26 concave and 1 squarish base; finally, sub-type 5-c, or typical Folsom with long and broad groove, 4 straight, 31 concave and 13 with squarish or wavy base line.

The consideration of the *dimensions* of Yuma and Folsom may best be presented in the form of

tables taken from our publication of October, 1934, "The First Thousand Yuma-Folsom Artifacts." The *length* of the points is the following with indication of minimum, maximum and average by sub-types.

	Types	Minimum	Maximum	Average
	1	36	83	52.83
	2-a	29.5	99	58.33
	2-b	30	121	63.86
	3-a	34	150	67.01
Yuma	3-a D base	50	57.5	53.10
	3-b	48	98	72.20
	4-a	33.5	88	69.60
	4-b	42.5	110	66.80
	5-a	31	115	65.27
Folsom	5-b	44	102.5	67.20
	5-c	17	75	45.41

This shows that true *Folsom* points are by far the *shortest.* The types 1, 3-a with convex base, and 2-a form a medium group, while all the others are longer and very close together, except 3-b which is probably a tool more than a weapon point.

The *breadth* of the Yuma-Folsom points is shown in the table below.

	Types	Minimum	Maximum	Average
	1	15	31	21
	2-a	17	29	22.06
	2-b	13	31	22.04
	3-a	13	43	20.71
Yuma	3-a D base	14.5	29	18.88
	3-b	22	33	28.10
	4-a	17	31	22.87
	4-b	12.5	30	21.91
	5-a	16.5	33	25.78
Folsom	5-b	20	36	26.40
	5-c	14	32.5	21.94

It will be noticed that the widest artifacts are those of sub-type 3-b already noticed as being the longest, then the points with short and medium groove, 5-a and 5-b, while the 3-a sub-type with convex base, already mentioned, is the narrowest, and all the others approximate the same medium width.

As to *thickness* the following table reveals that the typical *Folsom* points, shortest of all, are also the thinnest. The 4-b sub-type is. thickest; all the others have closely similar thickness.

	Types	Minimum	Maximum	Average
	1	4	7.5	5.77
	2-a	4.5	8	6.03
	2-b	3	9.5	6.05
Yuma	3-a	3.5	9	5.97
	3-b	4	8	6.66
	4-a	4.5	9	6.77
	4-b	5	9.5	8.69
	5-a	5	14	7.00
Folsom	5-b	3.5	10.5	6.73
	5-c	3	6	5.38

Something may be said now about the *quality of workmanship*. Perfect symmetry of contour, elegance of shape and good proportions, can hardly be expressed in a comparable manner, and degree of skill cannot be estimated exactly in words. That is why, a few years ago, I used two centimeters as a measuring unit and counted the number of flakes at various places along the edges of the points in order to obtain an average figure thus expressing in a clear and comparable manner the relative fineness of the flaking. A few figures will suggest the results for Yuma points: type 1, 4 to 8, average 5.8; type 2, 3 to 8, one case 17, average 5.3; type 3, 4 to 8, average 6.5; type 4, 4 to 7, average 5.5. This shows that three types have almost the-same average degree of workmanship, although there are variations in the manufacture of the different points. It also translates the fact, often observed, that the long, narrow triangular points are frequently of beautiful fracture and display fine regular flaking, their average being clearly superior to that of the other types. In the Folsom group we find a great variation in quality. For instance, 5-a points have a range from 3 to 12 flakes for 2 cm. and 5-b points 3 to 9, but their averages, respectively 5.8 and 5.7, are practically the same and also similar to those of

the three ordinary Yuma types or slightly better, except for type 3, suggesting again their relationship to them. As for the original Folsom points, once more they reveal a difference of fineness. Their flaking fluctuates between 4.5 and 15, with an average of 8.87, well above all other classes, although a few are somewhat roughly made, as previously mentioned. They seem to represent a final achievement in skill; in that they are really comparable to the best Solutrean artifacts of Western Europe.

Last, a few words about the *materials* used in making the points. For the Yuma group we find the following percentages: chalcedony 34.56, quartzite 20.37, chert 16.66, agate and petrified wood 14.19, jasper 7.46, the rest made of miscellaneous kinds of stone. For the Folsom series we have: chalcedony 53.84, jasper 12.30, quartzite and chert, each 7.84, petrified wood 6.15, and miscellaneous 12.30. In both groups chalcedony was then the preferred material, but jasper passed from the fifth place to the second in the Folsom types, quartzite and chert are fairly strong; in both classes, with agate-petrified wood following. It is interesting to note that chalcedony, leading in the main groups, is the material used in the fashioning of three-fourths the number of true Folsom, 5-c type points, probably for its beauty and fine grain allowing especially skillful flaking.

It would be useless to discuss the *geographical distribution* of the Folsom and Yuma points as it is constantly changing and expanding. They have been found from the Rocky Mountain region, seldom west of it, clear to the Atlantic sea coast, with possible local variations of detail, and from the Mexican border to southern Canada. But the area of greater concentration of the finds, so far, seems to be on the Western Plains, principally in eastern Colorado and eastern New Mexico, in western Nebraska and eastern Wyoming, as well as western Texas. Folsom and Yuma specimens have been found together, at other places only the one or the other type, and the respective distribution of the two main classes is not yet sufficiently known to draw conclusions as to their cultural and chronological relations.

Work done by archaeologists, geologists, and paleontologists, at various sites of New Mexico, Colorado and Nebraska, so far seems to indicate an antiquity reliably estimated by several scientists between 10 and 15,000 years, possibly more. Thus these beautiful points are the oldest human artifacts scientifically dated until now in America. They have been discovered, as expected, in association with other implements such as hunters of the late Old Stone Age used elsewhere in the world: side scrapers, end-scrapers, borers, knives, utilized flakes, etc.

Such is our present archaeological knowledge of these points, the best shaped artifacts manufactured by the ancient Americans toward the end of the Pleistocene period.

University of Denver,
Denver, Colorado.
April, 1937.

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A STUDY OF INDIAN PICTURES IN TEXAS

By Forrest Kirkland

Our North American Indian, like primitive man in most other parts of the world, had a profound interest in picture making. He decorated his pots, his baskets, and his clothing with conventional designs; he painted his body in stripes and figures or decorated it with elaborate tattoos; he often pictured his brave deeds on his buffalo robe or on the walls of his tepee; and when rock walls or cliffs were available, he often carved or painted on them designs and figures common to his culture. Most of these designs, except those on the rock walls and cliffs, have perished with the material on which they were painted; and, only rarely, a fortunate archaeologist uncovers some specimen that has escaped complete destruction. But many of the shelter walls and overhanging cliffs, on which the Indian painted his pictures, still stand, like great art galleries, crowded with these dim and crumbling designs—the last extensive examples of our aboriginal art.

Definition of Terms

Wherever smooth, protected rock surfaces occur in North America, Indian pictures are found. These pictures may be divided into two general classes—petroglyphs and pictographs. Petroglyphs, as the name implies, are the pictures which have been carved, scratched or pecked into the surface of the rock. They are usually without color and are, as might be expected, generally in a much better state of preservation than the painted pictures. The number of petroglyphs in Texas is small compared to those reported in other .Southwestern States; however, there are several very fine groups in the district around Van Horn.

Pictographs are the pictures and designs that have been painted on the rocks with some kind of color. Usually, they are found on the back wall or ceiling of dry shelters, but sometimes they occur on the protected sides of boulders and overhanging cliffs. This type of Indian art is, by far, the most abundant in Texas, being found in large groups near Paint Rock, Comstock, Langtry, Dryden, Fort Davis, and El Paso; and in smaller groups, from the Nueces River Valley to the West throughout the Big Bend and the Davis Mountains, and north to the Canadian River in the Panhandle.

Pictographs Are in Very Bad State of Preservation

The thing that impressed us most when we saw our first group of Indian pictures, the group at Paint Rock, was their deplorable state of preservation. Their location, on a stratified rock cliff above the Concho River, is near an old ford of the river. A campground: first, for the Indians; then, for the early travelers and settlers; and since, for fishing and picnicking parties. Thousands of curious people have climbed up this cliff to look at the crude Indian pictures and to leave their names painted, penciled or carved on the rocks. We noticed one name dated as early as 1852. Hundreds of these names are written across the Indian designs. Some of the designs have been painted over with housepaint; others have been hacked off with an axe or used as a target for a rifle. Fires at the base of the cliff have destroyed many designs on the lower rocks. Destruction is in evidence everywhere.

For example: Originally, the ends of 175 stones along the rugged cliff had contained from one to a dozen or more Indian pictures or designs. In 1934, when we made copies of the group, the designs on 41 of these stones had been completely destroyed, and 81 single pictures on the remaining 134 stones had been ruined. We returned in 1935 to check our copies with the originals, and found that many of the pictures had received additional damage during the one year since we were there. It is distressing the way careless sightseers are destroying these fine examples of primitive art.

We have found the condition at other sites just as bad, and in some cases, even worse. Groups like Paint Rock, near public picnic grounds, have suffered most from the hand of the white man. But the white man has destroyed many less designs than did the Indian himself. At almost every location, there has been a great deal of overpainting. One Indian artist, apparently, had little respect for the work of another. In the basket maker shelters of Val Verde County, this over-painting on the back wall was continued generation after generation, until all that remains now in some shelters, is a confusion of color from which, only now and then, a fragmentary design or figure can be distinguished. There are hundreds of feet of wall space in these shelters on which the pictures are destroyed. And this destruction is always worse in shelters where the midden deposit has accumulated in very large quantities. Evidently, the first designs were painted at a convenient level, about five feet above the original floor. As time went by, the pictures were over-painted again and again; and the accumulating refuse in the floor raised its level until, at length, the pictures were at the very feet of the occupants; thus they were scuffed and scarred until they were completely destroyed. Basket maker shelters have been found in which the pictures were almost completely covered by the midden deposit. Fortunately, in a number of shelters, the pictures have been protected by a shelf, or hump of rock at the base of the back wall; from these shelters we have secured our best examples of this art.

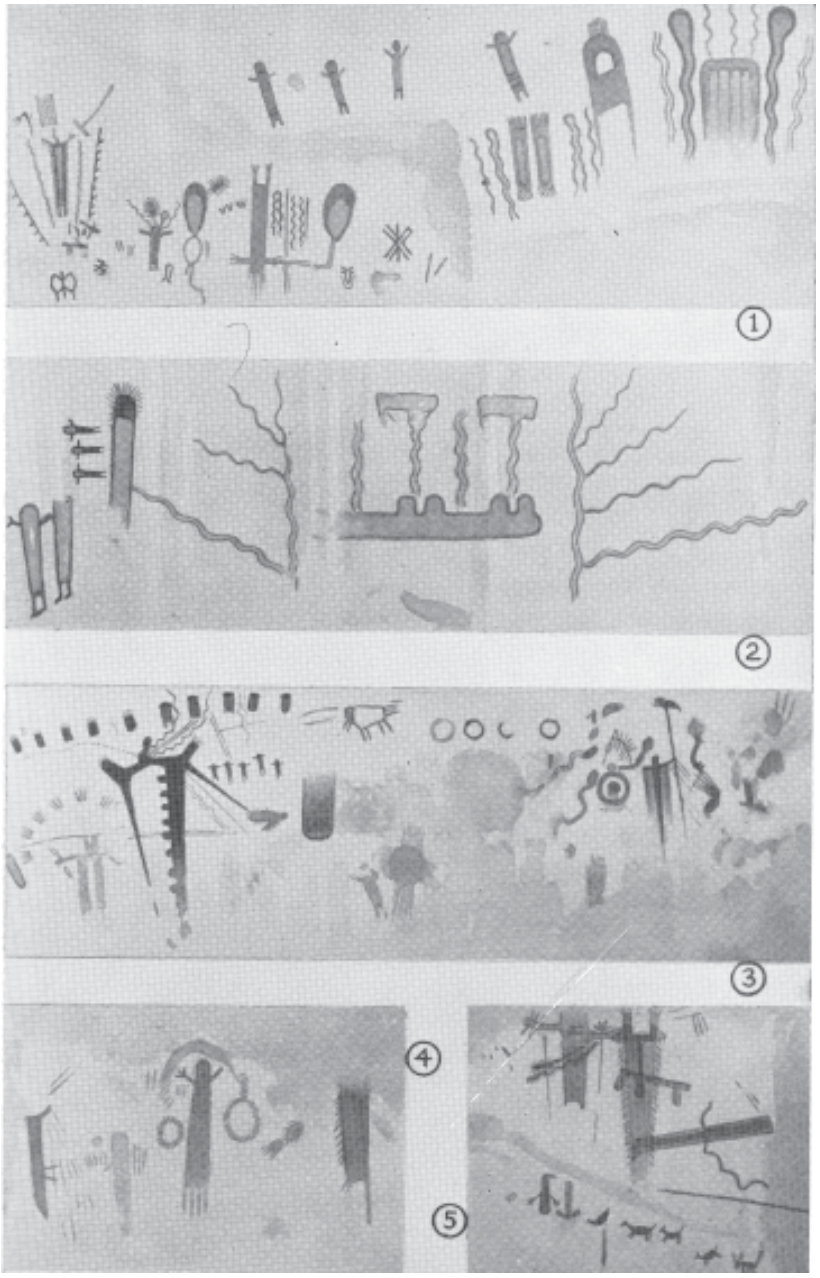

PLATE 14.

Typical basket maker designs from four shelters in One Mile Canyon, one mile east of Langtry, Texas. Figures 1 and 2 are from the same shelter and are continuous on the wall. They represent a total length of 36 feet. Fig. 3 is all that remains of a large group of pictures in the largest shelter in the canyon. Fig. 4 is of special interest because these designs were originally completely buried by the debris. They had been recently uncovered by a trench against the wall and could only be seen when wet. Fig. 5 comes from a small shelter in the bank of the Rio Grande just below One Mile Canyon.

At Meyers Springs near Dryden and at a few other locations we have found very good evidence that certain designs were deliberately smeared or otherwise mutilated by the Indians themselves.

Fires and smoke have done much damage to pictures at many locations. In the Davis Mountains, the pictures were often painted very low on the sloping backs of small shelters used chiefly as fire places. These pictures, usually painted in black, and very difficult to find, have been badly damaged by the fire, and can only be seen clearly when wet. Most designs on the ceilings of shelters have suffered to some degree from the accumulation of soot.

The hand of man, however, is by no means the only enemy of Indian pictures. At Langs Mill near Fredericksburg we found a large group badly damaged by a gray lichen which is gradually covering the damp walls of the shelter. A similar lichen is growing over the paintings in one of the shelters in the Seminole Canyon. Exposure to sunlight, blowing sand, rain, and the effect of flood waters — weathering — is another most unrelenting and certain agency of destruction. The rate of this weathering depends, to a large measure, on the amount of exposure and the type of rock. Chalky surfaces weather away much faster than those of hard limestone or granite. The designs at Comanche Springs near Lajitas on a chalk bluff, although comparatively recent, are almost weathered away. At Aqua Frio in the Big Bend, also, the very hard, igneous rock is splintering off in huge flakes, taking the designs with them. At every location the effects of weathering and flaking can be seen. A few more years—fifty or a hundred, perhaps less— and time will have finished its task of erasing the art of our American Indian.

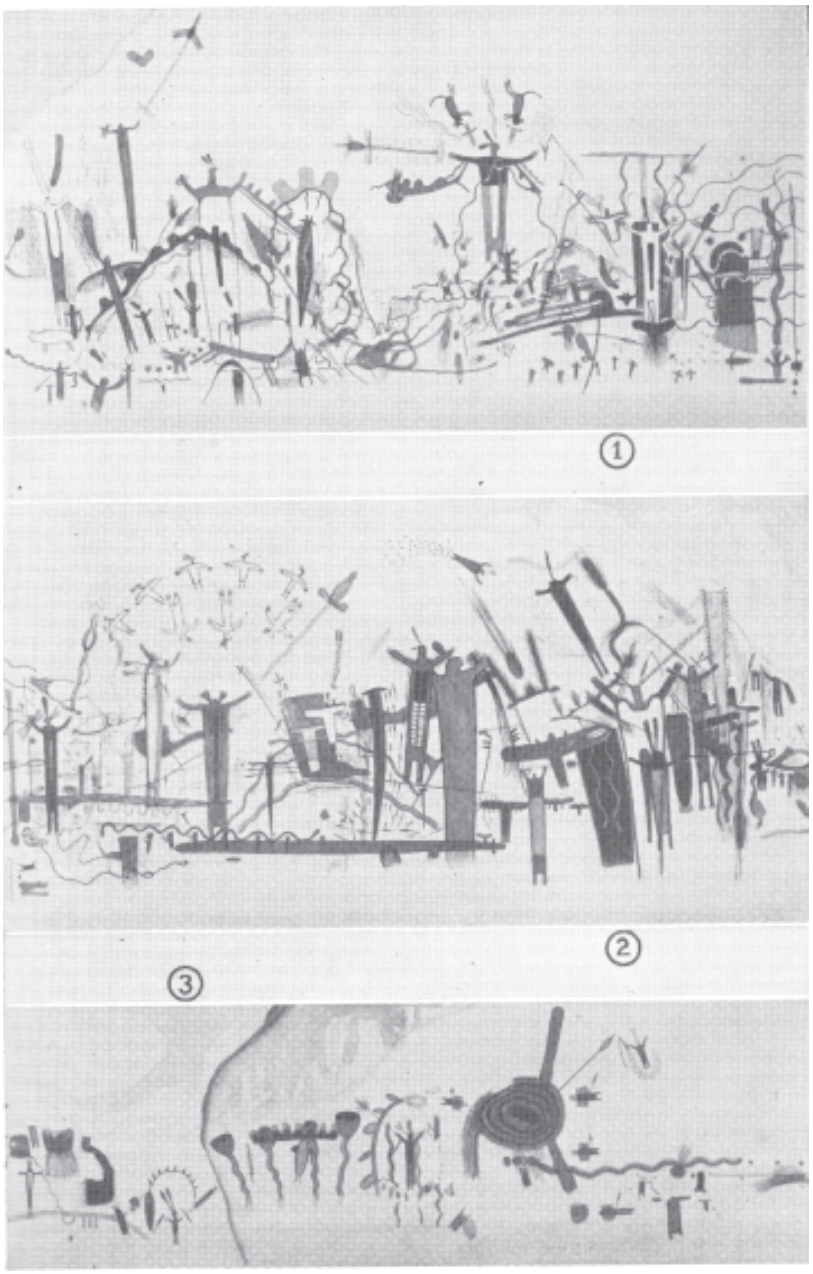

PLATE 15.

Basket maker designs from a small shelter in Rattle Snake Canyon on Babbs' Ranch, eight miles west of Langtry, Texas. Figures 1, 2 and 3 are continuous from left to right on the shelter back wall and ceiling. The total length is 75 feet. The designs are now very dim but easily seen when wet with water.

I know of no effective method of checking the natural weathering of the rocks, but many years may be added to the life of some of the paintings if

the people who visit the sites will show the respect due such examples of art and refrain from the use of pencils, paints, rifles, and chisels. The chalking or oiling of pictographs for photographic purposes, even by scientists, should be discouraged. This practice does irreparable damage to the pictures and is quite unnecessary. We have found that an application of clean water is the most effective method of temporarily restoring very dim pictures to their original strength.

How We Became Interested in Indian Pictures

My wife and I became interested in Indian paintings after a visit to Paint Rock in 1933. Realizing that in a few years these pictures would probably be gone forever, we decided that something should be done at once to save them for the future. And it was only natural, since both of us are professional artists, that we should think first of making accurate copies to be filed away in a safe place for future study. To make correct copies, even of this one group, would take time. And we were told that there were many other groups. Our spare time consisted, chiefly, of our summer vacation, but we were definitely interested; so in 1934, we returned to Paint Rock, and as an experiment, made scale copies of every design and picture on the cliff. This work proved so successful and met with such favorable comment from both artists and archaeologists that we have adopted Indian pictures as our pet hobby, and have devoted all of our spare time since to copying and studying the pictures at other well known locations.

At the time of this writing, complete copies have been made of the pictographs at 30 locations scattered over most of South and West Texas. Because the painted pictures are weathering away so much faster than the petroglyphs, we have worked exclusively at pictograph locations, reserving until last the sites where petroglyphs are found.

So far as I know, we are the first to undertake the task of systematically copying and studying Indian pictures on a very large scale. It was, therefore, necessary at the very beginning to develop a procedure best suited to the task. Since we hope that this and subsequent papers will prove the value of such an undertaking, it may be well to give some attention to our methods for the benefit of other artists or archaeologists, who may wish to undertake similar work in other sections.

The Advantages of Scale Drawings Over Other Methods of Copying

Tracing, photographing, and making scale drawings, are the three methods generally employed to get copies of Indian pictures. The chief advantage of tracing is that this method can be used by any one not skilled in making drawings. The difficulties encountered, however, in obtaining tracings of very large designs, and designs high above the floor; and the very bulky copies that result, make the method unsatisfactory for use on a large scale.

Photography is the method most commonly used. First, because it requires so little time and can be done by almost any one who has a suitable camera; second, because photographs are generally, but without sufficient reason, accepted as the most accurate copies possible. There are, however, several very serious drawbacks to this method:

1. Many designs clearly visible to the eye are entirely too dim to photograph successfully.

2. The imperfections of the background and over-painted names, etc., show up so clearly on the photograph that the Indian designs are difficult to determine.

3. Many pictographs are painted in positions that make it almost impossible to focus a camera on them.

4. Photographs of pictures on curved or uneven surfaces are only accurate in the center. Designs at each side are always badly distorted.

5. There is no way of securing a uniform scale in a series of photographs. Size can only be judged by some known object placed in the picture.

6. This is very important—ordinary photographs do not record the colors of the original pictures.

The only serious objections to making scale copies are that this method requires considerable

time, and that the artist must combine professional skill with a keen interest in archaeology. We chose this method for making our copies because we were fortunate enough to have the professional skill, and because this method, when properly used, overcomes almost every objection raised to tracing and to photography. Every design that can be clearly seen and reached for measurement can be accurately copied to scale, and designs too high to be measured can be drawn freehand almost as accurately as a photograph. Every design can be shown in the same scale without distortion and without a distracting background. The copies are small and of uniform size. And, what is more important in the case of pictographs, every design can be shown in its correct colors.

Materials Used For Making Copies

Water color was chosen as a medium because water color board is most suitable for careful pencil drawings, the color can be quickly and accurately matched and applied over the pencil sketch, and will dry immediately. Since the copies are intended to be filed away as a permanent record, only the best standard materials are used. Our colors are chosen from an absolutely permanent palette of a reliable make, and our paper is hand made English linen mounted on six-ply board. All copies are made on uniform size cards, eleven by fifteen inches, which is one-fourth of a standard water color board. This size is ideal for handling and storage, and has proved a very convenient shape for copies at most locations. When the copies are finished, these boards can be sealed in cellophane envelopes, and with reasonable care, should remain unchanged almost indefinitely.

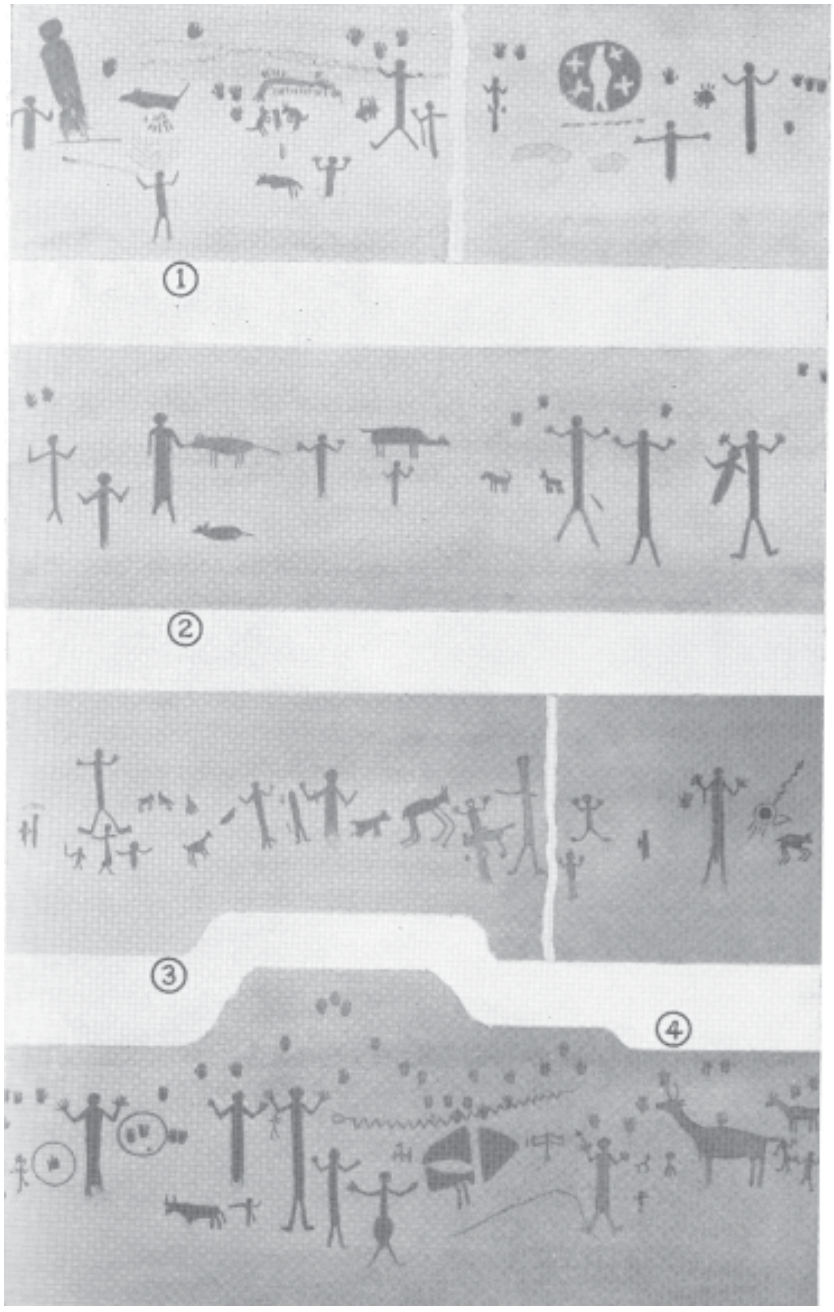

PLATE 16

Pictures from the back wall of a flooded shelter in the Seminole Canyon, just below the highway bridge eight miles west of Comstock. All of the pictures are in red except two or three designs which are in yellow. They are associated with a burnt rock mound which is on the bank in front of the shelter.

Choosing the Scale For the Copies

The size and type of the pictures at a location determine the scale. For the sake of easy comparison, however, we try as often as possible to use the same scale on all pictures at one place. Very large pictures can, of course, be reduced successfully to a much smaller scale than very small or complicated designs. One-half inch to one foot is the usual scale for large designs, although one and one-half inches to one foot is best for groups or small pictures. When the pictures are continuous, or almost so, on a long wall, a scale is chosen that will fit the group to a series of boards or plates, as we call them, so that no important design will be divided, and so the group can be reconstructed in its true relations by placing the plates end to end. (Plate 15). To do this requires considerable measuring and planning before the copies are begun, but the plan has worked out remarkably well at every site where the pictures were continuous. If a blank space is on such a wall, a break is shown in the copy and the distance omitted is noted on the plate. If for any reason, a picture has to be moved from its correct position, a note is always attached explaining the alteration. Where the designs are scattered about over the wall or cliff so that the above procedure is impractical, they are copied or numbered as nearly as possible in their order from left to right. (Plates 17 and 18).

Procedure of Making Copies At A Location

Our actual procedure at a location is as follows:

1. A careful survey of the location is made to determine the number and type of designs to be copied.

2. The walls are measured, the scale chosen, and the designs to go on each plate determined.

3. The section allotted to the first plate is divided in convenient spaces, usually three or four feet, depending on the scale, and marked with upright sticks. (We avoid chalking the wall if possible). This greatly simplifies the work of copying.

4. Each design in this section is carefully measured and copied to scale on the plate in pencil. The accuracy of the final copy depends entirely on the skill of the artist and the care with which he performs this operation.

5. When every design on the first section has been copied in pencil, the general tone of the background is painted in. No attempt is made to show small imperfections in the rock or slight variations of color, which would only confuse the Indian designs.

6. Seated in front of each design, we recheck its copy for accuracy, match its color, and paint it in on the plate. For the sake of legibility, it is necessary, in most cases, to use stronger color than is now found on the paintings. As a rule, we try to make our copies about the strength of the original paint. Slight breaks in lines and figures from flaking or other injuries are disregarded in the copy, but no part of a picture is ever added that we cannot be positively certain about.

7. The above procedure is continued with each section until the entire group is copied. Then, a careful survey is made of the location for artifacts, mortars, burnt rock hearths, and other cultural indications.

8. Photographs are made of the shelter or cliff and of any other objects of interest at the location.

9. Notes are made of the location and of every interesting thing observed during our survey of the grounds. The kind of rock on •which the designs are painted, the condition of the designs, the colors used, the over-lapping of designs, and any other unusual feature of the paintings, are carefully recorded in these notes. A condensed draft of these notes and the photographs made at the location are later attached to the back of the copies. The original notes are filed away as a permanent record of the survey.

In the beginning we were interested chiefly in the artistic merit of Indian pictures, and although we felt that our copies might be an aid in the study of Texas Archaeology, we had little knowledge of the subject and no thought of qualifying for the work. However, after our first field trip, we decided that the archaeological point of view was essential to a complete success of our undertaking; and so,

we began collecting and studying all available material on the subject. From this study and from the ever increasing knowledge gained from the field trips, we have developed a keen interest in the scientific aspect of Indian pictures, and have come to believe that much light can be thrown on Texas archaeology by their study.

There are three general approaches to the study of Indian pictures: First, a study of the color with which pictographs are painted or the type of carving used on petroglyphs; second, a comparative study of the designs used at different sites; and third, a correlation of the artifacts and other cultural evidence with the pictures at each location. Study along these lines should throw light on the material culture of the Indian, his artistic taste, and his ceremonial and religious practices; it should indicate the general distribution of cultures; and should furnish a means of determining their approximate age. Although our survey is yet far from complete, the following brief discussion of what we have learned should give some idea of the information we may expect from a complete systematic study:

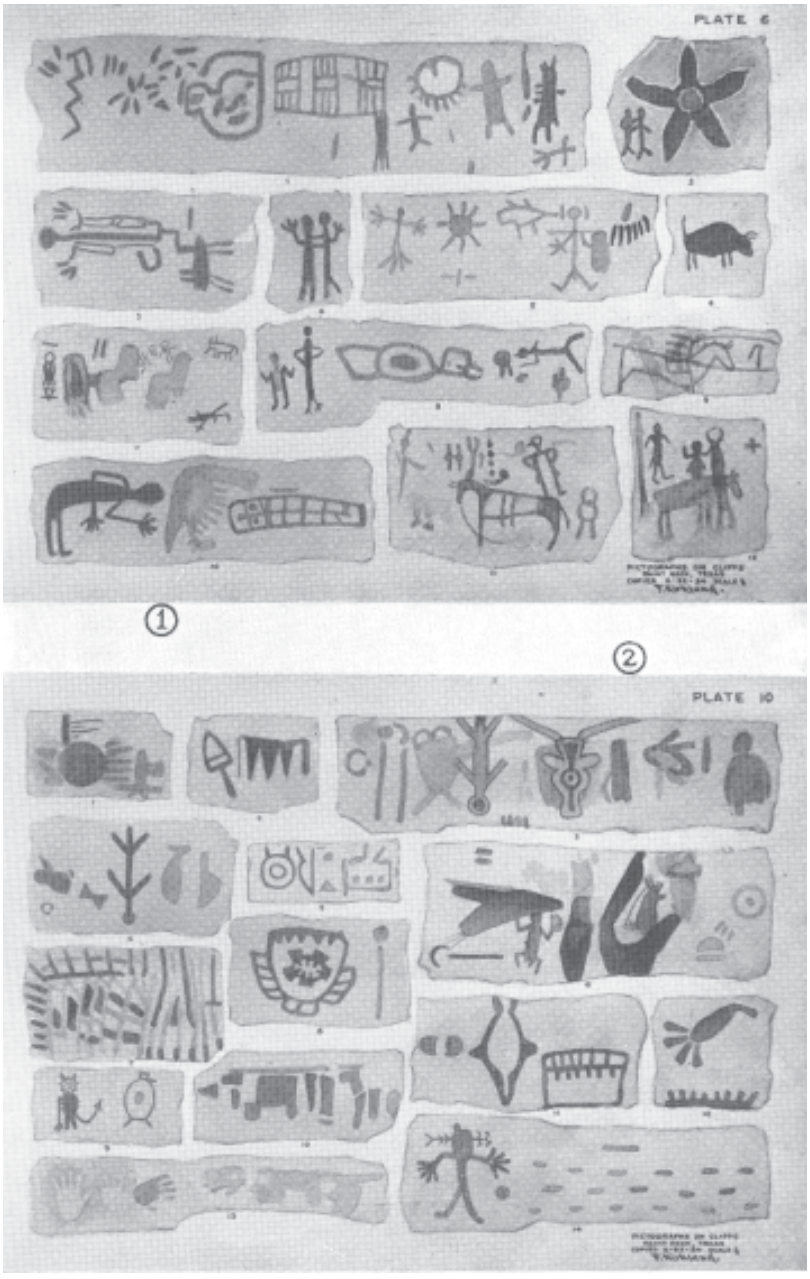

PLATE 17

Designs from the cliff on the bank of the Concho River about two miles north of Paint Rock, Texas. Note the horses at the bottom of Figure 1 and the devil at the left of Figure 2.

The Color Used On Indian Paintings

The study of Indian color has been an interesting part of our survey. The material from which the color was made is about the same at all locations. Reds, browns, orange, and yellows were all made from oxide of iron, found in abundance in most parts of The State, in the form of soft lumps or concretions. Pieces of this color, showing signs of use, are often found in dry shelters. Black was made from charcoal or some other form of carbon, and white from clay or chalk.

Some of the smaller designs at most locations were drawn with the sharp edge of a piece of dry color, but the great majority of the paintings were made with liquid paint, with the aid of some kind of brush.

This paint was prepared by grinding the color in small mortars and mixing it with some kind of liquid binder. Mortars and grinding stones have been found, still stained with the

color. Little is known, however, about the binder. It, evidently, varied somewhat, with different mixtures of paint, which explains why certain designs have flaked off much worse than others on the same surface. On one shelter in the Seminole Canyon, we found three, large, human figures in light yellow, where every other figure was red. On close examination, it developed that these pictures, originally, had been red, also, but the color had almost entirely flaked off leaving a yellow stain on the chalk rock. This stain, no doubt, was due to oil in the binder which had soaked into the porous sur face. Lumps of prepared color have been found (as before stated), but, as far as I know, no brush, still containing color, has yet come to light.

As simple as the Indians' color was, we must admit that it has stood up well under the conditions. At Meyers Springs, the pictures are on a wall that faces west and receives the full force of the afternoon sun from about the middle of the afternoon until sundown, and are so near the water level of the stream that runs under the shelter, that the lower designs are submerged with its every rise; yet many of the pictures are as bright as if they had just recently been painted. We know, however, that many of the pictures in this group are comparatively recent, because of the evidence there of white influence.

The paint in all basket maker shelters is very dim. This is due, more to an accumulation of dust through the ages, than to the fading of the color. This is indicated by the way the color is restored when the surface is wet. Designs on chalky walls often appear dim because much of the color has fallen away in very fine flakes, giving the designs the appearance of crayon drawings.

Of all the six or more colors used, purple-red is, by far the most common; then comes bright red, black, orange, yellow, and white in the order named. We have never found blue or green pigment, although it has been reported at certain locations within the state. Red, in its various shades, appears to be the most durable color. White is seldom very clear and black is always very dim. The carbon,

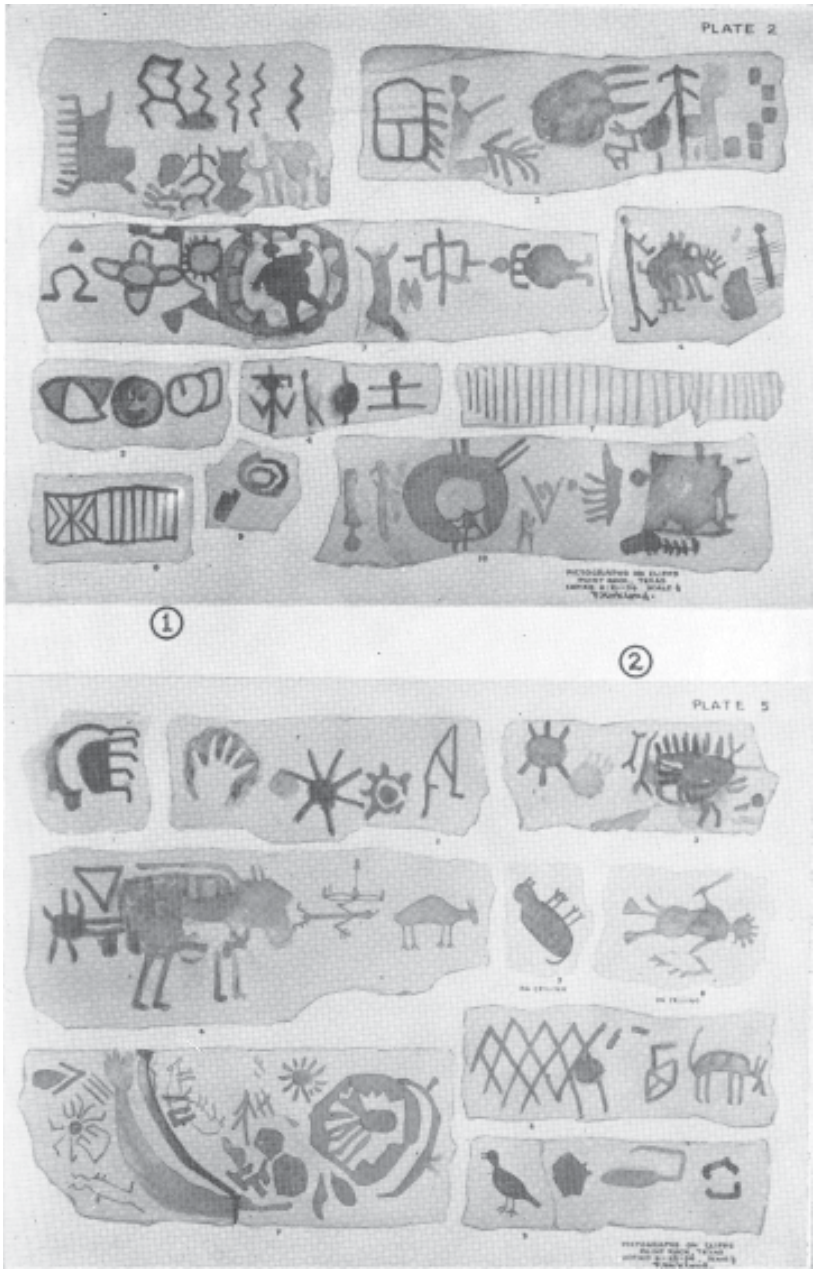

PLATE 18

Designs from the Paint Rock group. This illustration shows two of the complete plates from that site. It required 13 such plates to hold all of the designs at that place.

from which black was made, has not stood very successfully the test of time.

Although three or more colors are found at practically every location, they are, as a rule, used separately on different designs, and only rarely combined in one design. At Paint Rock, Meyers Springs, Rock Pile Ranch, and at many of the basket maker shelters, however, we have found exceptions to this practice. Many of the geometrical designs at Paint Rock are executed in two or three well chosen colors; two colors are combined in many pictures at Meyers Springs; and two very large intricate designs, at Rock Pile Ranch in the Davis Mountains, are done in four colors—red, yellow, black, and white.

The basket makers, however, made the most of polychrome painting. Their favorite colors were purple-red, red, pink, orange, ocher, yellow, and black. In a few instances, we have found two of these colors over-painted to give still a different shade. White has never been found on their designs. Usually, they used two or three colors on one figure, but one fine group, in a shelter in the Seminole Canyon, was painted with six colors. The basket makers were fond of two-tone outlining, and alternating colors in stripes. Their taste for color was very well developed; some of the best examples of their art, when fresh and bright, would have rivaled the work of some of our present day mural painters.

The Study of Designs At Different Locations

An exhaustive study of the designs at the various locations will certainly add a great deal to our knowledge of the Texas Indians. Such a study will require much time and cannot be pursued with any degree of finality, until all the important pictures in the state have been reduced to scale copies, and are available for easy comparison. This, of course, has not yet been done; so, it is only possible here to suggest the course this investigation may take, and the results that now seem likely.

We observed, very early in our survey, a great difference in the type of designs. Some designs were simple, others very intricate; some figures crude, others highly conventionalized; some animals nondescript, others accurately drawn. Several easily distinguished types were often found at one location. Seldom were all the designs at two locations of the same type.

We naturally wondered if these distinctly different types of design, had resulted from difference in ability or taste of the individual artist or from fundamental cultural differences. And, although certain experienced archaeologists contended that the difference was due to the individual artist, we felt that it was too profound in many cases to be the result of anything short of cultural differences. If this were true, our problem was to devise some means of isolating the designs that belonged to only one culture. The first large groups which we copied, Paint Rock and Meyers Springs, presented such an array of types that our task looked hopeless. It was only at the very end of our second year's work that any hope of a solution was found.

It came first, with the discovery of two small shelters in the Davis Mountains, containing only very small pictures of animals painted in black (Plate 20, Fig. 1), and second, with the discovery of four dry shelters in One Mile Canyon near Langtry, containing designs of only one type, very different from any we had copied before. (Plate 14). The small animal drawings were certainly the distinguishing work of a particular culture in the Davis Mountains, and served well to indicate it at other locations, but the number of drawings in the shelters was too few to represent the full work of the culture.

Val Verde County Basket Maker Culture

In One Mile Canyon, it was different. There we found four locations with many different designs and figures, and yet, obviously, all of the same type. We returned to this district at the beginning of our last field trip, July, 1936, and spent two weeks copying and studying similar designs at other locations, and positively determined that this type of design was the work of the Val Verde County basket makers. These Indians always occupied dry shelters, usually, high up steep canyon walls, and

chosen, it seems for their inaccessibility; and perhaps for that same reason, these shelters were seldom if ever occupied by later Indians; so their art is usually unmixed and can instantly be recognized by any one familiar with their designs. (Compare Plates 14 and 15, and Fig. 4, Plate 20 with other illustrations.) Their human figures are very distinctive and of two different types—very large, slender figures and much smaller, squatty figures.

Usually, a slender, broad shouldered man, wearing a fringed robe, holding in his upraised hands a scepter and a broken plant, will be surrounded by several of the small, plump individuals. Serpents and animals, as well as, plume-like designs are common. The consistency with which many of the figure groups and designs are repeated at different locations, indicates a very well developed mythology in the culture. This is, by far, the finest type of work we have studied, and certainly deserves a more detailed report when the survey in that district is finished.

Type Stations in the Study of Indian Pictures

Finding locations at which only the basket makers had lived and painted, gave us hope of finding other locations at which only one culture had left its art. If other such locations could be found, they might be designated as type stations to serve as a basis for the study of their particular culture. And here, we suggest the Rattle Snake Canyon shelter (Plate 15), eight miles west of Langtry, as the type station for the basket makers, until a better location is found.

Our next discovery along this line was a very large shelter in the Seminole Canyon just above the large basket maker shelter explored and reported by the University of Texas in 1933. Here, we found scores of figures, animals, and designs totally

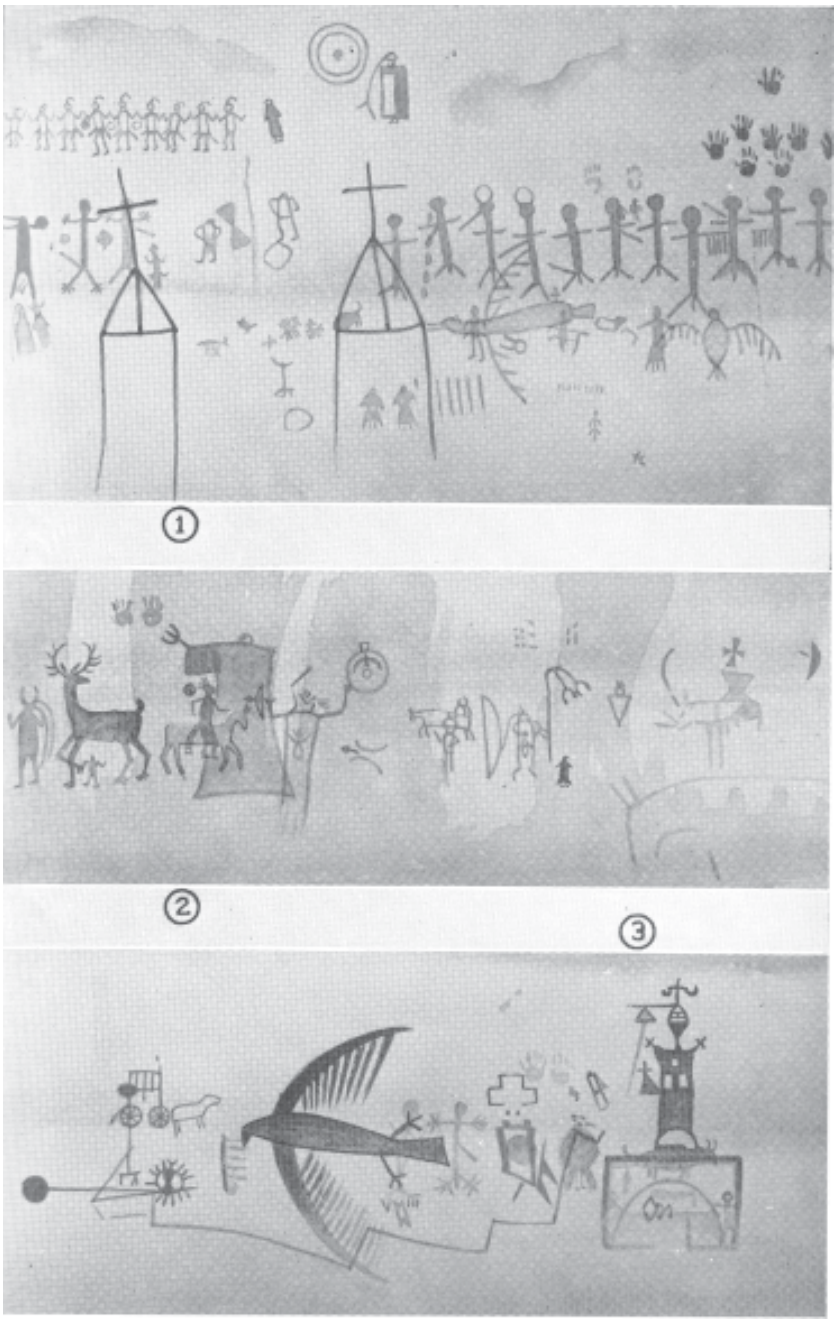

PLATE 19

Here are shown three sections from the Meyers Springs group, 18 miles northeast of Dryden, Texas. Each section represents a length of 18 feet. The group is continuous on the wall and was copied in ten sections. Note the white influence, evidenced by the horses, the stage coach, and the church steeples.

different from those of the basket maker; very obviously, the work of one single culture (Plate 16). And, what was more interesting, the figures correspond exactly with a certain type which we had already observed at both Paint Rock and Meyers Springs. The floor of the shelter is level with the bottom of the canyon and is flooded with every rain, which, no doubt, explains why it was never occupied by the basket makers, who occupied four other shelters near by. There were many mortars under and near the shelter, and on the bank immediately in front was a large burnt rock mound. The Indians responsible for the paintings at this location, evidently, had lived on the bank in the open and cooked on a community hearth. This corresponded exactly with the location at Meyers Springs—the flooded shelter, the mortars and the burnt rock mound—so, it was no surprise that many of the designs at Meyers Springs were of this particular type. Tentatively, we have designated this location, type station for the burnt rock mound culture.

In comparing the designs at Paint Rock with those at Meyers Springs, we noticed that the small, simple, geometrical designs, so plentiful at the first place, were not common at the other. (Compare Plates 18 and 19). This suggested that these designs were the work of a particular culture which had camped a great deal at Paint Rock and not at Meyers Springs; if this be true, we might expect to find somewhere a location occupied only by this culture and containing only its designs. We did this very thing on our last field trip! At Chalk Draw, Comanche Springs, and Hot Springs, all in the Big Bend, we found stratified rock cliffs very much like the cliff at Paint Rock, on which were painted only small, geometrical designs almost identical to those at Paint Rock. Either of the three locations might serve as a type station for the culture (Fig. 2, Plate 20).

Our investigation along this line gives considerable promise, but it has no more than begun. Many more sites will have to be copied and studied before the full value of type stations, in the study of Indian pictures, can be determined.

Another method of studying Indian designs, for which we have had little time as yet, has been made possible by our scale copies. With these copies, it is a simple matter to transfer each design at a location to small individual cards, which can be grouped or shifted according to any desired classification, and percentages and other figures arrived at that would be difficult or even impossible from any other method of study. These cards can also be used in making comparisons of designs at different locations and, perhaps, in many other ways that may be suggested when such study is undertaken.

Indian Handprints

One kind of a design found at many locations in Texas and sufficiently interesting to warrant special study, is Indian handprints. Handprints are of two kinds: Positive prints, made by dipping the hand in color and stamping it on the wall; and negative prints, resulting from placing the hand on the rock and spraying color around it. Red was the color most commonly used in making handprints, however, yellow and white were sometimes used, and one shelter was found in which handprints were made with gray mud on a black ceiling.

We have found handprints in only two basket maker shelters; these were undoubtedly intrusive, but certain of the basket maker designs have a close resemblance to the open hand, except that they are usually larger. In the shelter mentioned above as type station for the burnt rock mound culture, are more than 100 handprints, some as high as 12 feet above the floor and so arranged in more than one place to form a definite design on the wall. (Plate 16, Fig. 3). Not all of the prints were made by men. On the ceiling of one shelter 12 miles west of Fort Davis, are 20 handprints, 19 of which are those of children or women. Children's handprints are also found at Paint Rock. Perhaps the handprint was the Indian's signature which he left, like the white man, as evidence of his visit to the shelter or bluff, but, more likely, it was a part of some initiation or ceremony. Some light may be thrown on this point by further study.

Pictures As A Means of Determining Age

The question of age is one of great interest, and one on which the archaeologist is constantly striving to throw more light. The study of Indian art offers several means by which the age of pictures, and through them, the age of cultures, may be approximated. Any picture showing white influence such as the horse, the gun or the church, must, necessarily, be placed in historic time. Many locations contain such pictures, but that does not mean that every picture at the location is, necessarily, recent. A total absence, however, of white influence at an extensive group may be accepted as strong evidence that the pictures date back to a time before the coming of the white man. Very dim and badly weathered color, especially on a firm rock surface, is always an indication of extreme age. From this sign alone, the basket maker culture would rank among the oldest in the state. This evidence is strengthened by the accumulation of many feet of midden deposits in many of their shelters, until, in some cases, the pictures themselves have actually been covered. An indisputable discovery of pictures of extinct animals, like the pictures found in Europe, would be hailed as positive evidence of great age, but no such pictures have yet been found. It may be of interest, however, to note that although bows and arrows are found at most other locations, they are totally absent in the 10 basket maker shelters where we have made copies.

One method of studying age which we may find very helpful in

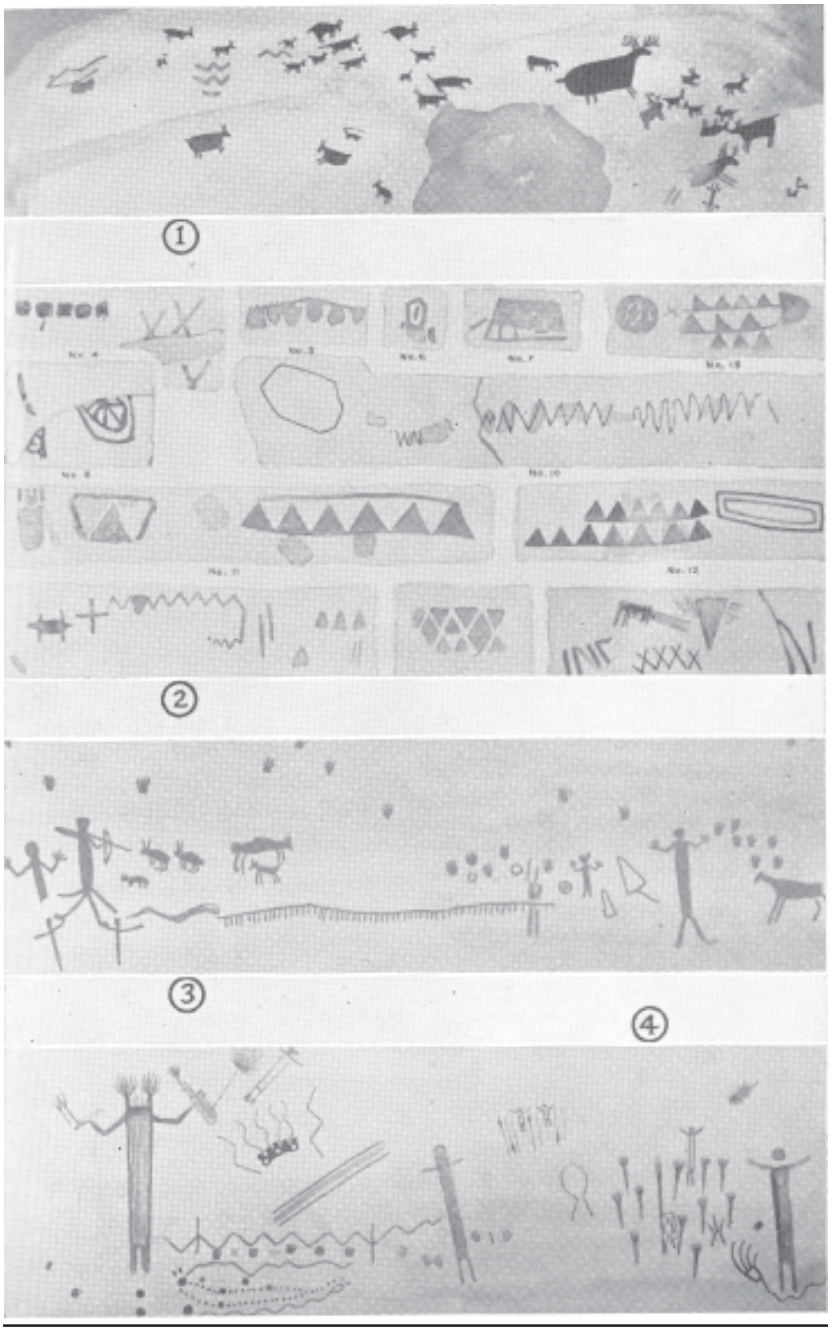

PLATE 20.

Here are shown four distinctly different types of Indian pictures.

Fig. 1. Small black animal drawings from a shelter 12 miles west of Fort Davis. Similar animal drawings occur in other shelters in the Davis Mountains.

Fig. 2. Simple geometrical designs from Comanche Springs, 12 miles west of Terlingua, Texas. Compare these with the designs at Paint Rock.

Fig. 3. A section from the shelter in the Seminole Canyon described in Plate 3.

Fig. 4. Basket maker designs in a small shelter in the Seminole Canyon only 200 yards from the shelter from which Fig. 3 was taken.

the future is the overlapping of designs. If it is definitely proved that different types of designs are the work of different cultures, and the chief designs, belonging to each culture, can be determined through the study of type stations, then the sequence, at least, of the different cultures can be determined by a close study of over-lapping designs at locations like Paint Rock and Meyers Springs where so many different types of work are found. This investigation, however, must await further study of the type stations.

The Question of Interpretation

A preliminary survey of the Indian pictures in Texas cannot properly be concluded without a few words, at least, about the interpretation of the designs. The prospect of finally being able to read the pictographs is, perhaps, the one thing that fires most the imagination of the average person but, unfortunately, offers the least in a scientific investigation. It is quite true that the American Indian was struggling with the problem of recording his ideas, and a large part of our Texas pictures are, no doubt, illustrations of a system of writing in the making, but even the clearest examples of writing among these pictures are far below the stage where an accurate interpretation is possible. At best the Indian pictograph was only mnemonic—it served only to prompt an individual in telling a story which he carried in his memory. When the story teller and his audience were gone the interpretation of the pictograph was forever lost.

It is probably true that pictures of thunder birds, sun emblems, and certain other designs had some general meaning in the ceremonies of most tribes; and the unique designs of the basket makers must have had some definite connection with their mythology; but our work along this line is so incomplete at the present time and the subject of so much interest that it seems best to defer this discussion until space will permit of a fuller treatment.

The purpose of this paper has been to call attention to the Indian pictures in Texas, the way they are being destroyed, and the importance of their study; to tell of the systematic survey which my wife and I have undertaken and the methods we are using; to relate briefly some of the interesting things we have observed; and to suggest some of the ways our investigation may contribute to a better understanding of our Texas Indians. This paper is, therefore, offered only as an introduction to the study of Indian pictures in Texas. At the invitation of the Texas Archaeological and Paleontological Society, we are planning to prepare an additional paper each year for its annual bulletin. It is planned that each paper will report in detail some phase of our work and that the complete series will constitute a full report of our survey.

It is unfortunate that our enthusiasm for the work and our professional skill as artists can not be linked with years of archaeological experience. This handicap, however, has been largely overcome by the helpful suggestions and the hearty cooperation of every one who has learned about our undertaking. This, we deeply appreciate. We hope that we may be able to pursue our delightful hobby each year until the survey has been finished and the results recorded and passed on for whatever they may be worth in the study of the Indian in Texas.

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FURTHER REMARKS ON THE PRECOLUMBIAN RELATIONSHIPS BETWEEN THE UNITED STATES AND MEXICO*

By J. Alden Mason

It is generally believed that most of the higher elements of North American aboriginal culture originated in Mexico and spread from there to the less highly civilized peripheral regions. North of Mexico the areas of highest development were the Pueblo region of our Southwest, and the Mound region of the Mississippi Valley and the Southeast. The cultural relations between these two regions and between each of them and Mexico is one of the most important problems of American archaeology and one upon which much superficial theorizing has been done, generally a generation or two ago, but very little sound rationalization to date. It needs much more study, and the present paper is an attempt to formulate some of the problems and the present state of our knowledge.

The temporal element especially needs to be carefully considered. It is generally accepted that agriculture and pottery had their origins in Mexico, yet the rise and spread of these cultural elements took place at such a remote period that we do not generally consider them under the heading of "Mexican influences" any more than we consider the Indian himself as an Asiatic, despite the fact that his remote ancestors probably came from that continent. At the time of white settlement corn culture had spread to practically its maximum possible natural limit of cultivation, and all the tribes cultivating it had no traditions, except mythological ones, concerning origin. Pottery had an area of distribution practically equal but probably spread at a later period since the earliest agricultural people of the Southwest, the Basket-makers, apparently were ignorant of the art of pottery-making. By "Mexican influence" we mean influences of a later period from the higher cultures. If, for instance, we find in the United States corn culture of a specifically Mexican type, such as is indicated by the use of the metate, or pottery of specifically Mexican types, then we may truly be entitled to posit Mexican influences.

Of recent years we have become a little less certain of influences from Mexico. The rather heavy crude pottery of the Northern regions, of the Algonkians and the Eskimo, may have had a different center of distribution, possibly even an Asiatic one. The ceremonial ball-courts, of which several have been found in Arizona, need not be *ipso facto* of more southern origin; they might belong to an old common cultural background, or it is not impossible that the influence ran in the opposite direction.

In the Mississippi Valley, especially in the prehistoric mounds, are found some resemblances to later Mexican culture, which may possibly be due to direct contact with or influences from Mexico. Among these may be mentioned the custom of making large mounds, somewhat resembling the pyramids of Mexico, certain shapes of pottery vessels, elements of design such as the horned or feathered serpent and human figures found on shell and copper gorgets, and some elements of social and religious organization found among some of the tribes, such as the Natchez, at the time of the first European occupation. Yet between this region, the Southwest Pueblos, and the nearest high civilization of Mexico stretch hundreds of miles of prairie or arid land or of desolate swamps, which were populated at the time of discovery by peoples of lower and different cultural status, with little or no agriculture, pottery or weaving. How, then, was Mexican influence, if such there was, spread? Doubtless we must look to archaeological investigations for the answer, and these have been greatly neglected in these intervening regions.

Probably the first question requiring determination is: Is there any proof of actual relatively late Mexican influence in the Mound region? Unfortunately practically all of those who have written upon this topic, with the exception of Mrs. Nuttall[1] and Spinden[2], have been specialists upon the Mound region with little knowledge of

Mexican archaeology, and any unusual and especially excellent object found has been considered as resembling Mexican work, or as showing Mexican influence, without due consideration of the characteristics of the many different Mexican areas, or of the temporal elements. Many of the older writers, who regarded the "Mound-Builders" as a separate and now extinct higher culture, leaped at once to a conclusion of direct Mexican migration, many of them considering the Mound-Builders as Aztecs or Toltecs, some even reversing the direction of migration. Now that it is generally believed that the mounds were made by the ancestors of the present or recent Indians of that region, such close relationships are no longer accepted, but Mexican influence is still generally credited. Such influence could have occurred in one of three ways: by a large scale migration; by migration of a small group which might have introduced a small number of definite elements; or by an infiltration of cultural elements and ideas by means of slow spread or diffusion from tribe to tribe without any introduction of alien blood or language.

In comparing two cultures in order to appraise the degree of diffusion of cultural elements between them, it is essential to consider not only elements that occur in common, but also the absence of fundamental elements. The importance of such absences must be appraised differently in accord with the nature of the hypothetical method of diffusion, or rather they will indicate the method. Thus in a mass migration the most fundamental elements of the autochthonous culture will remain in the new area, the details changed. Resemblances should be found in physical type, language folklore and fundamentals of economic culture. Among the most fundamental elements of Mexican culture are the use of the metate and the toasting of corn cakes, stone masonry, and loom weaving. None of these is found in the Mound region. I think it would be generally agreed that all these elements differ radically in the Mexican and Mound regions, and that therefore this hypothesis must be ruled out. In cases of slow diffusion without migration, readily adaptable elements might be spread, but it is obvious that these elements would be found in the intervening regions. In the hypothesis of a rapid migration of a small group, close or exact correspondences in minor details may be found, but the major elements of culture would be unchanged, and no such correspondence need exist in the intervening areas.

The following elements of possible Mexican origin in the southern Mississippi Valley, apart from the older generalized elements such as agriculture and pottery, have been suggested by Moorehead[3]: truncated pyramids or temple mounds, monolithic hatchets, seated human figures, sculptured idol heads, plumed serpents as decorative or symbolic design motives, vessels with tripod feet, certain engraved shells, spool-shaped ear ornaments, and long ceremonial swords chipped from flint.

These nine elements might be classified into three groups as regards their natures: (1) the very generalized trait of building truncated pyramids; (2) the very specific comparison of the figures of the plumed serpent and the human figures of the shell and copper gorgets; (3) the other six.

The building of truncated pyramids is a very fundamental element of lower Mississippi Valley culture, and obviously on an ancient horizon. It could hardly have been introduced by a small immigrant group; it must either have been brought by an early mass migration, accompanied by the other fundamental elements of culture, or spread by slow contact. In the latter case certainly, and in the former case probably, similar structures would be found in the region intervening between the Mississippi Valley and Southern or Central Mexico; apparently they do not. On the other hand, the concept of an elevated substructure for a temple, which must of necessity be truncated, is such a natural one, and occurs in so many different places in the world, that the possibility of independent origin is very great, and more specific and detailed points of resemblance with Mexican temple-pyramids must be advanced before any connection can be considered as proved. It must also be remembered that in the region where these are most frequently found the land is low, frequently flooded, and the mounds even today used as refuges in case of flood. Even in this area probably the majority of mounds are mortuary rather than domiciliary or

ceremonial, which is never the case in Mexico; they are uniformly made of earth instead of stone or adobe as in Mexico, and, on the whole, the case for independent origin is probably better than that for diffusion.

Monolithic axes are unknown in the Mexican and Maya regions, but are especially typical of Caribbean Colombia and the Antilles. In the southeastern United States the occurrence is rare and sporadic. A good case may be made out for Antillean connections, but independent origin is by no means ruled out.

Long ceremonial swords chipped from flint are also not typical of Mexico, nor of the Antilles either, in which latter region chipped objects are almost unknown. They should probably be regarded merely as a high development of a characteristic art of the Eastern United States.

Seated human figures and sculptured idol heads are common in the higher Mexican cultures, but here again the concepts are so general and unspecific that I cannot consider them as proving connections without more details in common or proof of continuous distribution. Independent origin is very plausible.

Vessels with tripod feet are very characteristic of Mexico but far less characteristic of the Mound region. In Mexico they are most commonly found on flat dishes or bowls, in the Mound region on narrow necked vessels. Spool-shaped ear ornaments are found in both regions, but here again relatively few types of ear ornaments are possible and the spool type is found in many widely separated parts of the world and was almost certainly evolved independently several times.

The remaining two elements are concerned with art, and are more specific and distinctive. The plumed or homed serpent is a very characteristic element of Mexican religion and art, not so characteristic, but still important, in the Pueblo region, and even less common in the Mississippi Valley.

The shell and copper gorgets of the eastern Mound region with their human and animal figures certainly look superficially very Mexican-like, but more than superficial resemblances must be found before Mexican influence can be considered as proved. Mrs. Nuttall has compared certain ones in which Mexican elements seem to be most obvious, mainly from Etowah, Georgia, with Mexican figures, generally those from various codices, and has published her comments upon these. She was apparently furnished with photographs of all Etowah art objects and searched for resemblances in Mexican art. Considering the wealth of Mexican material and Mrs. Nuttall's unexcelled familiarity with it, it is but natural that a number of resemblances were found. Her best analogy is with the Etowah gorgets showing a human figure with a nose like an eagle's beak, lines on the cheek which may indicate the eagle's mouth and tongue, headdress with dots which might represent pearls, fringed loincloth, and circular ear ornaments, brandishing in one hand an object which might be a spearthrower (although spearthrowers have been found in the eastern United States only in Florida), and in the other a decapitated human head, or an object in that form, around the eyes of which are lines which may represent tears. These she compares with figures from Mexican codices depicting "eagle warriors" which show the eagle face, dotted headdress, fringed loincloth and circular ear-ornaments. Out of the hundreds of other Mexican figures she has found some which show prancing figures holding spearthrowers and figures holding decapitated heads with tears in their eyes. Between other Etowah gorget figures and Mexican figures she notes resemblances in the kneeling and cross-legged postures, and serpent heads with recurved upper jaw and triangular lines in the tail.[4]

Mrs. Nuttall also suggests possible Mexican influences in Etowah spider gorgets, and notes the resemblance in spool-shaped earplugs. She notes the absence of woodpecker figures in Mexico.

Mrs. Nuttall makes a good, but not quite convincing case. She does not commit herself regarding the method of transfer, contenting herself with concluding that it is not impossible that a band of Aztecs may, in the unsettled period immediately following the Spanish Conquest, about 1520, have wandered to Georgia.

Mr. Moorehead, with greater assurance, states it as his theory that the contact was in very early times, and that a group of Indians crossed from Yucatan to Cuba, populated the Antilles, and then crossed to Florida, from which group the Mound Culture developed. Although this problem will later be taken up in more detail it might possibly be objected at this point that such an early migration could not explain the Etowah gorgets, whose detailed resemblances are with specifically Toltec and Aztec art.

Dr. Spinden has studied the question more deeply and reached more tenable conclusions which, even though he has published his data only in brief form, carry great weight though not absolute conviction. The "Eagle Warriors" in his opinion were a cult of the Toltecs who flourished at about the beginning of the current millennium. They are depicted in both regions as anthropomorphic eagles bearing decapitated human heads. The plumed serpent was one of their symbols. The far-flung trade relations of the Toltecs carried this cult and the art motives and symbols associated with it, together with certain technique such as that of engraving shell and copper gorgets, to the Mound and Pueblo regions in the United States, to Peru to the South. Probably the traders to the Mississippi Valley bartered for native copper from the Great Lakes region, those to the Southwest for turquoise. The hypothesis seems very reasonable, but we should await Dr. Spinden's presentation of his complete data and argument before considering it as proved.

These detailed resemblances in art are in a class apart from the other seven that we have considered and are explicable on Spinden's hypothesis of trading bands. They are relatively on a late horizon (Spinden apparently thinks about the thirteenth century). The contacts could not have greatly affected the relatively civilized peoples of the Mound region, and could have had little if any effect on the nomadic peoples of lower culture in the intervening regions.

To summarize my opinion as regards these nine elements which have been proposed as indicating Mexican influence in the Mississippi Valley; Monolithic axes and long ceremonial swords chipped of flint I do not consider as typical of Mexico, and therefore should be ruled out of consideration. Seated human figures, sculptured idol heads and truncated pyramids or temple mounds seem to me so unspecific and general in character that a hypothesis of independent origin would seem more plausible than one of diffusion. Pottery vessels with tripod feet and spool-shaped ear-ornaments may also be of independent development, but diffusion has here a better argument than in the case of the other five. Only certain of the art elements in shell and copper and that of the plumed or horned serpent seem to carry a presumption of Mexican origin.

The latter two elements apparently did not appear in Mexico until the Toltec horizon and could therefore not have been diffused until that time. Pyramids and tripod vessels are found in the Archaic Cultures of the Valley of Mexico, and seated human figures, spool-shaped ear-ornaments and sculptured human heads were also probably characteristic of these and some of them probably also of the archaic Maya Q-complex. These might therefore have been diffused at an earlier period. If this were the case, before the development of trade routes, these elements should be found in the intervening regions.

Let us now consider the regions intervening between the Mississippi Valley and Mexico to see if possible migrations or diffusions may have left traces of Mexican influences here.

There are three routes by which Mexican influences could have reached the Mississippi Valley: (1) from Yucatan via Cuba to Florida; (2) from the Southwest Pueblo region, where certain few Mexican influences are indubitable and accepted; (3) directly from Mexico via the Texas coast A table showing the occurrence of the nine elements, which have been considered in these regions might be suggestive; X denoting presence, O absence, and ? uncertainty.

	Mexico	Pueblo	Plains	Texas Coast	Miss. Valley	Florida	Antilles
1. Monolithic axes	O	O	O	O	X	O?	X
2. Flint swords	?	O	O	O	X	O?	O
3. Seated human figures	X	?	O	O	X	O?	X?
4. Sculptured idol heads	X	O	O	O	X	O?	X?
5. Truncated pyramids	X	O	O	O	X	X	O
6. Spool-shaped ear plugs	X	O?	O?	O	X	X	X
7. Tripod vessels	X	O	O	O	X	O	O
8. Plumed serpent	X	X	O	O	X	X	O
9. Art of engraved gorgets	X	O	O	O	X	X?	O
	7	1	O	O	9	4	4

It is seen from the foregoing table that of the nine elements proposed as indicating Mexican influences, two of which are not characteristic of Mexico, not one has been found in the typical Plains region or on the Texas Coast; almost all are also missing in the Pueblo region, the majority are absent in the Antilles, and most not even found in Florida. While the archaeology of the Texas Coast and the Plains is but superficially known, and future researches may reveal the presence of one or two of these elements, yet it is practically certain that almost all of the nine elements never existed in these regions. It is difficult to see, therefore, how they could have served as corridors for the transfer of Mexican elements into the typical eastern mound region, by means of mass migrations or slow diffusion. The route via the Antilles and Florida has, on these grounds, a little better case, but by no means a good one.

As regards this route, Miss Gower[5] concluded that "So far there are no satisfactory indications of Central American influence on the culture of the Antilles." That there are Antillean influences in the southeastern states she accepts, regarding them as "too great to be purely fortuitous," and she considers them as due to "a series of not extremely intimate contacts occurring at intervals during a long period of time," together with the "existence of a common primitive culture." Mexican and Antillean cultures are so unlike that Moorehead's hypothesis of a very early migration from Yucatan to Cuba, thus populating the Antilles, cannot be accepted. Neither is the slow diffusion theory acceptable, since no objects of a nature resembling Mexican have ever been found, to my knowledge, in Cuba or the other islands. It is not impossible, of course, that at the time of the conquest, or possibly in the days of the late Maya Empire, a band may have crossed from Yucatan to Cuba and thence to Florida and Etowah, where they introduced the supposedly Mexican art elements. However there are no other indications of trade over this route and I consider such a journey to Etowah by this route as highly improbable.

The other two possible routes have been discussed at more length in my former article in this Bulletin. In the Arkansas mound region are mounds, generally ascribed to the Caddoan peoples, the pottery of which shows surprisingly close connections with that of the archaic Q-culture of Central America as pointed out by Vaillant.[6]

The influence that brought this must have been more of the nature of a true migration than the ephemeral trade relations that may have influenced the culture of the eastern mounds, such as Etowah. It was also presumably on a much earlier horizon. Strangely, there are few evidences of such passage in the areas between Arkansas and either the Pueblo region or northeastern Mexico. In the former region there appear to be none, but on the Gulf Coast there are a few evidences, mainly in ceramics, that indicate that the influence may have taken this route.

There are, then, the following possibilities of influence from Mexico in the United States: an early extensive influence or migration from eastern

lowland Mexico to Arkansas; early contacts between highland central Mexico and the Pueblo region; late ephemeral trade relations between central highland Mexico and both the Pueblo region and the eastern mound area.

Museum of The University of Pennsylvania, Philadelphia, Pennsylvania.

*This paper is the revised and revamped remainder of a longer article from which the section with special reference to Texas was excised and published in this Bulletin as "The Place of Texas In Pre-Columbian Relationships between the United States and Mexico," Vol. 7, 29-46, 1935.

(1) Zelia Nuttall, "Comparison between Etowan, Mexican and Mayan Designs," in "Exploration of the Etowah Site In Georgia," by Warren King Moorehead, 137-144; Department of Archaeology, Phillips Academy, Andover, Mass., New Haven, 1932.

(2) Dr. H. J. Spinden's monograph on "Toltec War Cults," read at the International Congress of Americanists in Hamburg in 1930, has never been published in full, but some of his conclusions are given in his article on "Indian Symbolism," one of the publications of The Exposition of Indian Tribal Arts, New York, 1931.

(3) Warren K. Moorehead, "The Mound Builder Problem to Date"; American Anthropologist (n. s.), 31, 3, 544-554, 1929.

(4) Possibly impertinently I may remark that I am not convinced that one of the reasons why the serpent stands as a symbol for water in Mexican and Mexicanized cultures is the resemblance between the Aztec words coatl, snake, and atl, water. The symbol must be a very old one and extends beyond the bounds of the Aztec language. The ending tl, it must be remembered, is a nominal suffix; the roots are coa and a, surely not close enough to be a causative factor. The use of these words in rebuses must be secondary and relatively late.

(5) Charlotte Gower, "The Northern and Southern Affiliations of Antillean Culture," Memoir 35, American Anthropological Association, 1927.

(6) G. C. Vaillant, "Some Resemblances in the Ceramics of Central and North America," Medallion Paper 12, Gila Pueblo, Globe, Arizona, 1932.

EXCAVATION OF PUEBLO GRANDE DE NEVADA

By M. R. Harrington

Immediately after the completion of Boulder Dam, the rising waters impounded by it, now called Lake Mead, began to inundate the sites of camps, villages, caves and rockshelters once occupied by ancient man along the Colorado river and its affluents in Nevada and Arizona. Two of these sites were of real importance, one a late Basketmaker village at the junction of the Virgin and the Colorado; another, Puebloan in character, at the mouth of the Walapai Wash.

The loss of the Basketmaker site is especially unfortunate, because its ruined pit-dwellings contained charred timbers, some of them pine drift logs from the Colorado, by which the place might have been dated by the tree-ring method. This date once established it would have been possible to figure approximate dates for other ancient settlements in the vicinity; for instance the so-called Lost City of Nevada which we know followed the Late Basketmaker occupation. The "city" cannot be dated by its own charred timbers for these are always willow or some sort of mesquite which are useless for the purpose.

Lost also beyond recall are a salt-mine containing a deep aboriginal deposit, about six miles up the Virgin from its mouth; also a dry cave at Pierce's Ferry, on the Colorado just below the mouth of the Grand Canyon, in which sandals and other perishable objects from Basketmaker age up to recent Walapai Indian were perfectly preserved.

So much for the darker side of the picture; there is fortunately a much brighter side. Thanks to a happy three cornered arrangement between the National Park Service, the Southwest Museum and the Civilian Conservation Corps it was possible to save much of scientific and popular interest before the water reached it, especially from the "Lost City" itself and elsewhere in the Moapa Valley; moreover many things were found within the very portals of the Grand Canyon, not to mention discoveries made incidentally in adjacent territory while the work of rescue was going on.

Last but not least a trailside museum was erected by the Park Service near the little town of Overton, Nevada, to house the finds.

The "Lost City," it may be remembered, was discovered in 1924 by two brothers, John and Fay Perkins, local residents, and reported by them to Col. J. G. Scrugham, now Congressman, but at that time Governor of Nevada. The writer visited it with the Governor in the fall of the same year. It was officially christened "Pueblo Grande de Nevada" but some newspaper writer dubbed it the "Lost City" and this name caught the popular fancy.

It turned out to be a group of ruins, more or less covered by sand dunes, scattered along east of the Muddy River between Overton and St. Thomas for nearly six miles. The period, judging from the pottery, was Early or Developmental Pueblo also known to archaeologists as Pueblo II, which proceeded the building of the Cliff Dwellings and the great four-story communal houses marking Pueblo III, the Great Period of Pueblo Indian prehistory.

Excavations sponsored by the Museum of the American Indian, Heye Foundation, and assisted by the State of Nevada, were continued in the "Lost City" two seasons, in charge of the writer, and many of the ancient houses were uncovered. It was found that these houses, constructed usually of adobe, or of adobe and stone combined, were one-story affairs, commonly with small rooms arranged around a court or patio. The number of rooms ran usually from six or eight to twenty or thirty, but one house was uncovered comprising nearly one hundred rooms arranged about two courtyards. An interesting feature of this house was the fact that part of it had been destroyed and rebuilt three times with a somewhat different floor plan, the buried foundations, one below the other, telling the story.

When the Museum of the American Indian closed its work in 1926 this house remained unfinished, and its completion was one of the first tasks attempted when excavation was resumed under Park Service auspices in 1933, with the writer, now Curator of the Southwest Museum, again in charge. Although a large sand-dune had to be removed to get down to the crumbling walls, the force of about thirty CCC boys under two experienced foremen made short work of completing this task and turned then to other ruins the excavation of which had not been hitherto attempted. When the writer left the project in 1935 more than one hundred distinct houses had been uncovered in the "Lost City" and a large number of specimens unearthed, of which the Southwest Museum received a representative collection.

Since 1935 the work has preceded with the writer in the capacity of consultant, and at last accounts was still continuing in a race with the advancing waters, and the collections have been greatly enriched, although with a smaller crew and only one foreman in the Moapa Valley sector. The museum was completed in 1935 and has already been visited by thousands of tourists and students.

The material removed from the ruins consists, for the most part, of pottery, usually broken of course, but with plenty of whole vessels to give an excellent idea of what the ancient people could make along this line—bowls, graceful water jars, canteens, cooking pots, occasional toys, and odd pieces. The decoration is mostly confined to the inside of bowls, although other vessels were sometimes ornamented on the outside. The patterns are geometric, frequently well planned and executed, and are made with black lines painted on a gray, white or sometimes a lustrous red background, and made permanent by firing. Corrugated ware—that is, pottery ornamented with parallel ridges, sometimes modified by notching, is very common, especially in the latter houses of the "Lost City" and the outlying settlements.

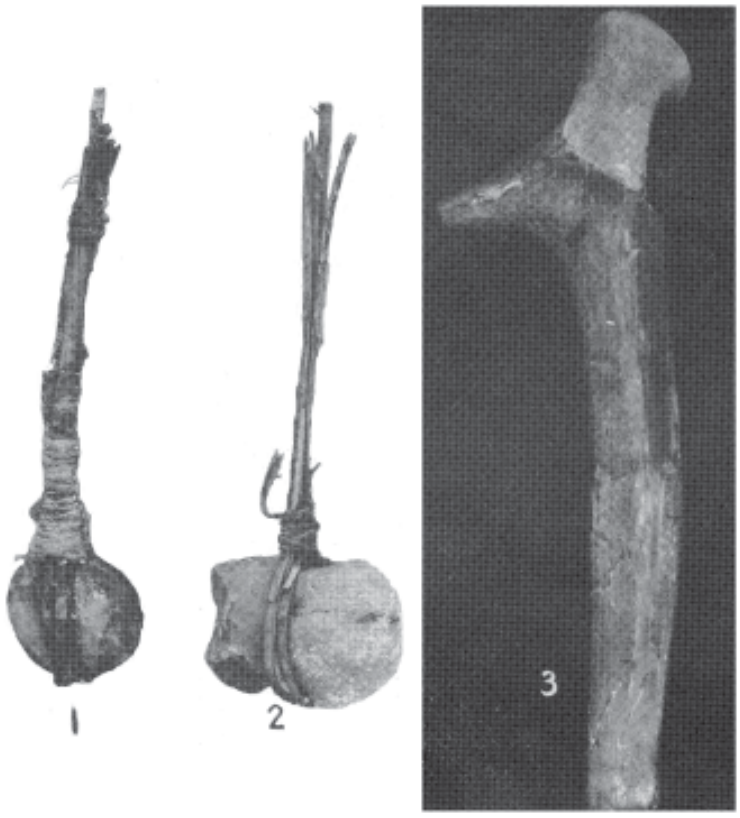


PLATE 21.

Nos. 1 and 2. Stone hammers with original wooden handles, from the ancient salt mines near Pueblo Grande De Nevada ruins.

No. 3. War-club made of Elk antler, Pueblo Grande De Nevada ruins.

In heavy stone-work we have first of all metates upon which the people ground their corn—trough-shaped slabs open at one end, and the manos or hand stones used with them range from elliptical to rectangular and are usually rather long and flat in proportion. There are a few pestles made of stone, used in mortar holes in ledges, but no grooved stone axes; rudely chipped choppers held in the hand apparently answering this purpose. However, grooved mauls are sometimes found in the turquoise mines worked by these people, and notched hammers are common in their salt-mines, occasionally with wooden handles still attached. For ordinary

hammering purposes a more or less globular tough stone was preferred although flat pebbles showing use as hammer stones sometimes appear. Classified also as heavy stonework are the hatch-covers chipped from flat slabs used to cover smoke-holes and hatchways in the roofs of the houses.

The characteristic arrowheads of the "Lost City" Pueblos were thin and well made, with narrow stems and wide shoulders or barbs; the knife-blades stemless; the drill-points varied in form, some intended to be used with a wooden shaft, others to be held in the hand. An unusual implement was a thick type of drill about three inches long and half an inch or more in width. Spear-heads were not found. The typical flint scraper, flat on one side with beveled edge, used by many eastern tribes and even in Nevada in earlier days did not appear at the "Lost City" where the only implement apparently intended for scraping purposes was an oval blade chipped from both sides.

Among smaller stone objects might be mentioned flat gaming disks, about an inch in diameter, chipped and ground into form, pendants made of various fine-grained, not-too-hard stones, including turquoise; and beads of similar materials, some of them very minute, the last of black and red stone.

Straight pipes of cigar-holder form were made not only of stone but pottery as well.

Turning to bone we find numerous awls usually made of splinters from the leg bones of mountain sheep or deer; occasional bone blades suggesting the hair ornaments of the California coast; elliptical and circular bone dice; and now and then a bone bead. In antler we find thin cylindrical implements doubtless used in chipping flint, and, shaped from elk-antlers which must have been imported from the west, large war-clubs with projecting points, really formidable weapons.

Shell was, of course, all imported from the Pacific coast or the Gulf of California; and in this material we find bracelets, beads and pendants made

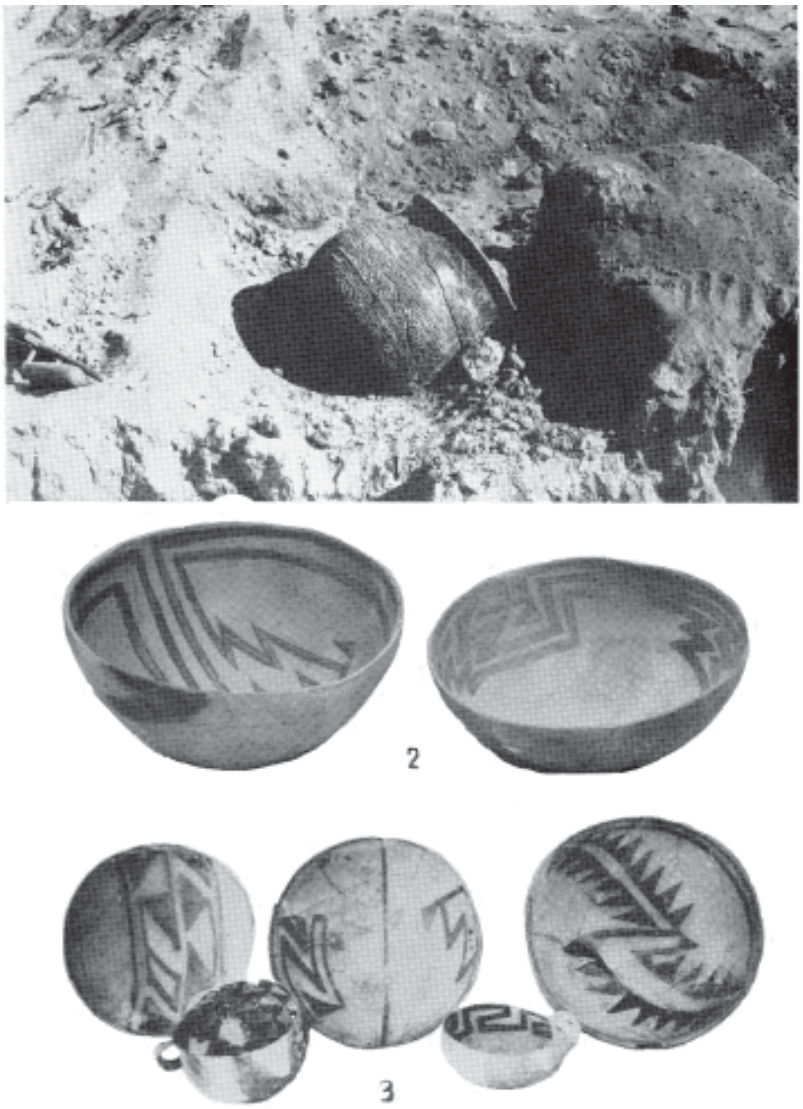


PLATE 22.

No. 1. A corrugated pot in situ. Pueblo Grande De Nevada. (Third or Mesa House stage) "Lost City" of Nevada. Courtesy Museum of the American Indian, New York.
No. 2. Pottery bowls, Second or "Lost City" stage. Pueblo Grande De Nevada, "Lost City" of Nevada.
No. 3. Pottery bowls (first stage) Pueblo Grande De Nevada, "Lost City" of Nevada. Courtesy of the Southwest Museum, Los Angeles, California.

from various bivalves and such univalves as the abalone and the olivella. The bracelets, especially, came from the Gulf, and must have been traded up the Colorado river.

So much for the more or less imperishable articles found every day in the rooms of ruined buildings, in the ash-dumps outside, or with human burials. We also found a few things ordinarily perishable in such places, due to charring and other conditions especially favorable to their preservation. Among the most interesting of these were pieces of cotton cloth, some of it surprisingly fine, found with burials where graves had been carefully covered with an impervious layer of adobe clay. Most of these textiles were plain white in color, but in some cases, apparently for women's dresses, they were dyed a sort of purple.

There were also diagonally woven bands, especially headbands worn by men, that showed a square or diamond shape interwoven pattern, usually in black, as well as a fringe along one edge. Men wore kilts or breechclouts of white cotton cloth, supported by waist-cords composed of many strands of soft cotton string loosely twisted together.

Both sexes seem to have worn blankets woven of strips of rabbit-skin twisted around a yucca cord to make a strong furry yarn, or of cotton, and sandals woven of yucca fiber. One infant's grave yielded the entire yucca-cord foundation of a little rabbit-skin blanket.

Speaking of infants, we know that these Pueblos used the cradle-board, not alone from the flattening of the back of many skulls, probably due to this cause, but from the fact that a clay toy was unearthed representing a baby tied on its cradle-board, which was provided with

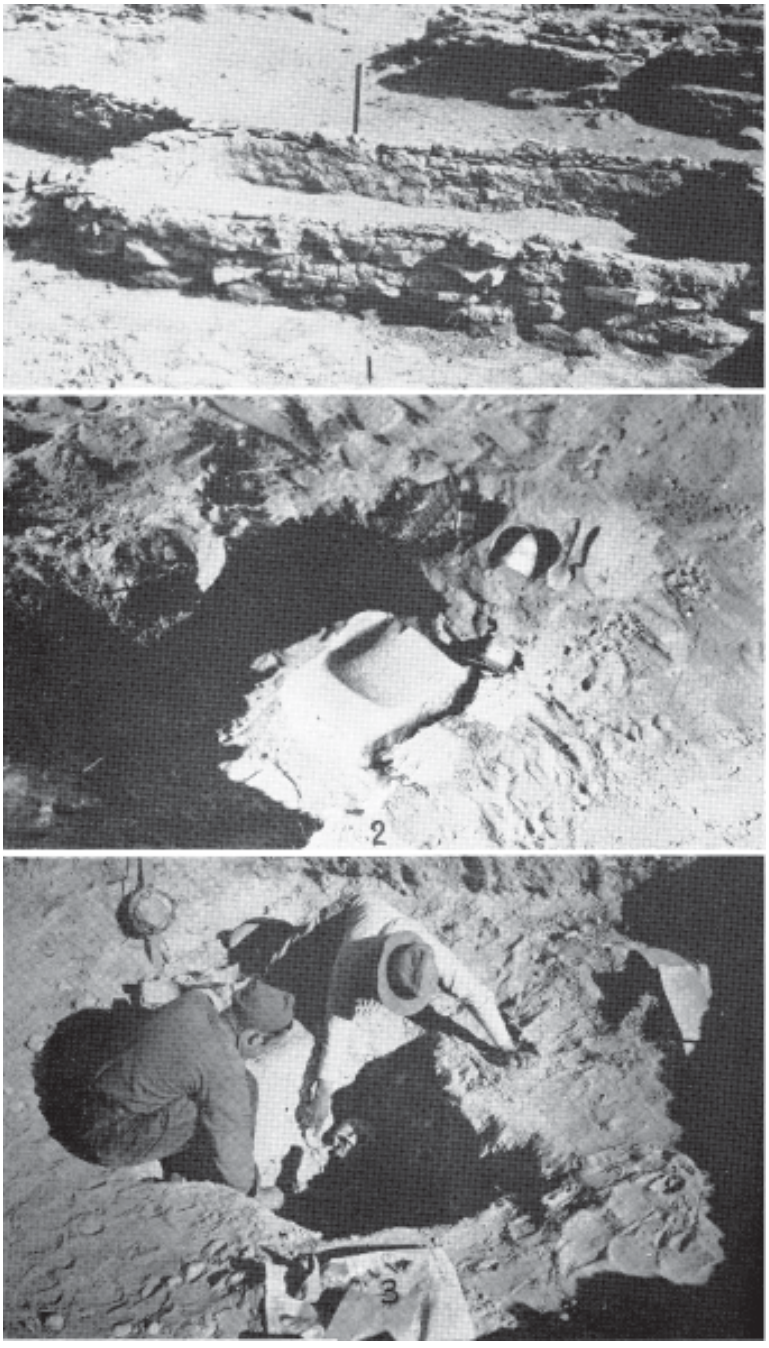


PLATE 23

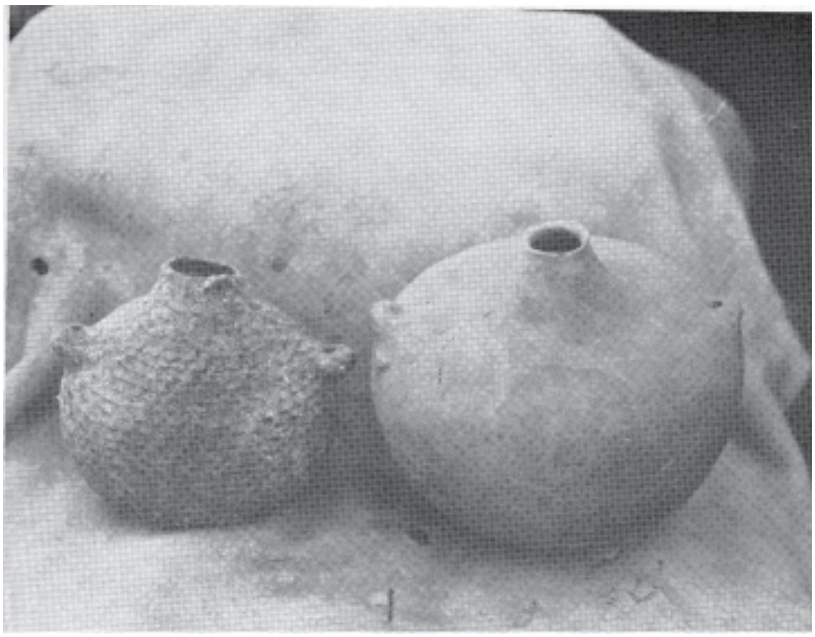
No. 1. Part of ruin showing adobe and stone wall construction. Pueblo Grande De Nevada or "Lost City" of Nevada. Courtesy Museum of American Indian, Heye Foundation, New York.

No. 2. A typical metate in situ, Pueblo Grande De Nevada or "Lost City" of Nevada. Courtesy of Southwest Museum, Los Angeles.

No. 3. Archeological foreman and C. C. C. boy uncovering a skeleton at Pueblo Grande De Nevada or "Lost City" of Nevada. Courtesy of the Southwest Museum, Los Angeles.

a sort of hood to protect the infant's head. Rude clay dolls or figurines, always broken, and miniature dishes and conical pack-baskets made of clay were common.

Several specimens of basketry were found in graves or ruins, but as a rule these were too far gone in decay to preserve. One was a large cone-shaped coiled pack-basket with a geometric pattern in red; the others bowl-shaped plain coiled baskets.



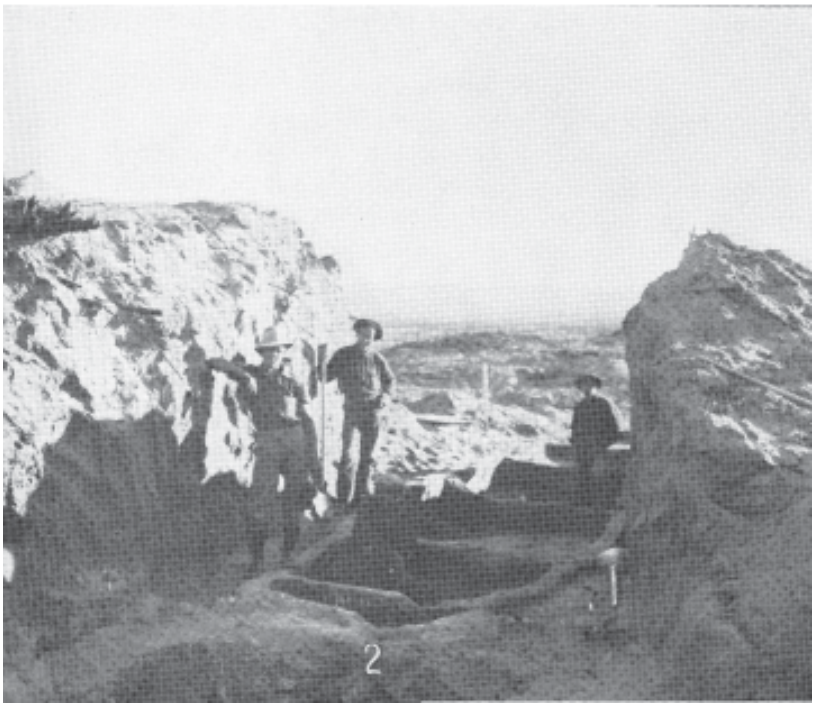


PLATE 24.

No. 1. Pottery canteens, right, first or second stage, left, third stage. Pueblo Grande De Nevada or "Lost City."
No. 2. C. C. C. boys uncovering a house-ruin at Pueblo Grande De Nevada or "Lost City." Courtesy of The Southwest Museum, Los Angeles.

In one grave only was there enough left of the arrows to see that they were made of cane with hardwood foreshafts to which the stone points were attached; in another the wooden handle of a flint knife remained and fortunately could be saturated in dilute ambroid and preserved.

In the dry caves and rockshelters near the "Lost City" in deposits known, from the pottery, to be of Pueblo origin, a few other articles appeared not found elsewhere. Among these were a wooden spindle with a whorl of unbaked clay and rags of typical Pueblo feather blankets—yucca strings wound with downy feathers which had once been woven in blanket form.

One of these caves yielded cotton-bolls almost exactly like those of modem Hopi Indian cotton, which showed that the cotton so abundantly used in the "Lost City" was in part at least, home grown. Pieces of squash shells, squash seeds, corn, corn cobs and husks, reddish beans, complete our picture of Pueblo agriculture, already suggested by quantities of charred corn found in the ruins.

The burial customs of the "Lost City" Pueblos were peculiar, for they seem to have preferred to bury their dead near the abodes of the living, either in ruined buildings, in ash-dumps near buildings, or most frequently of all, beneath the floor of the room that had been occupied by

the deceased. In this case after filling the grave they burned the roof and threw down the walls upon it. Frequently personal belongings such as pottery, implements and ornaments were deposited with the dead and sometimes even dogs, or pet wild animals.

In the early days of our explorations at "Lost City" it was thought that the Pueblo occupation represented only one stage of Pueblo II; later it was seen that there were two stages, and very recently, thanks to the Park Service work, it has become plain there were three, made apparent through changes in the architecture and especially in the pottery.

When the first Pueblos entered the Moapa Valley (already occupied by Late Basketmaker or Basketmaker III people) their dwellings were groups of small isolated huts, often of wattle-and-daub construction, built partly underground. Near these huts were small storage bins built of adobe, or adobe and stone, sometimes singly, sometimes in rows.

In the next stage, that of the "Lost City" proper, we have the living rooms, still sometimes partly underground, connected directly with the bins, now grown to the dignity of storage rooms, so as to form a continuous row of rooms encircling, except for a gateway, a rounded court or patio.

In the third or "Mesa House" stage, after the decline of the "Lost City" we find the same form of dwelling, but most of the rooms were built on the surface of the ground, and the house was often situated in a place capable of defense, such as a mesa top.

The first Pueblo pottery in the Moapa Valley was characterized by bold patterns in black, rather carelessly done, with the outlines slightly smudged; and no corrugated ware; the "Lost City" stage produced much well decorated black on white and some black on red ware, with intricate designs and skillful workmanship, but very little corrugated ware—simply the type known as "banded neck"; while the last Pueblo stage was marked by the great popularity of corrugated ware.

Any attempt to date the "Lost City" or to correlate it with the development of Pueblo centers farther east without a tree-ring checkup must be fraught with uncertainty. We can say definitely that Basketmaker III survived in the Moapa Valley while the Pueblos had begun their development in northeastern Arizona, through to Pueblo II, when the influx took place. We also know from pottery evidence that the Moapa Valley people were still in Pueblo II so far as architecture was concerned when the Great Period, Pueblo III, had begun in their former home. We may guess that the Nevada Pueblo episode lasted from about 600 A. D. to between 800 and 900 A. D., but with the "peripheral lag" an unknown quantity we can not state accurately.

After the departure of the Pueblos the Moapa Valley was occupied by a much more primitive people, the Paiute or some tribe of similar culture, and the Paiute still survive to the present day.

Before the coming of the Pueblos the territory was inhabited by Late Basketmaker (Basketmaker III) people, as has already been mentioned, and before these again vestiges of still earlier occupants or visitors remain to be studied. With the exception of the one Basketmaker village at the mouth of the Virgin river, mentioned as being already submerged, most of these earlier traces are above the water-line of Lake Mead, and there is still hope that they may yield information of value.

Curator of Southwest Museum,
Los Angeles, California.

EXPLORATION OF CERTAIN SITES IN CULBERSON COUNTY, TEXAS

By A. T. Jackson

During October and November, 1934, the writer headed an expedition sent by the Anthropology Department of the University of Texas to explore sites in the east-central and northeast parts of Culberson County, Texas. The sites, consisting of two sink-hole shelters, three other caves and a burnt-rock ring-mound or midden circle, are located from 32 to 49 miles northwest of the town of Toyah. All were completely excavated.

The region has an elevation of about 3700 feet above sea level, is semi-arid, sparsely settled and devoted exclusively to the ranching industry. The average annual rainfall is 17 inches. Scrubby mesquite, greasewood, yucca and cacti abound in places. Jack rabbits and quail are plentiful. The rolling prairie and Culberson Plateau merge into the Rustler Hills and Delaware Hills as one goes northeast and west.

Types of Sites

Numerous caves are found in the low hills. Some are real caves, with small openings that lead into large chambers. Others are called "sink-hole shelters," due to the entrance being a large depression or hole with parts of the wall overhanging. Adjacent to the caves usually are a few burnt-rock ring-mounds or surface middens.

Water Supply

The question of the water supply for the aborigines is a perplexing one. Some of the large sites, that show extensive occupation, are located as much as two to six miles from permanent water. For a few weeks after a heavy rain, pools of water might have been sufficient for the requirements of small bands. But it seems likely that during most of the year water was secured by digging shallow pits in some nearby valley. Ranchmen report that in certain places water can be found by digging from three to six feet in the sandy soil.

Site No. 1 Caldwell Ranch

Work was started on Cave No. 1, Caldwell Ranch. Since it is fairly representative of other sites in the region, the work there will be described in some detail. Only the outstanding features of other sites will be mentioned.

Site No. 1 is of the sink-hole type, with an opening 90 x 74 feet. The shelter proper begins at the north end of the surface-hole and extends north-northeast for 110 feet. The floor has a gradual, but fairly steep slope from front to rear. This resulted in the low back portion, and a drain along the west side of the shelter, made it damp and unsuited for habitation. Likewise, the steepest part adjoining the edge of the overhang was unoccupied. The concentrated midden deposit, in the center of the cave, covered an area about 50 x 35 feet. Some one previously had dug a part of the deposit.

Four small midden mounds of the circular type are located very near the cave. Inside the shelter, worn into hard limestone, is a mortar hole. Four others are in the flat-topped rocks outside the cave. Three are circular and two "boat-shaped." They range in depth from 7 to 9 1-2 inches, and in diameter from 6 to 7 inches.

Cross Section of Midden

A cross section in this first cave was as follows:

1"-9"—Trash deposit consisting largely of small sticks and twigs, some grass and midden material. A few fish-tail sandals and wooden implements.

10"-48"—Brownish-yellow ashy deposit intermixed with a great number of small burnt rocks, some limestone boulders (from roof) and much gravel. Considerable charcoal; a few small animal and bird bones. Several potsherds at depths ranging from 10 to 28 inches. An occasional fragment of charred matting.

49”-61”—Blackish ashy deposit, much the same as the level just above, except that this one contains much trash intermixed with gravel. Very few burnt rocks. Few flint chips and short pieces of cordage.

62”-76”—Trash deposit, containing matting, basketry, cordage, wooden implements and a few potsherds. Some stones among grass, weeds and twigs.

77”-86”—Black material like that from 49”-61”.

87”-99”—Trash deposit, consisting largely of grass and twigs intermixed with some burnt rocks and pebbles. Contains matting, cordage, yucca-leaf spliced “rope,” a potsherd (at 88 inches), and an occasional wooden artifact.

100”-112”—Undisturbed small stones (limestone).

113”—Bedrock.

It thus will be seen that evidence of human habitation extended to a depth of 99 inches.

So-Called Storage Pit

In the course of the excavation there was found what appeared to be a trash pit or abandoned storage pit. Its upper part was 33 x 20, increasing to 42 x 28 inches at a depth of 65 inches. Beneath a quantity of grass and twigs there was a well-arranged layer of large fragments of matting and basketry. The edges of the pieces overlapped and the whole had a concave surface 20 x 15 inches.

Under the matting, and extending 13 inches further west,

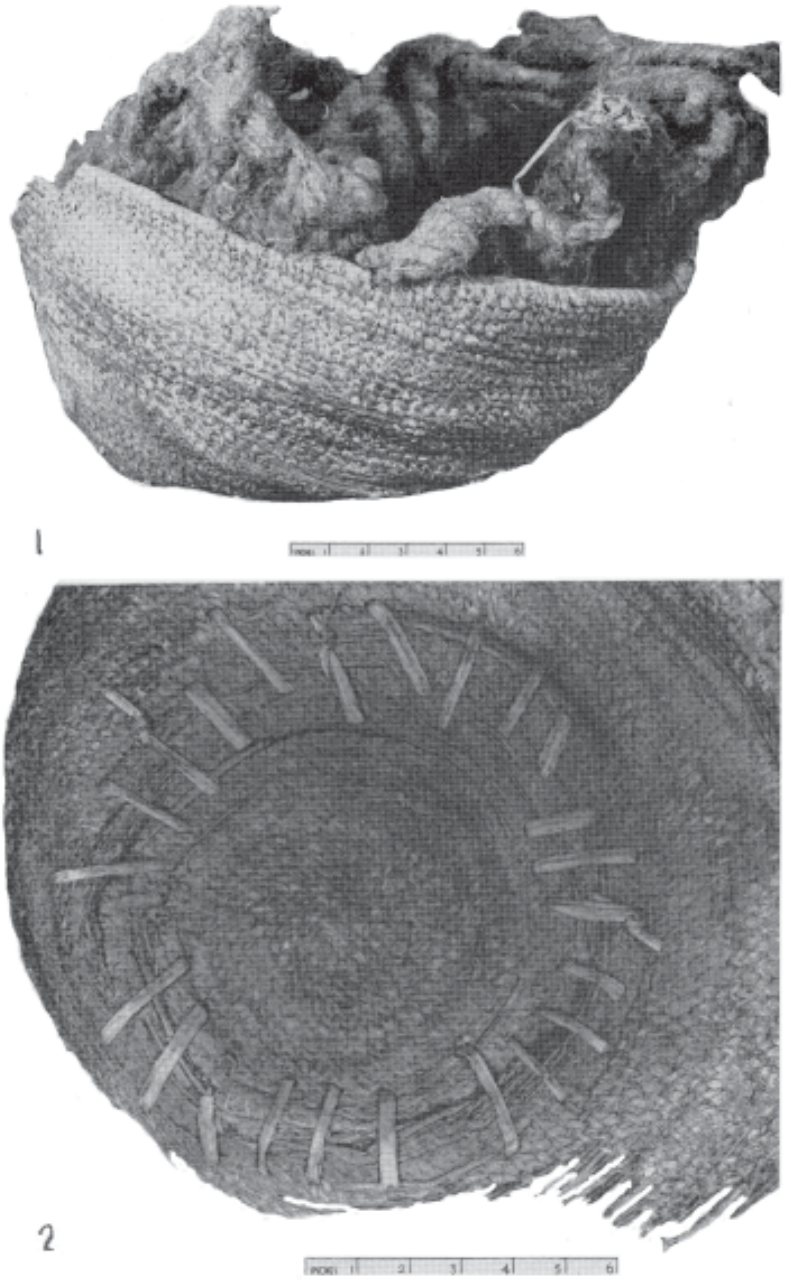


PLATE 25

BASKET AND POUCH CONTAINING MESQUITE BEANS

1. Basket found in an inverted position at a depth of 22 to 28 inches in cave deposit at Site No. 1 C. M. Caldwell Ranch, Culberson County. The basket is 6 inches tall and 14 ½ inches in diameter. One side is decayed, due to location at edge of a small drain coming from the mouth of the sink-hole. Inside the basket is a pouch made from coils of grass stems and leaves twined together with small fiber cords spaced one inch apart. In the pouch were hundreds of mesquite bean seeds. Pods apparently had been devoured by insects.
2. Bottom of basket, showing reinforcing stitches of yucca leaves.

was a 4-inch layer of grass and small brush. Next below was a layer of ash 2 to 5 inches deep; then a 17-inch thickness of matted grass and twigs, with pieces of charcoal and a few rabbit bones. Bedrock was found at a depth of 87 inches. Partly surrounding the lower 20 inches of the pit were four limestone slabs. It is possible that these may have been the remains of a stone-lined cist.

Found in the pit were four fragments of matting of diagonal weave, five of the over-two-under-two technique; five pieces of basketry of split-stitch type; a small piece of rabbit skin; a fiber cord 20 inches long and 3-16 inch in diameter, with ends tied by a square knot; and a section of reed shaft 9 inches long and 5-16 inch in diameter. The unbroken end had been trimmed then compressed by wrapping with sinew; a second wrapping was 1 3-4 to 2 1-4 inches from the first. The fragments of matting varied in size from 7 1-2 x 5 to 12 1-2 x 7 inches; the basketry from 11 x 2 to 15 x 7 inches.

Yucca-Leaf Spliced Rope

From a depth of 94 inches came a "rope" made by tying together 13 strips of split leaves of Spanish dagger (*Yucca treculeana*). The strips, about 1-4 inch wide, were united with 9 square, 2 granny and one double-granny knots. The length of the rope is 8 feet 10 inches. It was found doubled up in a bundle, with a quantity of grass and twigs beneath.

Cache in Basket

At a depth of 22 inches was an almost complete basket. Six inches tall and 14 1-2 inches in diameter, it was in an inverted position with the rim 28 inches deep. The basket was surrounded by small burnt stones and black ash. One side, next to a drain, was rotted away, while the remainder was dry and well preserved. Of split-stitch technique, the basket has walls 5-16 inch thick. The bottom is reinforced or repaired with a row of yucca-leaf stitches.

In the bottom of the basket was a thin layer of grass. Next was a fiber cord net with mesh 4 x 3 inches. Inside the netting was a pouch-like receptacle or bag, made from coils of grass stems and leaves twined together with small fiber cords spaced one inch apart. The Ethnobotanical Laboratory[1] at Ann Arbor reports that "The grass is of the wiry bunch-grass type and has convolute leaves. Although it may not all be of the same species, identifiable parts of *Pappophorum* sp. (probably *Pappophorum vaginatum*) were found."

In the storage pouch, intermixed with ashes and numerous small lumps of charcoal, were hundreds of mesquite (*Prosopis juliflora*) bean seeds. Near the center of the deposit of beans was a heap of reddish powdered material. This may have been the remains of the bean pods devoured by insects.

Not far from the basket, at a depth of 19 inches, was about a pint of mesquite bean seeds in a heap. They were in no kind of a receptacle.

Possible Net Snare

At a depth of 30 inches was part of what appears to have been a snare for birds or small animals. It is made of very small fiber cord, knotted into 2 1-4-inch mesh. The present size of the net proper is 11 x 7 inches; an end-cord or loop adds another 5 inches to the length. The bottom of the end-cord contains a small loop, into which the main cords of the snare or net are attached by simple loop knots. The end-cord may have served to attach the snare to a bush or stake. This specimen is suggestive of a net snare found by Nusbaum.[2]

Pottery

Most significant of the finds in Caldwell Cave No. 1 was the pottery. No whole vessels, but 44 potsherds, were found. Eleven per cent came from the surface; 55 per cent from the midden deposit at depths of 10 to 36 inches; and 34 per cent from 60 to 88 inches. No sherds were found between 37 and 59 inches.

The question of the association of the pottery with the various types of artifacts is an important one. After eliminating all doubtful cases, due to disturbances of any kind, there remain a number of others representing unmistakable associations. These are summarized as follows:

Fish-tail sandals were found with potsherds at depths of 10, 14, 20, 26, 34 and 78 inches. One sandal, at the latter depth, was in a bad state of decay, undisturbed and with a potsherd at the same depth and at a distance of 6 inches.

A basket bottom, at a depth of 49 inches, was 11 inches above a potsherd. The basket containing mesquite beans was uncovered at a depth of 22 inches, and near by at the same level were potsherds. Other basket fragments from depths of 12, 20 and 26 inches were with pottery. At a depth of 65 inches were two basket fragments and a piece of matting of the over-two-under-two diagonal weave; 26 feet away and at depths of 78, 86 and 88 inches were potsherds in an undisturbed deposit.

Rabbit-sticks, from 15 and 33 inch depths, were in levels with and not far removed from pottery.

A reed shaft and wooden foreshaft from 19 inch depth and the nock end of a reed shaft from 16 inches, were in levels at which pottery was found.

Mera[3] of the Laboratory of Anthropology at Santa Fe identified representative sherds from this and nearby sites. From Caldwell Cave No. 1 were Chupadero Black-on-white, Red-on-terracotta, El Paso Polychrome, El Paso Brown and a probable hybrid. Sherds, from depths indicated, were described by him as follows:

Description by Mera

No. 1. Depth 12 Inches: Chupadero Black-on-white. Difference in appearance due to a thinly applied paint and over-firing. Also has a better polish than usual.

No. 2. Depth 26 Inches: Red-on-terracotta. Related to Three Rivers Red-on-terracotta. The type has not yet been named because of some doubt of its relationship to the classical type.

No. 3 Depth 68 Inches: El Paso Polychrome from an undecorated part of a large vessel. The finish sets it apart from the earlier El Paso Brown.

No. 4. Depth 60 Inches: El Paso Brown.

No. 5. Depth 86 Inches: This is probably a hybrid. The paste is of the El Paso sort, but the thick red slip on the interior is derived from an, as yet, unnamed ware, that ranges from Northern Chihuahua to the Mimbres region where it is very common.

No. 8. Depth 19 Inches: El Paso Polychrome; somewhat reburned by use but typical. A fine example of the best period of thin walled vessels.

With regard to sherds from the different depths he stated: “I should say that all of these sherds, from what data we have at present, and regardless of depth, can be considered as contemporaneous within, to be on the safe side, fifty to one hundred years at the most.”

In discussing the Chupadero Black-on-white he adds: “This particular type seems to have existed over a much longer period than many other black-on-white sorts. We think that its range would be from in the neighborhood of 1300 A. D., or perhaps a little earlier, to circa 1600. * * * Inasmuch as black-on-red occurs concurrently with the black and white during a period up to about the middle of the 14th century, but probably not later, as it seems to disappear about that time, although the black and white appears to have lasted much longer.

Setzler[4] makes the following comment regarding the Culberson County pottery: “The details regarding the association of pottery in the C. M. Caldwell cave are convincing, and I would certainly agree with you that the inhabitants, who for the most part belong to the western Big Bend culture, had contact with the Pueblo people in the eastern part of the Southwest.” * * *

Sandals

Seventy-two sandals from Caldwell Cave No. 1 were of the fish-tail type. Of that number, 52 per cent were of the narrow unsplit leaves of beargrass (*Yucca tenuistyla Trelease*); 40 per cent from split leaves of the same species; and 4 per cent each from split leaves of Spanish dagger (*Yucca treculeana Carr*) and split leaves of *Agave lechuguilla.*

The sandal frames, or warp elements, are in most cases of multiple strands. Particularly is this true of ones made of the small leaves. The frames form one rounded end; but cross at the opposite end, leaving a V-shaped protrusion—thus giving rise to the popular term "fish-tail sandal." The weaving technique seems to be uniform, the weft strands crossing near the center.

A number of the sandals are reinforced by attaching pads of fiber or yucca leaves on the bottom side. Some of the pads are more than 1-2 inch thick. They may have been attached originally or later when the bottom became badly worn.

There are several variants of the general sandal tie-string. In each case there is a loop, of the same material, at the rounded end; a string attached to the frame at each side near the center. The strings are united by square knots. In one case the two loops interlock; again, a third loop interlocks and joins these two. Apparently no string was used back of the heel, the ones found being for use between the toes and over the instep. Of the sandals with tie-strings remaining, 27 per cent each were of the two-loop-two-strand and two-loop-four-strand; 18 per cent each of two-loop-three-strand and three-loop-three-strand; 10 per cent of them were three-loop-one-strand. The loop at the toe-end usually is a continuation of the warp element, tied by an overhand knot.

The sandals are comparatively small, many appearing to have

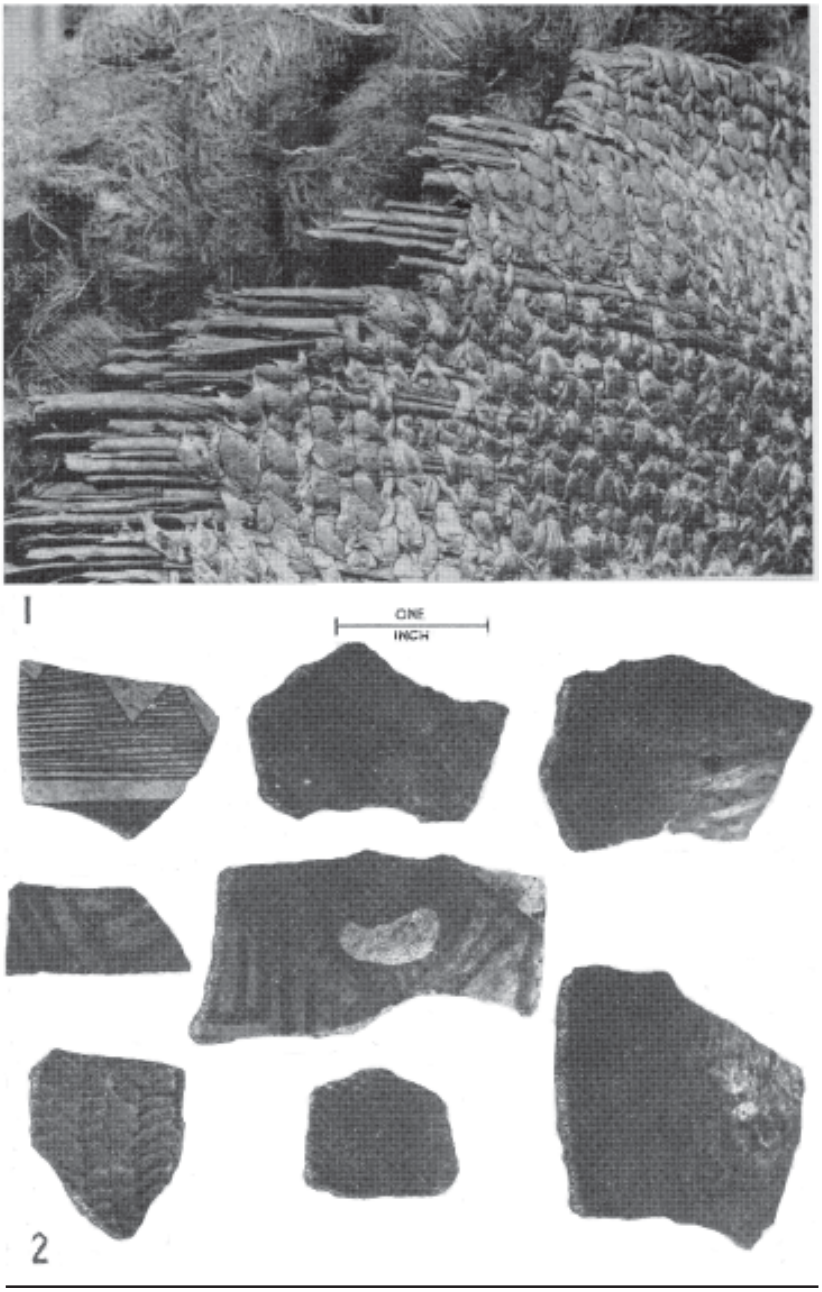


PLATE 26.

BASKETRY AND POTTERY FOUND IN ASSOCIATION

1. Close-up of decayed edge of basket, illustrating the split-stitch technique with single-bundle foundation.
2. Potsherds found at various depths in the cave deposits. The pottery includes Chupadero Black-on-white, El Paso polychrome, vertically indented coiled ware, fine rubbed plain coil and other types. The former, according to Dr. H. P. Mera, may range from about 1300 to 1600 A. D. Some of the sherds were found at the same level and near the basket.

been for infants. The sizes range from 8 x 4 to 3 1-2 x 1 3-4, with an average of about 6 x 3 inches. These sizes compare very closely with those of the same type of sandals reported by Smith[5] from a shelter near Alpine.

Fabrics

A fragment of a blanket, mat or pouch, 7 x 5 inches, was found at a depth of 12 inches. It seems to be similar to a "blanket-like fabric of soft fiber" from Brewster County illustrated by Coffin.[6] The Ethnobotanical Laboratory identified the material from the Culberson County specimen as follows:

"The warp is of grass stems and leaves matted together. * * * The grass of which the warp is composed is of the wiry bunch-grass type and has convolute leaves. * * * The weft strands are twined around the warp. The weft is of two-ply cord about 1-32 of an inch in diameter and is of lechuguilla fibers. (*Agave lechuguilla*)." * * *

Other Fragments of Basketry

Three basket fragments, found with pottery, have been identified by Setzler of the United States National Museum as follows:

"Fragments Nos. 71 and 74 belong to the type described as a single bundle foundation with yucca thread stitches split on the convex or non-work surface, sewed toward the left of the worker on the concave or inside of the basket. Fragment 35 belongs to the type known as the interlocking stitch with a single bundle foundation. My researches seem to indicate that the split stitch type is more prevalent than the interlocking stitch in the southwestern part of the Big Bend, while the interlocking stitch is the more prevalent around the Pecos River drainage."

Cordage and Knots

Of 110 pieces of cordage found in the first cave, 93 were fiber, 15 skin and 2 yucca leaf. The greater portion of the fiber cordage was made from lechuguilla fibers and consist of two strands. The sizes vary from 1-16 to 1-4 inch in diameter. The lengths range from one to 28 inches.

Skin thongs were from 1-8 to 3-8 inch wide with lengths as much as 13 inches.

At a depth of 12 inches was a fiber cord containing 24 knots. Yucca leaf fragments in two of the knots suggested that the cord came from a twined mat.

Of 125 knots found in the debris, 110 were square; 4 each larkshead and single half-hitch; 2 each clove hitch and overhand slip knot; one each, slip, granny and square with overhand knot.

Skin Fragments

Five skin fragments were from almost paper thinness to a thickness of 1-10 inch. The sizes varied from 3 1-4 to 1 1-4 to 10 x 4 inches. There also were 6 coils of rabbit skin. They were about 1-2 inch in diameter and 3 to 6 inches long. Originally they may have been part of a rabbit skin blanket or robe.

Metates and Manos

Two whole and one broken metate, seven whole and four broken manos were found in the camp refuse. The metates were fairly small, being 12 1-2 x 10 x 5 1-2 and 16 x 10 x 1 1-2 inches. One was used on both sides; the other on only one side.

Most of the manos were little used and poorly shaped. A few showed much use. One large mano, used on both sides, had black paint smeared over one side. Another, from 6 inches deep, had red paint on one edge.

At a depth of 24 inches was a mano worn down from both sides to a sharp edge. It was 5 1-4 x 4 1-4 inches and varied in thickness from 1 3-4 to 3-16 inch. Another specimen of edged mano came from 20 inches in the camp refuse. Manos of this type have been reported from Brewster County by Coffin[7], from Val Verde County by Pearce and Jackson[8] and from Llano County by Jackson[9].

A stone pestle, 7 1-2 inches long and showing considerable use on one end, was found at a depth of 9 inches.

Flint Work

Only 33 flint artifacts were found in the cave. These included 22 scrapers, 5 projectile points, 3 so-called warclub spikes, 2 spokeshaves or woodworking knives, and one awl.

A large very crude projectile point was found an inch beneath a potsherd at a depth of 10 inches. The other points were somewhat crude but of medium and small size. One from the surface was a broken microlith or so-called "bird point."

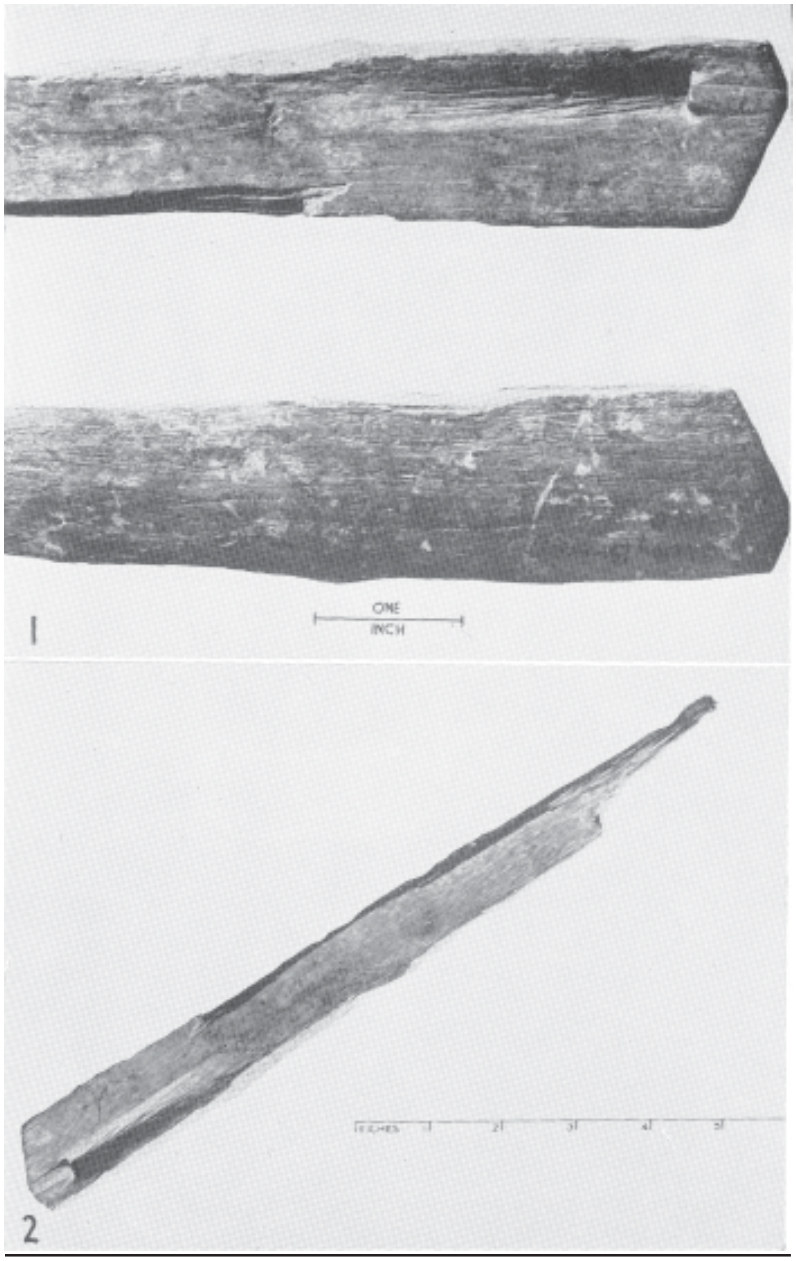


PLATE 27.

ATLATL OR SPEAR-THROWER

1. Close-up view of obverse and reverse sides of an atlatl fragment. Found in debris at a depth of 4 inches in Shelby Brooks Cave, Culberson County, Texas. The groove is 2 ¾ inches long, 3-8 wide and 3-16 inch deep at the spur end. The spur protrudes 1-8 inch. 2. Entire fragment of atlatl. Length, 11 1/2 inches; width, 1 3/8 ; thickness, 5-16 inch.

This extreme scarcity of flint artifacts is in striking contrast to the situation in regions where there is abundant local supply of flint.

Rabbit Sticks

Fewer rabbit sticks were found in the first than in some of the other caves. The specimens came from depths of 15 to 43 inches. Certain distinctive features are: groups of finely carved lines encircling the small rounded end of the implement; three parallel grooves or lines on each side, running lengthwise. The width of the specimens range from 9-16 to 2 1-2 and thickness from 1-4 to 5-8 inch. None from the first cave was complete, so that the exact lengths could not be determined.

An interesting feature on two specimens was the working down on one edge, for about half the length, to a sharp knife-like finish.

Fire-Making Implements

In the debris were found six yucca fire hearth sticks and a hardwood fire drill. A split sotol (*Dasylirion texanum Scheele*) flower stalk, 23 inches long and one inch in diameter, had one pit near the edge of the stick. There was a groove beneath, to facilitate the spark reaching the tinder. The specimen was found at a depth of 94 inches. It is interesting to note that fire-hearth sticks from many of the caves in Val Verde County do not have a groove or side opening to the drill pit.

The fire drill seems to have been a combination device to serve as drill and

digging stick. One end was round and charred, the other sharpened. Its length was 18 3-4 inches and diameter 1-2 to 3-4 inch. It came from a depth of 16 inches.

An oak scoop, 5 x 2 1-4 x 5-16, was found at a depth of 26 inches. One end was broken; the other end and sides were charred. It may have been used for carrying coals, or for scraping ashes, etc.

Other Wooden Artifacts

A wooden foreshaft, from a depth of 49 inches, was 7 1-8 inches long and had a sharpened point.

The nock end of a wooden shaft came from 34 inches in the camp refuse between boulders at the rear of the cave. The shaft was 9 1-4 inches long with a diameter varying from 3-8 to 1-2 inch. The notch, in the small end, was very shallow. Subsequent to its use as a shaft, the specimen was severed by hacking and breaking. It is of hardwood and in good condition.

Articles of Reed

The nock end of a reed shaft was against the southeast wall and 16 inches deep. Wrapped at three places, the shaft had a length of 6 9-16 inches, diameter of 5-16 and notch 3-16 inch deep. Various other fragments of reed shafts were found.

A possible reed pipe, suggestive of some described by Coffin[10] and Martin[11], came from a depth of 12 inches. It was 4 inches long and 5-16 inch in diameter. Cut at one end and broken at the other, the only joint has a hole through its septum. The specimen, however, is not charred. A similar one, from 18 inches, was 3

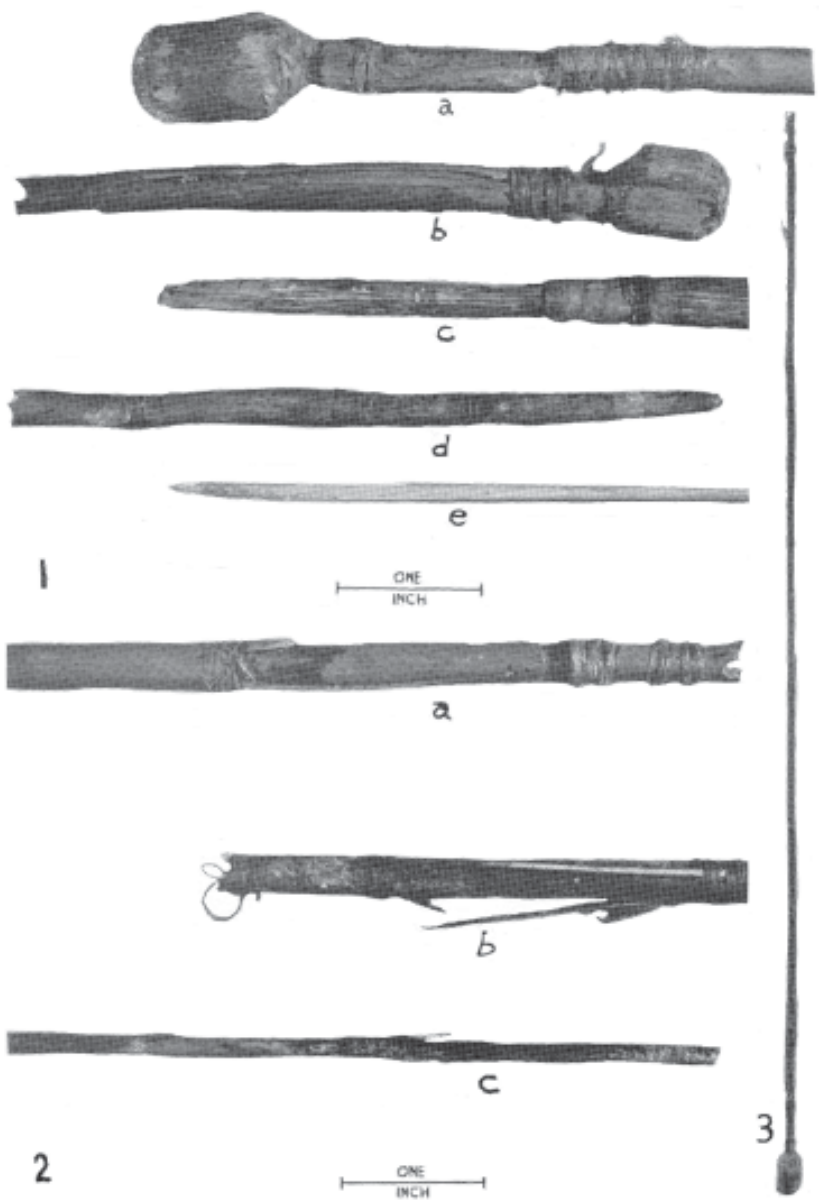


PLATE 28.

WOODEN BUNT POINTS, FORESHAFTS AND REED SHAFTS

1a, and 2a, are close-up views of bunt points and nock end of complete shaft illustrated in No. 3. Found at depth of 7 inches in Brooks Cave (near spot where an atlatl fragment was found). The reed is 30 inches long and 5-16 inch in diameter. The wooden bunt point increases the length to 33 inches. The notch is 3-16 inch deep. Remains of attached feathers may be seen. The wooden stem is 1 ¾ inches long to point where it merges into the bunt proper; the latter is 1 ¼ inches long and 3-4 inch in diameter, rounded and battered at the end. 1b is a reed fragment, from a depth of 9 inches in same site, containing a wood bunt point. 1c and d are wooden foreshafts in place in reed shafts and 1e is the point of a tiny reed shaft, all from deposits in caves on M. McAlpin Ranch, Culberson County.

inches long, 11-32 inch in diameter and charred at each end.

Bone Artifacts

A few bone awls, from depths of 11 to 25 inches, ranged in length from 3 to 4 1-2 inches.

A possible whistle or call found 20 inches deep, was made from a bird bone. A hole was drilled through to the hollow near one end; the other end was broken off.

Gourd Fragments

One whole and two fragmentary wild or Mexican gourds (*cucurbita foetidissimi*) came from the debris in the upper 20 inches. Three pieces of large, thick gourds were found at 10, 12 and 18 inches. One fragment had a carved edge, suggestive of a vessel rim. The gourd may have been a foot or more in diameter. There was no paint on any of the fragments.

Food

Cacti and mesquite beans seem to have been the chief items of food. Next in importance came rabbits and birds. Large game was scarce, but an occasional deer and antelope furnished a feast. No buffalo bones were found in this cave.

No corn was found. A lookout was kept for cobs, husks or kernels, but none were found.

Intern odes of the cactus stem, or prickly pear (*Opuntia lindheimeri*), were plentiful. From most of them the spines had been removed. Some appeared to have been roasted. Tunas or fruit of the prickly pear also were present in the midden deposit.

Other species of cacti were more plentiful. Single finds were numerous and at times they were in heaps. At a depth of 30 inches were 15 cactus fragments. It seems the inner portions were eaten, leaving only the "rinds."

In addition to the cache of mesquite beans, previously mentioned, many others both in the pod and out were scattered through the debris.

A few agarita berries, grass and yucca seeds and numerous fragments of sotol crowns were found. There were a number of quids resulting from chewing pieces of fibrous stalk—such as *Agave lechuguilla* flower stalks—when young and tender. But they were not as abundant as in cave deposits in Val Verde County.

Rabbit bones were abundant; bones of other rodents also were found. Among these were the kangaroo rat (*Dipodomys sp.*) and wood rat (*Neotoma albigula*). At a depth of 18 inches was the flattened carcass of a quail, with feathers missing.

A badger skull (*Taxidea taxus*) was found 26 inches deep. Bones of the turkey vulture (*Catharus aura*) were found. The head of a horned lizard or "horned toad" (*Phrynosoma cornutum*) was found at a depth of 83 inches. Bones of the great horned owl (*Bobo virginianus*), lynx (*Lynx rufus*), and pronghorn antelope (*Centelocapra americana*) likewise were found.

Caldwell Cave No. 2

This site, a typical "sink-hole shelter," was similar in many respects to Site No. 1. The entrance is circular, with a diameter of 74 to 77 feet. The walls have a sheer drop on all sides of 8 1-2 to 27 feet. Except for the east and southeast, the circular wall has a considerable overhang, under which the Indians lived. Back of the shelter is a low-roofed chamber, leading by a narrow passage to a large cave toward the west. The cave extends several hundred feet, but shows no signs of human habitation. On the surface adjacent to the cave are the usual mortar holes and ring mounds of "midden circles."

Flint artifacts were just as scarce as at the previous site. Scales from the roof with painted designs were found at depths of 4 to 8 inches. The paint was black. Nine stones had roughly circular areas on one side covered with black paint.

Eighty-four potsherds were found and these were at all depths down to 34 inches (the deposit was only 36 inches deep). Thirty-one per cent of

the sherds were black-on-white and came from the upper 15 inches.

Among the 14 manos from Site No. 2 were two of the edged type. They came from 9 and 12 inches.

Thirteen rabbit sticks came from depths of 5 to 19 inches; one from 30 inches. The longest was 20 x 1 x 1-2 inches. Three had no carving; on three others lines encircled the ends. Some had three continuous grooves, others two sets of three grooves each, running lengthwise. Martin[12] reported similarly grooved sticks from along the Rio Grande.

An unsplit firehearth stick of lechuguilla flower stalk, from a depth of 16 inches, contained eleven charred pits.

Bone specimens included an awl and flaking tool. A deer antler pick or digging implement, from 30 inches, was 10 1-2 inches long. It was cut and broken at the large end; the small end was badly worn from hard use.

The 35 sandals from Site No. 2 were much the same as those from Site No.1.

At a depth of 22 inches were found softwood sticks pierced and twined on fiber cords. This probably was part of a mat.

Burials, Caldwell Cave No. 2

Two burials were found at this site. The first, at a depth of 18 inches, was on a fiber mat or blanket that measured 36 x 15 inches. The upper surface of the mat was slightly concave. At the south end was a round depression, as if made by the skull; but the latter was missing—as were most of the other bones. Remaining were four ribs, a femur, several toe and finger bones, radius, ulna and humerus. It seems that the skeleton may have been placed with the head to the south and feet to the north. The length of the femur was 16 1-2 inches. The length of the mat suggests a flexed burial. Apparently rats gnawed and scattered the bones.

The bottom mat was made of coils of fibrous material about one inch in diameter and twined with rows of fiber cords spaced some 2 1-2 inches apart. At the south end of the grave were the remains of a second mat. The grass of which it was made was twined with fiber cords. A number of loose cords on top of some of the bones suggested that originally the body may have been covered with the grass mat.

The second burial was between boulders at a depth of 12 inches. There was grass above and beneath the burial. All that remained of the skeleton were two ribs, a few vertebrae and the skull—minus the lower jaw. The skull was that of a child of perhaps two years.

The skull was on the concave part of a mat that measured 16 x 13 inches. The mat, badly gnawed by rats, was made of fiber coils 1-4 inch in diameter; twined with rows of fiber cord spaced 3-4 inch apart. There were no offerings other than the mat.

Another possible disturbed burial, or mat-lined storage pit, was at a depth of 20 inches. The top mat, made of whole leaves of Spanish dagger, measured 18 x 14 inches. It had a concave upper surface. The weaving technique was over-one-under-one and over-two-under-one. A small mat of beargrass leaves had a size of 10 x 7 inches. A bundle of the same kind of leaves was at the east and another at the west. Beneath the matting were many twigs and a quantity of grass. Several limestone slabs lay near by.

Ring-Mound Group, Caldwell Site No. 3

This site consists of a group of ten burnt-rock ring-mounds—sometimes called “mescal pits.” The place is located in a draw, at the edge of a lowland, where water was available for several months in the year. The draw extends in a northwest-southeast direction and is hemmed in on both sides by chains of hills. The region is at the edge of the Alkaline Plains, which extends east to the Pecos River.

The dimensions of the ring-mounds vary from 57 to 19 feet outside diameters; 23 to 6 feet diameters of the inner depressions or “pits”; and from 33 to 6 inches in heights of the outer rocky portions. In addition to the ten mounds there were a number of smaller ones so badly scattered by erosion, or the trampling of cattle, that no definite measurements could be made. The area covered

by the group is about 600 x 150 feet, following the course of the wet-weather stream.

These ring-mounds are made up chiefly of small angular pieces of burnt limestone. The appearance and content of the ring of burnt rocks is practically the same as the flat-topped and conical burnt-rock middens of Central Texas. But the depression or "pit" contains very few stones, and a large quantity of ashes.

Of more than 50 middens of this type observed by the writer on the expedition, only three showed evidence of digging. In no case was the amateur "dig" larger than 3 x 2 feet. The reason may be found in the fact that these middens yield few artifacts. That fact probably gave rise to the belief that they were not ordinary midden deposits. On the basis of surface examinations and certain historic accounts, the" "rings" have been referred to as "mescal pits."[13]

A number of years ago Pearce[14] made the following statement about such ring-mounds:

"* * * Often the mounds in those parts are perfect circles with circular depressions in the middle. Sometimes they are elliptical with a trench-like depression. This suggests very strongly that the stones and earth of the kitchen middens were used, after sufficient accumulation, to make earth-lodges. * * *

He later added as follows: "These mounds—in all their shapes and sizes and in all regions where they are found—are of kitchen midden character. In West Texas, the annular character of many of the mounds with the fire place in the middle and with the burnt rock thrown back, so as to keep the fire on or near the ground, seems best explained on the assumption of the use of the rock pile as a wind break; and as a base for the tipi or house over and about the fire."

Mera[15] who for several seasons conducted expeditions in the Guadalupe Mountains area, and excavated or trenched a number of the "pits," stated:

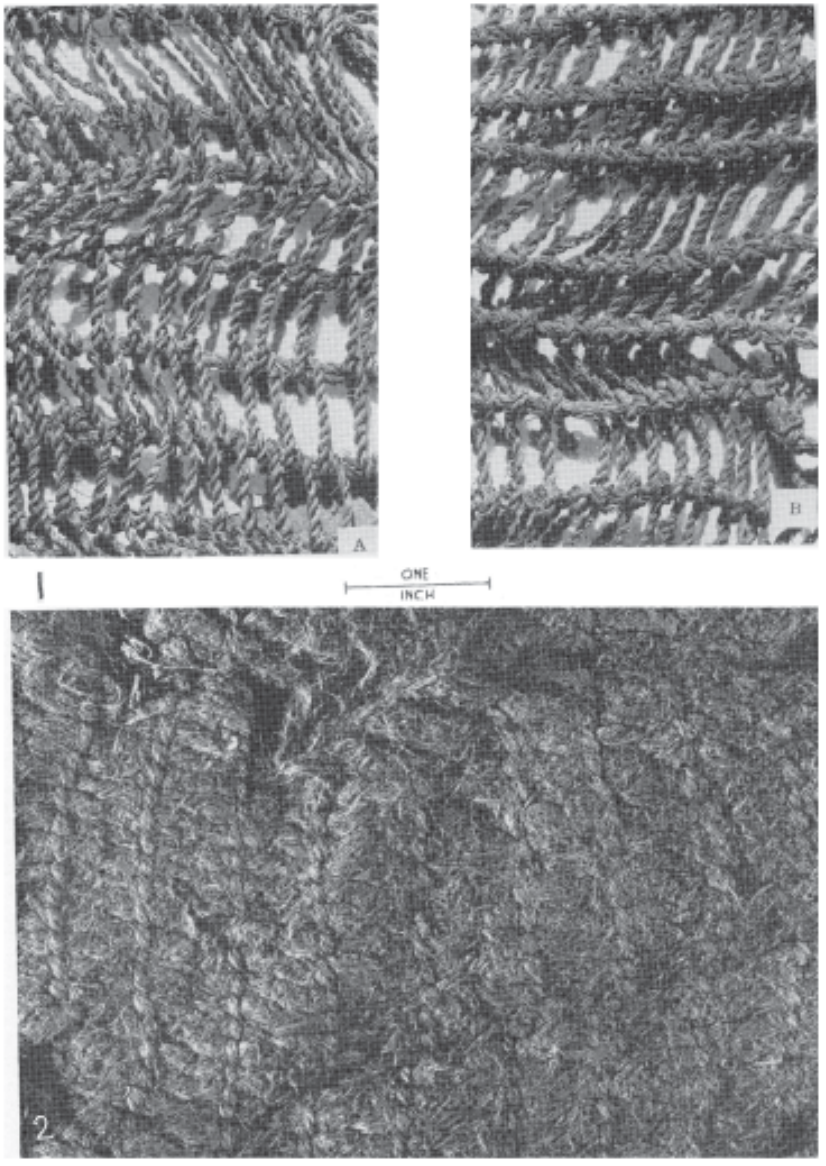


PLATE 29.

NETTING AND MATTING

1. Section of net showing technique of manufacture; A, obverse; B, reverse sides. Cords are twined from fibers of Agave lechuguilla.

2. Fragment of a mat. Warp consists of bundles of fibrous material about 1-8 inch in diameter; weft is two-ply twisted cord. Both warp and weft seem to be of the same material.

"* * * It was definitely determined that they were not pits, in any sense of the word; nor were they concerned especially with the preparation of mescal for food. Instead, they were found to be specialized refuse heaps. These circular mounds contained, in addition to the more obvious small cracked rocks, accumulations of ash, charcoal, food bones and other camp debris. As the term 'mescal pit' is obviously a misnomer, and as it is likely to be perpetuated by usage, the writer feels that a designation more in keeping with the character of the structures should be chosen. Therefore, the name 'midden circle' is proposed." * * *

In order to secure additional first-hand information our crew excavated the largest mound of the above described group. Work was started on the east, or lowest, side near the draw and the mound completely excavated. It was found that the maximum depth in the outer ring of burnt rocks was 33 inches; while that in the ashy deposit of the central depression was 19 inches. The bottom of the ash deposit in the center was on a level with the bottom of the burnt-rock ring and the surface of the surrounding land. Apparently no pit was dug.

Finds in Midden Circle

Of a total of 77 complete artifacts from this site, only 21 were dug up; the others were from the surface of the entire group. Of 74 potsherds from the site, 48 came from the large mound; nine from the surface and 39 were excavated. The artifacts found in the midden were as follows:

Type of Artifact	No. Specimens
Bone Pendant	1
Manos—Whole 1; Broken 2	3
Flint spokeshave	1
Flint side scrapers	6
Flint fist axes, crude	4
Flint bone crushers	4
Flint knife, small	1
Flint projectile point	1
	21

The flint artifacts were uniformly crude. The projectile point was found at 10 and the knife at 8 inches in depth. The bone pendant, at a depth of 8 inches, was in the burnt stones near the east edge of the "ring." The specimen measured 1 1-4 x 7-16 x 1-8 inch, the edges were rounded, and a small hole was drilled at one end.

Of the 39 potsherds dug from the midden, 21 were black-on-white, and were found in the upper seven inches. Mera identified sherds from the midden circle as follows:

Description by Mera

Sherd No. 9—Depth 4 Inches: Unnamed. Probably belongs, as a late form, to the Mogollon series which has not been completely worked out.

Sherd No. 10—Depth 18 Inches: Coarsely indented coiled utility (cooking) ware. Indented coil was derived from the Pueblo region to the north; but in the south, particularly, the same appearance was often imitated by scoring or other kinds of impressions. This seems to be the result of the latter process. Probably originated from Northern Chihuahua. Not named as yet.

Sherd No. 11—Depth 13 Inches: El Paso Polychrome. Classical.

Sherd No. 12—Depth 8 Inches: Coarsely indented coiled utility ware. This specimen was actually built up by coiling, as opposed to No. 10. Provenience probably the same or perhaps Southern New Mexico. The several forms inter-relate.

Sherd No. 13—Depth 10 Inches: Fine rubbed plain coil. A treatment of coiling native to a section of country generalized as Upper Gila but also extends south into the Mimbres area, possibly from the latter source. Not specifically named as yet.

Sherd No. 15—Depth 14 Inches: Related to the red-on-terracotta series. I am not familiar with this sort, but as it is not normal to New Mexico sites so far as I know, think it may be Mexican.

Sherd No. 16—Depth 8 Inches: Chupadero Black-on-white, with paint fired to a glaze. This is not unusual and does not seem to indicate any developmental difference.

Sherd No. 17—Depth 6 Inches: Vertically indented coiled utility ware. This type of coiling seems to have been developed in the Middle Gila section of Southern Arizona but the paste assigns it to the same group which includes No. 10 and 12. Not named.

Sherd No. 18—Depth 14 Inches: Smoothed and polished ware. The more normal variety of which No. 10, 12 and 17 are more unusual.

Sherd No. 19—Depth 11 Inches: Indented coil technique borrowed from Pueblo sources to the north, though the paste indicates a relationship with that of the El Paso group. Very likely an aberrant form.

Sherd No. 20—Depth 8 Inches: Belongs to the terracotta group from Southern New Mexico and Northern Chihuahua.

These pottery finds in the burnt-rock ring-mound suggests that sites of this type are contemporaneous with the cave deposits where like sherds are found.

Among the surface finds on the site was an obsidian side-scraper and three stone hoe blades (?). The latter were chipped off on one side to form a digging edge—much like certain hoe blades along Red River near Texarkana.

Brooks Cave

A large cave on the Shelby Brooks Ranch proved to be of considerable interest. The cave, with several small openings in the side of one of the numerous hills, is located some five miles from a water supply. But water is said to be obtainable at a depth of six feet in a draw 1-2 mile southwest of the cave. The main cave opening faces west and has much burnt-rock and other evidence of camp life in front of the entrance.

For record purposes, the cave was divided into three sections. The first, at the west end, measured 180 feet long with a maximum width of 110 feet; the central portion has a north-south length of 160 and east-west width of 170 feet; the east end is 150 long with the greatest width 110 feet. This makes a total east-west length of 500 and maximum north-south width of 160 feet.

The roof in the dark, steep west end showed little evidence of smoke-blackening; on the roof in the other sections there was a dense accumulation of soot. In places fire at one time consumed much fibrous material. That no doubt smoked the roof; but the densest deposit of soot is on the roof, back for some 40 feet from the main entrance—where the fibrous floor deposit did not burn. This suggests that the camp fires were kept burning on the fairly level part of the central section.

One small circular mortar hole is located in a rock ledge outside and near the west entrance.

Disturbed Burials

A few years before our visit "treasure hunters" had dug large holes near two boulders next to the south wall along the steep incline in the west section. In the soil cast out were broken human bones, together with two damaged grass mats, a yucca mat, a rabbit net torn into many pieces, two rhythm sticks (one with 70 notches), a bone bead, horn pendant, three flint projectile points and a small flint knife.

From the disturbed burial also came part of a large cord or rope 29 inches long and 3-8 inch in diameter. It is twined from 27 small cords. Each small cord is twined from two strands. The Ethnobotanical Laboratory at Ann Arbor reported on the cord as follows:

"Strands are two-ply and tightly twisted clockwise. The material is cotton (*Gossypium sp.*). They have been dyed or stained an orange-red color, after having been twisted. The color penetrated only part way, the central portion remaining uncolored."

Another hank of cotton cords had a knot 2 inches in diameter that united 74 small cords.

One fragment of the rabbit net was 46 x 22 inches; another 40 x 10 inches. The warp was of double cords and woof of single cords looped around the warp. The mesh was 1 x 1-4 inch.

Skull Burials

Against the south wall in the west end of the cave, some 12 feet southwest of the disturbed

burials, were two skulls in what appeared to be undisturbed deposit. No artifacts were with them. One was at a depth of 4 inches the other immediately beneath at 12 inches. No other skeletal remains showed up near the skulls.

Other Burials

In the east end of the cave, eight feet from the wall, was a grave partly disturbed by rats. The depth to the top of the mat covering was 10 inches, and to the grave floor 20 inches. The length of the grave was 33 inches; direction, southeast-northwest. The head was to the northwest, with face to north. Some hair remained in place on the skull; the ears were found in a desiccated condition. The lower limbs were missing.

A grass mat, 51 x 40 inches, was beneath the body and was folded back as a covering. The mat was made of bundles of grass twined with rows of fiber cords spaced 3 to 4 inches apart. Another mat, made of fiber coils and twined with cords two inches apart, measured 24 x 18 inches and was immediately beneath the skeleton. Rabbit skin cords represented the remains of a fur blanket that was in a bad state of preservation. There was a small polished mano but no other stone artifacts in the grave.

The remaining burial was found in a large crevice in the rock, in the central section of the cave. Above the topmost of the two skeletons was a fill of stones and ashy soil to a depth of 22 inches. The width of the crevice was 28 inches and the length 11 feet; with the burial slightly south of its center.

The skeleton on top was that of an adult female, lying on the stomach face down. The body was straight from the head to the pelvis; the right knee

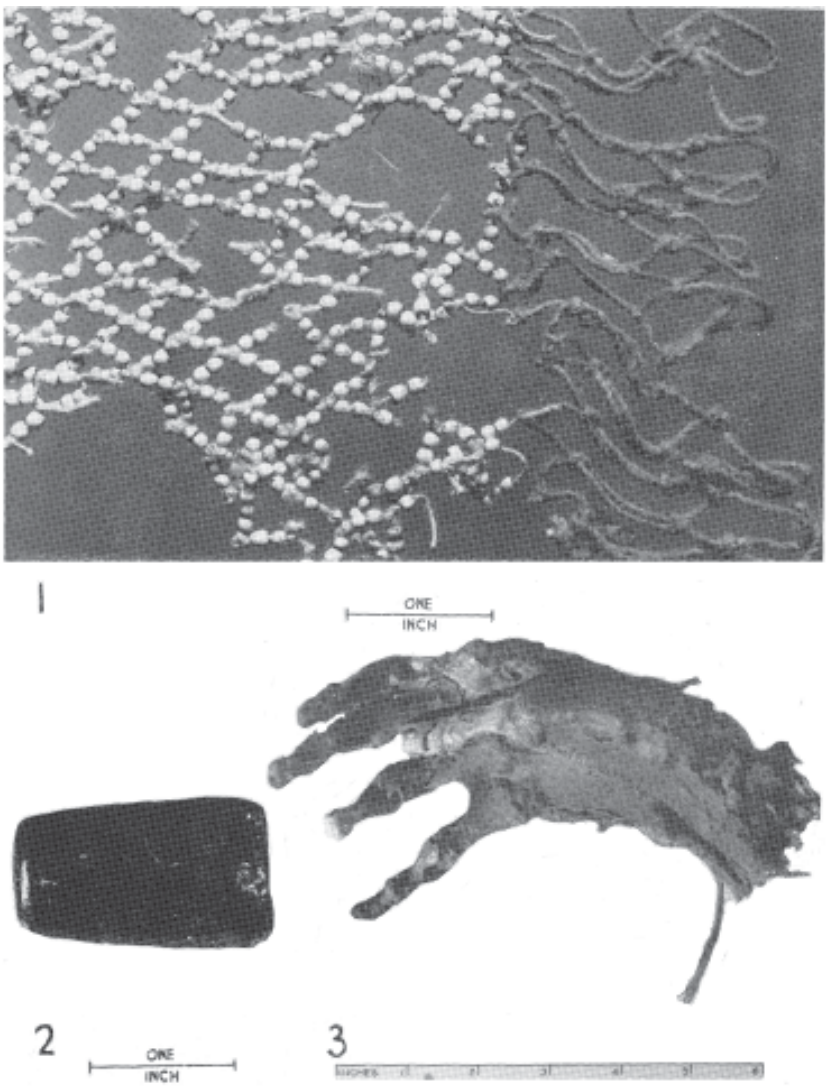


PLATE 30.

RECORDS DESTROYED BY RATS AND VANDALS

1. Fragment of a beaded pouch, found in a rat nest beneath a large boulder in McAlpin Cave

No. 2. One piece is 5½ x 3, another 9 x 7 inches. The seed beads are from some species of *Lithospermum*; and are on small undyed two-strand cord; the larger cord has been dyed or stained an orange-red. Mesh, 1-4 inch. 2. Highly polished horn pendant, with remains of human-hair cord in suspension hole. Cast out, along with human bones, by "treasure hunters" who dug large holes in Brooks Cave. Dimensions, 1¾ x 1 x 3-16 inch. 3. Desiccated human right hand, found in debris in Brooks Cave. Probably gnawed off and removed from grave by rats. Note the long finger nails.

was beneath the stomach, with the foot against a boulder; the left knee at the east side of the crevice, with the foot doubled back against the rock. The left humerus was extended outward over one femur of the skeleton beneath; the arm was flexed with the left hand over some matting; the right arm was bent beneath the stomach. The right side of the skull was against the west wall. The femora were 17 1-2 inches long. The teeth were small and badly worn; the rear molars of the lower jaw were missing—as was the case in certain skulls reported from Val Verde County[16].

A digging stick protruded 15 inches from beneath this skull. Another stick had one end near the left ear. The top skeleton was above a yucca leaf mat of two-over-two-under weave. Just beneath the mat, under the left hand of the upper skeleton, was a bundle of five sticks with a large fiber cord net of 2-inch mesh wrapped around them. Beneath the lower skeleton was a mat made of coils of fiber twined with cords. A little-used mano was just above the skeletons.

The lower skeleton, that of a child, was on the right side, with the head to the northwest and the feet to the southeast. The legs were semi-flexed, with the left foot across the right ankle. The body was bent with the front of the skull against the west wall. The right arm was bent with the hand beneath the pelvis; the left hand was south of the chin. The length of the femora was 11 1-2 inches.

In the grave was a short piece of yucca flower stalk decorated on one side with paintings in black. Another specimen from the grave was a wooden foreshaft 8 1-2 inches long and 1-4 inch in diameter.

The roll of netting, approximately 18 feet in length, may have been used as a rabbit net or snare. The sticks on which it was wound have one sharp end with the other notched. If stuck in the ground at intervals they would facilitate stretching the net, the upper cord of which might rest in the notched ends.

Remains of another badly decayed fiber cord net found beneath and above the feet of the lower skeleton which suggests that a portion at least of the body may have been encased in the net;

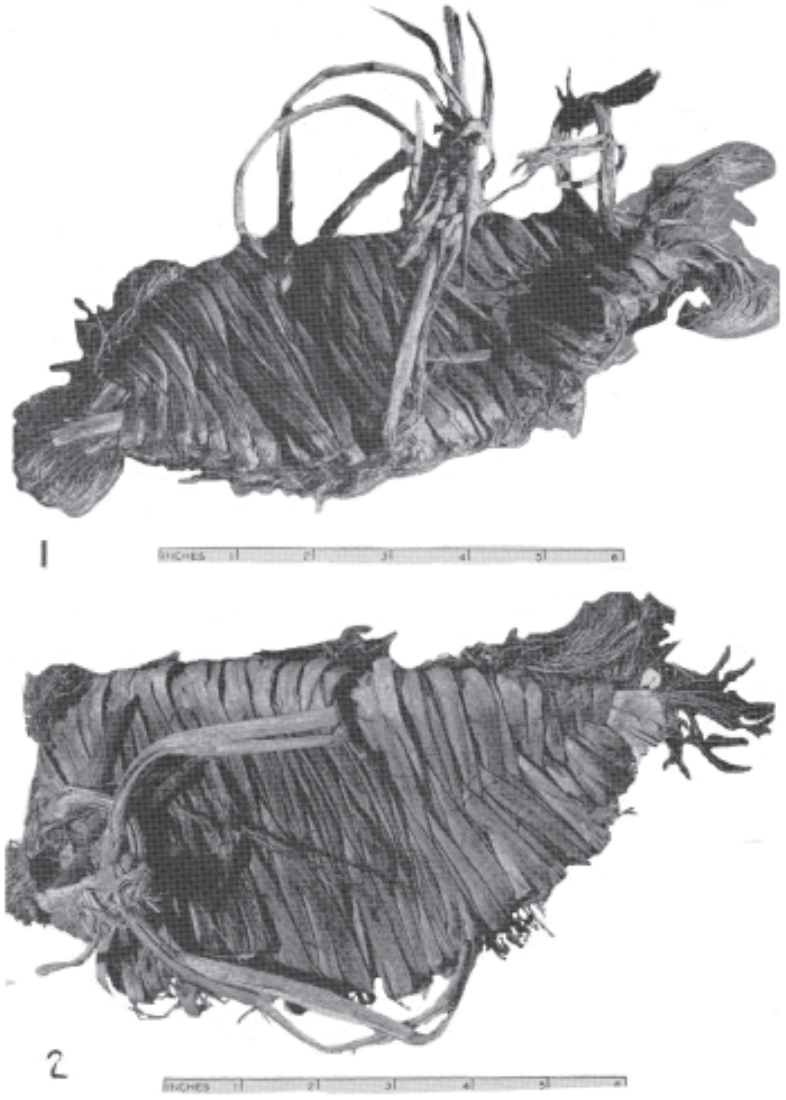


PLATE 31.

FISH TAIL SANDALS OF YUCCA LEAVES

1. Tie-string consists of large central and small toe-loop, united by a third loop. Apparently there was no string back of the heel. Found in Brooks Cave. 2. Two interlocking yucca-leaf loops served as tie-strings. The weft strands cross near the center, giving the sandal a symmetrical appearance. From Caldwell Cave No. 2.

or possibly a net fragment was used as a rope to bind the matting around the legs.

The bottom of a basket was located beneath the abdomen of the adult. Its diameter was 6 1-2 inches, with a hole about 2 inches in diameter in its center. Although the remainder of the basket was not found, the pierced bottom suggests ceremonial "killing."

Destruction by Fire

In the east part of the cave much of the deposit of fibrous materials, sticks, and other debris had been destroyed by fire. In some places the loose, feathery ash showed the trash deposit originally to have been as much as five feet deep. In other sections there seem to have been several fires, with periods of occupation between. When the flames reached large boulders, the fire sometimes was checked. This resulted in several small areas being saved. The fires may have been accidental; or started intentionally to clear the space of excess debris.

Cross-Section, Brooks Cave

A cross-section, at a point 6 feet from the wall at the east side, was as follows:

1"-10"—Surface material composed largely of bat guano.

11"-28"—Camp refuse, composed of sticks, fibrous material, small limestone slabs, some burnt, and brown ash. A few rabbit sticks, fire hearths and an arrowshaft. No flint. Small quantity of bat guano.

29"-55"—Same as level just above, except that sticks are more numerous and there are a few more stones. Rabbit sticks and two badly decayed sandals of yucca leaves. No flint. Rabbit bones and a few wolf and wildcat bones. Deer antlers. No cordage; no pottery. Grass stems make up a large part of the trash, intermixed with sticks. Latter vary in size from small twigs to branches 1 1-2 inches in diameter. Many of the sticks are charred at one or both ends. Some have been hacked with a flint or other crude implement and then broken.

56"-59"—Undisturbed yellow shale.

60"—Bedrock.

Grooved Rabbit Sticks, Brooks Cave

One of the most abundant and outstanding types of artifacts in this cave was the grooved rabbit stick or so-called throwing club. Forty-one specimens of this type were found in the cave. Some of the clubs were as much as 24 inches long; the average width was 1 1-4 inches and the average thickness 3-8 inch.

Twenty-eight per cent of the specimens had no grooves; 48 per cent had three grooves; 20 per cent four grooves; and 4 per cent two grooves. Five per cent of the grooved clubs had the lines arranged in five sets; 9 per cent in four sets; 13 per cent in three sets; 17 per cent had two sets; while 56 per cent had continuous or unbroken grooves.

Seven of the fragmentary specimens were charred at one end. This suggests that after the sticks were broken they may have been used as fire "tongs," shovels or torches.

Three specimens were wrapped with thin skin or sinew. Being near the ends, the wrappings may have served to give a better hand grip or to guard against splitting.

Many specimens gave evidence of having been put to hard usage. Often one end was battered, as also occasionally were the sides. This seems to confirm their use as throwing or striking sticks.

Eight specimens had scratching or fine carving near one end. These sometimes took the form of crosshatch and almost invariably encircled the stick. They may have been intended as a form of decoration or to roughen the surface and thus assist a firmer grip on the stick. In the latter event they would serve as a substitute for wrapping.

An occasional specimen had a large notch or hacked-out place in one edge near the end. This too may have been a form of handgrip.

The parallel grooves running lengthwise seem to have been primarily for decoration. The fact that many of them are divided into groups lends strength to the assumption. The prevalence of three and four as "magic" numbers should be noted.

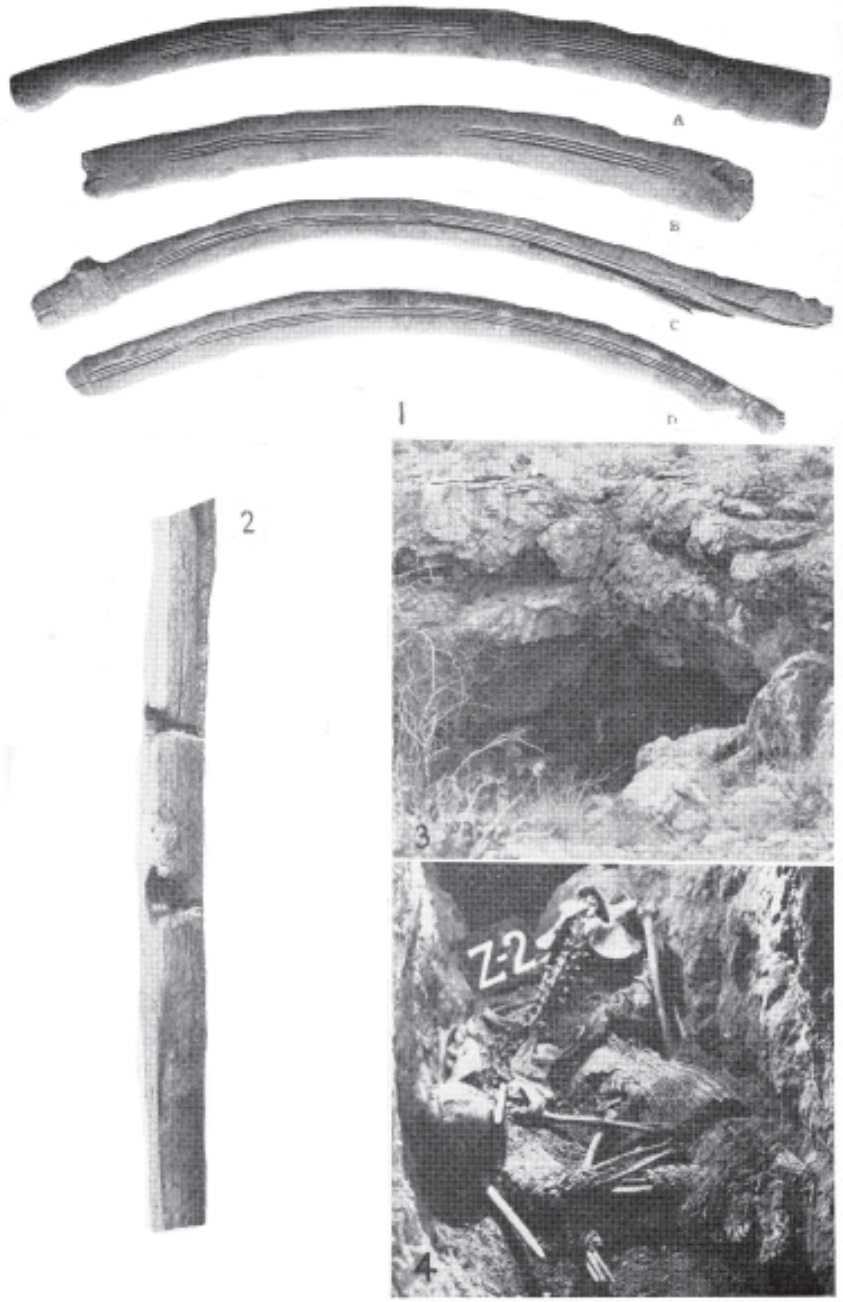


PLATE 32.

1. So-called rabbit sticks, from Brooks and McAlpin Caves. Lengths: A and C, 24 inches; B, 19 ½ and D, 21 inches. Note the groupings of the grooves, the end-wrapings and notched hand-grips.
2. Fragment of yucca stalk firestick, with charred pits and notches. Length, 5 inches.
3. Entrance to McAlpin Cave No. 2.
4. Burial of adult and child in crevice between boulders. Brooks Cave. Note the matting and netting. The mat, about 40 x 14 inches, is of two-over-two-under technique.

Types of Basketry, Brooks Cave

No whole basket was found in this cave. One bottom, 5 1-2 inches in diameter and employing the split-stitch, came from only two inches deep. Another of the same type was at 12 inches. This bottom, 6 inches in diameter, had been patched by use of fiber cordage. A fragment using the interlocking stitch was from 7 inches. Specimens sent to Setzler were identified by him as follows:

"After examining the coiled basketry fragments, I have come to the following conclusions: Fragments Nos. 117 and 119 belong to the type described as a single bundle foundation with yucca thread stitches split on the convex or non-work surface, sewed toward the left of the worker on the concave or inside of the basket. Fragments 97 and 120 belong to the type known as the interlocking stitch with -a single bundle foundation. Fragment No. 183 is most unusual. My analysis indicates a single rod foundation with non-interlocking stitches, some of which are split on the concave or inside of the basket. An example of this type will be found in 'Preliminary Classification of Prehistoric Southwestern Basketry,' by Gene Weltfish, Smithsonian Miscellaneous Collections, Vol. 87, No. 7, p. 18, fig. 12. This is considered by Weltfish as of rare occurrence, which she analyzed from the Wetherill collection."

Bows and Arrows

One fragmentary and two practically whole bows were found in the Brooks cave. There also were found one reed arrowshaft, with wooden bunt point, and the distal end of another; two wooden foreshafts; one nock end of a wooden shaft; and three probable wooden arrows.

At a depth of 6 inches was an end section of what appears to be a bow. It is 20 1-2 inches long and 1 1-2 inch in diameter. The undamaged end bears a notch, the other end is burnt. A curved bow-shaped stick, with remains of red stripes around it at close intervals, was found on the surface in the central part of the cave. Its length is 28 1-2 inches and diameter 5-8 inch. The ends are decayed.

One of the outstanding finds, at a depth of 7 inches, was a reed shaft 30 inches long and 5-16 inch diameter, with a wood bunt point 3 inches long, making a total length of 33 inches. The nock end has a notch 3-16 inch deep with two sets of wrappings within 1 1-2 inches from the end. A third set of sinew wrappings, with remains of three feathers, is 4 inches below the notch. The bunt "stem" is in place in the reed shaft and bound with wrappings one inch wide. The stem itself is wrapped near the bunt proper. The wooden stem is 1 3-4 inch long to where it merges into the enlarged blunt point. The latter is 1 1-4 long and 3-4 inch in diameter, rounded and battered at the distal end.

At a depth of 9 inches was a fragment of a reed shaft with a similar bunt point inserted in it. The reed section is 8 3-4 inches long; the bunt,

PLATE 33.

GRAVE AND OTHER FINDS

1, 2. Matting and basket fragments arranged in concave deposits, Caldwell Caves Nos. 1 and 2. Apparently not graves, as no skeletal remains were found. Immediately beneath the matting in No. 2 was a layer of grass. 3. Fiber cord net wrapped on six sharpened-and-notched sticks. Longest stick, 32 inches. Found in Burial Z-2, Brooks Cave. Diameters: roll, 6 inches; outer cords, 1-8; inner cords, 1-10 inch. Two-inch mesh. Probably a rabbit net to be stretched on the sticks. 4. Skull of adult from Burial Z-2, Brooks Cave. Note absence of lower molars and presence of adhering matting over left eye. 5. Burial Z-1, Brooks Cave, showing large grass mat (51 x 40 inches) partly turned back revealing skeletal remains. Grave was beneath camp debris and bat guano. Burial disturbed by rats.

one inch long and 5-16 inch in diameter. The entire stem is imbedded in the reed. The outer end of the bunt is badly battered and has a fragment broken out.

In comparing these specimens with one from Brewster County, illustrated and classed by Setzler[17] as an "atlati bunt point," photographs and full descriptions were sent him. He replied as follows[18]:

"* * * Photograph showing the complete shaft and bunt point illustrates an unusual specimen. It is the first that I have seen from that Texas region. There seems to be no question but what it was an arrowshaft, unless these people had some other method for propelling shafts with nock ends. The nock end, feathering and the fact that the shaft is made from a reed 33 inches long would certainly indicate an arrow-shaft. This, of course, raises the question as to whether my so-called bunt point might not also have been hafted to a cane arrow-shaft. I have consulted with several colleagues here, trying to determine the difference between a bunt point used in an atlatl shaft in contrast to one used in an arrow-shaft. We all agree that it is practically impossible to tell definitely the difference—as it would be in determining a flint projectile point—unless the specimen was actually hafted. My identification was based primarily on the opinion of Kidder, Nusbaum, Roberts and Judd. They may have been led to believe that it was an atlatl bunt point because of its association with the handle of an atlatl and the foreshaft which were found associated in this cave.

"The only possible criterion that I can think of at the moment would be the degree of tapering. One used in an atlatl shaft would probably be larger and less tapering than one used in the smaller reed shafts. Bunt points are commonly used in arrow-shafts reported from historic Indian tribes and Roberts feels that bunt points would be more rare with atlatl using people than with the former. The measurements on my specimen are 3 1-8 inches long and 1 1-8 inches in diameter, which is practically the same as yours except for the diameter." * * *

A wooden arrow, perhaps a toy, is 13 1-4 inches long and 1-4 inch in diameter, with one end sharpened and the other notched. It came from a depth of 8 inches.

Evidence of the Atlatl

An atlatl fragment, from the distal end, was found at a depth of 4 inches in the east section of the Brooks Cave. The specimen is 11 1-2 inches long, 1 3-8 inches wide and 5-16 inch thick. If the groove originally was in the center, the total width of the atlati was about two inches. The wood is polished on each side. The groove is 2 3-4 inches long, 3-8 inch wide and 3-16 inch deep at the spur. The spur protrudes about 1-8 inch.

Setzler[19] writes as follows concerning this specimen: "* * * I would identify the specimen * * * as a crude atlatl; however, one of the best examples I have seen from the Big Bend. The finding of this specimen, together with examples of the bow and arrow, would seem to agree with the numerous examples I have found. Here again, we have evidence showing their contemporanity comparable to the Pueblo I period in the Southwest. This does not, however, indicate a similar time chronology for the Big Bend."

The specimen has a shorter spur than ones the writer has seen from the Hueco Mountains near El Paso, and from a cave in Sierra de Pajarito, Chihuahua, Mexico; and apparently the spur is shorter than one from Oklahoma illustrated and described by Baker and Kidder[20]. The spur protrudes very slightly above the surface on this Culberson County, Texas, specimen.

The atlatl from Culberson County is unlike that reported from Val Verde County by Gardner and Martin[21].

Other Finds in Brooks Cave

Among the miscellaneous finds was a polished bone 8 inches long and 1-2 inch in diameter. It was ground down at one end. The U. S. National Museum identified it as a bone of the Golden Eagle (*Aquila Chrysaltos*).

Fire-making implements included 5 hardwood drills and 10 yucca stalk hearth sticks. The lengths

of the drills are 10 1-4 to 22 1.2 inches, with an average of 16 inches. A small bow, That possibly may have been used for drill rotation, came from a depth of 24 inches. The length of the bow was 26 inches; diameter, 3-8 inch. There is a notch half way around one end; the other is broken where the groove was cut. But the drills do not seem to show the use of a bow.

A so-called game carrier consisted of a fiber cord 10 inches long attached at one end to a rabbit bone "needle" or stringer, and at the other to half of the pelvic bone of a rabbit. It came from a depth of 8 inches.

Only 16 flint specimens were found. A lump of red ocher, showing evidence of use, came from a depth of 11 inches.

Four potsherds were found in this cave. They came from the upper level, none being deeper than four inches.

Skeletal Material

A detailed study of these, along with other, skeletons from West Texas caves has been made by a physical anthropologist and will appear as a separate publication. The present evidence seems to indicate for Culberson County a mixture of the round-headed Pueblo type with the long-headed Big Bend type. But much more work needs to be done before arriving at any conclusions.

Food, Brooks Cave

While a buffalo bone, a number of deer bones and bones of the coyote (*Canis sp.*) were found most of the bones were those of small animals—particularly that of the jack rabbit (*Lepus sp.*). Quail bones were plentiful. A horned toad in a desiccated condition, with the insides removed, came from a depth of 8 inches.

Cacti were not so abundant as in the Caldwell caves. Mesquite beans were numerous. There was no corn.

McAlpin Caves No. 1 and 2

The excavation of two small caves on the McAlpin ranch, while thoroughly worth while, brought to light very little new data. Hence a detailed report of the work will not be given here.

Summary

Perhaps the most important result of the work was the finding of potsherds at various levels in two caves. This gave the first inkling as to the approximate chronology of the cave culture of the region. It likewise indicates that the culture is not so old as some archaeologists had assumed. But there was no evidence of European contact.

The available evidence suggests a combination of the Pueblo culture and Pueblo physical types.

The atlatl and bow and arrow appear to have been contemporaneous.

There was found no evidence of corn.

Food consisted largely of small game and fruit of native plants.

Flint work was extremely scarce.

Rabbit sticks were well made and very abundant.

Sandals were prevailingly of the so-called "fish-tail" type.

Basketry and matting illustrate an interesting variety of weaving techniques.

The midden circles in the open appear to be of about the same age as the cave deposits.

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MORE EVIDENCE CONCERNING ABILENE MAN

By Cyrus N. Ray

The first two skeletons of the Abilene type of dolichocephalic man were found by the writer on the Brazos River near Albany, Texas, in January 1929. (1). These were buried in stone slab cists in an old charcoal and burnt rock floor stratum which lies between six and a half and seven feet below the present soil surface. Later other ancient buried floor levels were found by the writer fifty miles nearer to Abilene, buried at depths of 6, 8 and 15 feet below the soil surfaces, also on the Brazos River. These were on the W. Myatt place, located twenty-two miles northeast of Abilene. (2)

In January 1930 the Gibson site (Site 7), situated seven miles south of Abilene, was discovered by the writer where three distinct strata of charcoal, flint chips and burnt hearth stones outcrop, one above the other, in a vertical bank at depths of twenty-four and a halt, twenty-seven, and thirty feet below the present soil surface. (See plate 36, Nos. 1 and 2). In this bank the writer first found the distinctive, thick, base flattened, leaf shaped type of projectile point, (3) (later termed Abilene Points) (4) embedded in place, in a stratum 24 ½ feet below the present soil surface. Later a total of close to fifty skeletons of the Abilene type have been excavated by the writer (5) and (6), which has proved that this is a distinct type of man, and that the skeletal peculiarities were not monstrosities as at first claimed by some, or again rare and isolated family characteristics found in only a few skeletons (7).

This longheaded skeletal type, buried in typical stone slab cist buried mounds (8) has been found in a region extending 175 miles from east to west, and sixty miles from north to south, centering in Abilene. The deeply buried camp floor sites have been found in a similar area, centering in the same region, on the different branches of the Colorado River, and on both the Clear Fork, and the Salt Fork of the Brazos River, but wider in the diameter from north to south, it being one hundred and fifty miles from deeply buried sites on the Salt Fork of the Brazos, to others on the Colorado River which have been inspected.

Buried campsites have been found by this writer in Taylor, Jones, Callahan, Nolan, Mitchell, Shackelford, Runnels, Haskell and Concho Counties, and these sites doubtless exist over a much wider area. The writer has had neither the time nor the money with which to investigate the space limits of inhabitation of this ancient long headed Texas race. The territory is so large, and the evidences of ancient inhabitation are so abundant as to suggest that this area must have been populated with a considerable number of inhabitants in a period when most of America had few, if any.

In the center section, where the longheaded burials have been found in greatest numbers, the deeply buried ancient floor levels are also found to be the most numerous, and are almost continuous on every vertical eroded Brazos River bank for a distance of six miles or more. In the center of this Jones County area, on the Hollis Roberts place, is a small hill which stands close above some of these deeply buried ancient floor levels, and here in 1932 the writer excavated eighteen burials from four buried mounds, each grave enclosed in a separate stone slab lined cist (6) and (8). Of these seventeen were flexed burials, and one a cremated infant burial. However, the mound containing the cremated infant bearing cist, also contained three adults, and another infant, not cremated, buried in flexed position in stone burial cists.

Two Extended Burials

About a half mile to the south of the low hill on which the multiple cist mound burials (6) and (7), referred to above, were found, rises a high flat topped hill, on which the writer noted structures which he believed were burials; these he did not excavate for several years, in the hope that Texas University would get time to assist in the work.

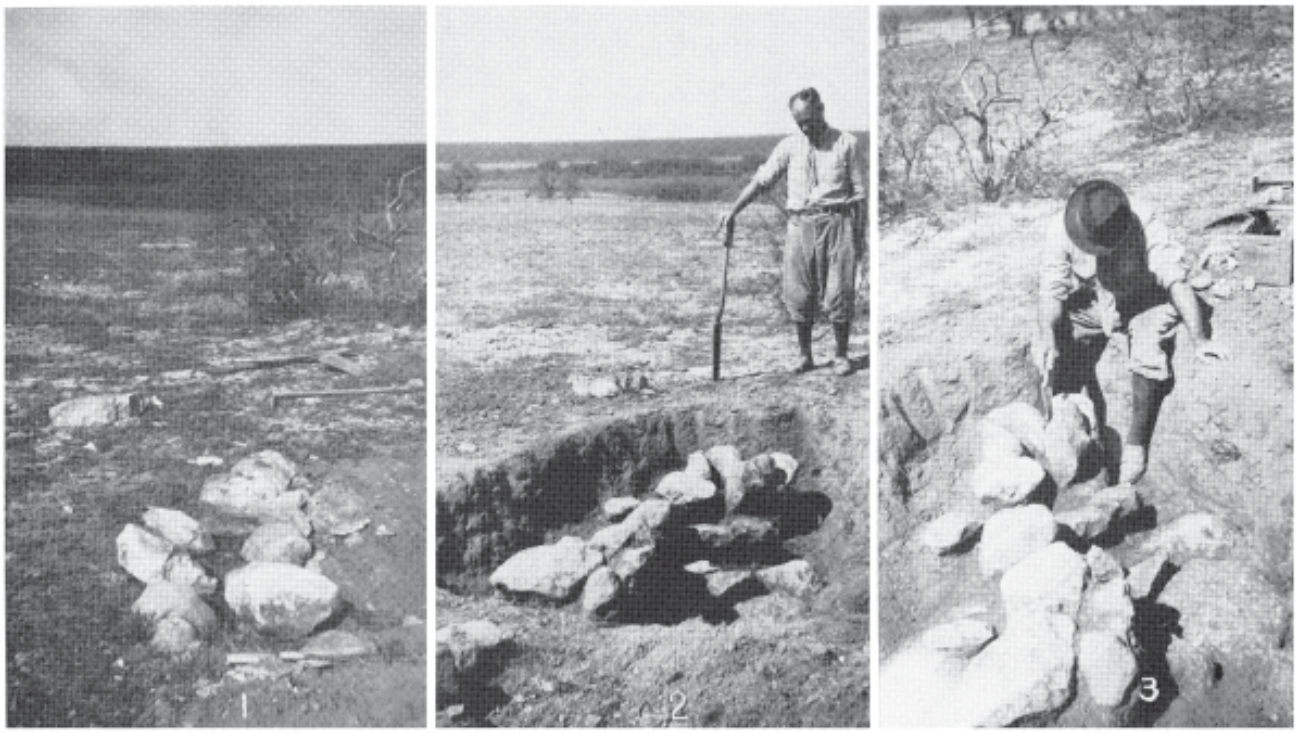

PLATE 34.
No. 1. Top layer of stones with earth removed, W. Myatt Flexed Burial (3).
No. 2. Middle layer of stones, earth removed, W. Myatt Flexed Burial (3).
No. 3. Another view of middle layer of stones, W. Myatt Flexed Burial (3).

There is always considerable danger in leaving such sites unopened over any considerable period, because of the fact that the country is full of persons hunting for mythical treasure pots, who frantically dig into any structure which remotely suggests the work of man, and deliberately destroy all of its contents.

Finally on September 23, 1936, the writer decided to excavate them with the assistance of two Hardin-Simmons University students, Mr. J. Morrow and Mr. Gerald Jarvis.**

On top of the highest point of this hill the writer found a rock pavement laid solidly in two layers covering an area 22 feet north and south by 23 feet east and west. The two top horizontally laid stone layers were closely fitted together and were somewhat over a foot thick. Beneath the top layer of stones were two feet of clay which showed little signs of ever having been moved. It was full of caliche nodules which apparently had formed since the burial was made. Beneath the clay was another layer of flat stones laid down in a single layer of flat pavement arrangement. Beneath this second layer, and at a depth of about three and a half feet below the surface, lay the bones of the arms and legs of two skeletons, which were extended at full length. The articular ends of the bones were decayed, but while the bone shafts were quite fragile, they were carefully dissected out in place. The two bodies apparently were laid on their backs with the arms and legs extended at full length. The bodies and skulls of both were completely decayed, and the space they had occupied was filled with large hard masses of caliche. No artifacts were found with the burials. Not all of the mound was excavated, and it is possible that others may be in the same structure. Pictures were made but on account of weather conditions did not turn out well.

These are the first fully extended burials found in the Abilene region.

Three More Flexed Burials

On the south end of the same hill were three smaller collections of stones consisting of three or

four surface stones each, which slightly protruded from the soil, in a row which extended from north to south. The three graves were so close together that the earth excavated from the second was used to fill the first, and the earth from the third to fill the second excavation.

No. (1) W. Myatt Flexed Burial

This burial was three feet deep. When the top structure of large close set stones was removed other long limestones were found extending endwise down into the earth and when these were removed, and some flat rocks which lay in horizontal position were removed a few bone and teeth fragments of a broken skeleton were found.

Two land snail shells with perforations for stringing were also found. Not enough bones were found to reconstruct a skull but enough fragments were found, with the typical stone slab cist burial structure, to determine that the structure was the work of the Abilene longheaded type of man.

No. (2) W. Myatt Flexed Burial

The top of this burial was also covered with large stones and it also was only about three feet across. Beneath this structure was another much longer roof-like stone structure about five feet long from east to west. When this was removed under the center of it were some thin shale slabs laid in roof shape over the bones. The skull lay in the lowest portion of the hole (the east end) and the body lay on its back, with the arms flexed so that the hands lay beside the face. The thighs were flexed on the chest, and the knees bent so that the feet rested on the pelvis. The body lay from east to west.

The body probably had been sewn up in a bag, and tied in the flexed position prior to burial. No artifacts were found. This individual belonged to

PLATE 35.

No. 1. Third layer of stones, W. Myatt Flexed Burial No. (3), Dolichocephalic Abilene Man.
No. 2. Another picture of the third layer of stones, W. Myatt Flexed Burial Cist (3).
No. 3. Flexed adolescent skeleton, exposed in bottom of pit 4 feet deep, down in caliche, W. Myatt Flexed Burial Cist (3).

the primitive type, Abilene longheaded race, previously described in the Bulletins. The skull has all of the teeth. One L. L. second molar tooth, and one upper wisdom tooth, were affected by dental caries.

A Primitive Tooth Type

The teeth are unusually massive and have some quite peculiar distinctions. In fossil apes, the three molar teeth decline in size from the third molar or wisdom tooth, to the first molar, which is the smallest. In some ape-like skulls dating very far back in the time of man's development this primitive Dryopithecus tooth pattern still existed. In modern man the reverse order exists. The third lower molars on this skull are the largest human third molars which the writer ever has seen (10).

In table II prepared by Gregory and Hellman in The Dentition of Dryopithecus and The Origin of Man it would seem that only the orang-utan and the gorilla have antero-postero third molar diameters greater than the left third molar of this Abilene man skull. Apparently none of the chimpanzee third molars listed were so large.

This extremely dolichocephalic skeleton has molar teeth of very unusual size and shape. Their longest diameters are from front to back. It was difficult to measure the second and third molars on account of the impaction of the third molars under the edges of the second molar's mushroomed crowns. The diameters of L. L. M. 2 will have to be estimated because of a large cavity in the posterior end, which extends to the tooth's center. The following table of measurements were kindly made with instruments of precision, by a gunsmith, Mr. F. A. Davis of Abilene. See review concerning Minnesota Man, in back pages of this Bulletin for some other measurements of these teeth made by a physicist.

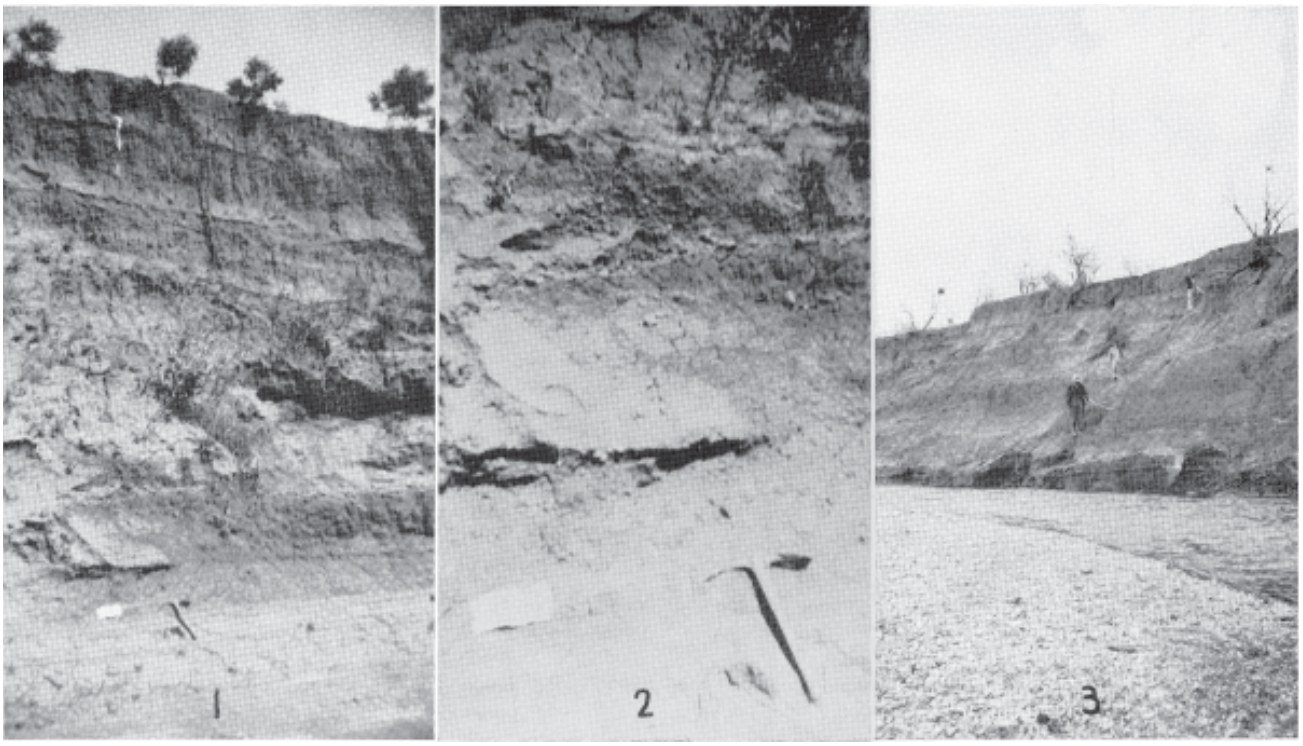

PLATE 36.

No. 1. Gibson Site southwest of Abilene where 274 flint flakes •were unearthed at 30 feet below the surface. Buried floor levels at 24 ½ , 27 and 30 feet below surface. Flints found between pick and handkerchief.

No. 2. Close-up of flint layer where 274 man made flint flakes found 30 feet deep.

No. 3. Hodges Site where 3 levels are exposed, the lowest at 19 ½ feet below the soil surface, 18 miles northeast of Abilene.

Measurements of W. Myatt (2) Skull Lower Molars

Left lower molar 1, antero-postero diameter, 33-64 inch.

Left lower molar 2, antero-postero diameter, one end decayed, probably above 1-2 inch.

Left lower molar 3, antero-postero diameter, 19-32 inch.

Left lower molar 1, tongue to cheek diameter, 31-64 inch.

Left lower molar 2, tongue to cheek diameter, probably 1-2 inch; caries makes measurements uncertain.

Left lower molar 3, tongue to cheek diameter, 33-64 inch.

Right lower molar 1, antero-postero' diameter, 17-32 inch.

Right lower molar 2, antero-postero diameter, slightly over 17-32 inch.

Right lower molar 3, antero-postero diameter, 35-64 inch.

Right lower molar 1, tongue to cheek diameter, 1-2 inch.

Right lower molar 2, tongue to cheek diameter, 1-2 inch.

Right lower molar 3, tongue to cheek diameter, 15-32 inch.

Pictures of these teeth are shown on Plate 38, Nos. 1 and 2. Both third molars are larger than the other molars. These teeth appear to be nearer to the anthropoid pattern than any heretofore excavated by the writer. It may be the type of man who lived on the deepest buried river bank levels below. (See Plate 36, No. 3, and Plate 37, Nos. 1, 2 and 3). The extreme length of the skull is 7 ½ inches. The breadth is 5 1/8 inches. There is considerable facial prognathism, as there is in all of these skulls.

No artifacts were found with the burial. The skeleton lay 3 feet 11 inches below the soil surface. Pictures of this skull are shown on Plate 38, Nos 1 and 2, Plate 39, Nos. 1 and 2.

No. (3) Myatt Flexed Burial

The top of this burial was covered with a few large stones and was about three feet across. (Plate 34, No. 1). Beneath the top layer was a long roof-like structure over six feet long. (Plate 34, Nos. 2

PLATE 37.
Three pictures of Hodges site at different places, each containing three buried floor levels, to which the men are pointing. Located not over a mile from Abilene Man burial sites.

and 3). Beneath the center of this was a small round stone structure consisting of one horizontally laid flat limestone surrounded by stone slabs set on edge. (Plate 35, Nos. 1 and 2). About a foot beneath this lay the closely flexed skeleton of a small adolescent. (Plate 35, No. 3). The long bones had not completed their growth and the epiphyseal ends were detached. The bones of the body lay closely flexed beside the skull in a very small space. The skull was in good condition. This skull also belongs to the same old extremely longheaded Abilene race which probably inhabited this region thousands of years ago (11). No artifacts were found with this burial. It was buried four feet deep. The third molars were showing but had not erupted in this skull; the other teeth were well developed. The skull length is 6 7/8 inches, and the width 4 13-16 inches.

All three of these burials had been placed, in round holes, two of which were close to four feet below the soil surface and just in the top layer of the hard shale and caliche formation, and all showed signs that caliche had formed adhering to the skulls, and a considerable amount of caliche stone had formed inside the skull of W. Myatt Flexed Burial No. 3. One finger bone was also inside the skull.

These circular basins had been cut down several inches into the caliche, in which the closely flexed bodies had been placed. (See Plate 35, Nos. 1, 2 and 3). Then a small circular stone structure in two graves, and a roof-shaped stone structure in one, covered the burial basins. On top of this was a great mass of heavy stones covering a large area in the center of the grave. (See Plate 34, Nos. 2 and 3). A third or top layer extended up barely to touch the soil surface. The top and middle layers were buried in the tan colored soil, which has in course of time been deposited by wind action, on top of such high flat topped hills.

The writer suggests that the circular bottom layer covering the caliche basins may have been the only portion of the structure originally buried in the earth and that the great amount of heavy stones in the center and top layers were originally, a very long time ago, piles of rocks heaped up on the soil surface over the graves, and that the passing of a long period of time has covered the whole structures with wind blown tan colored soil, so that now only an inch or so of the top three or four stones project above the present level soil surface. It is not a reasonable idea to the writer that primitive man would, with the inadequate flint tools then available, have buried such masses of stones three to four feet deep.

More Deeply Buried Middens

Until June, 1936, the writer had found only one other site where the campsite debris was buried at a depth approaching that at (Site 7 or Gibson Site) and that was at (Site 6) situated 18 miles southwest of Abilene where in 1929 he found a fossil horse bone embedded in a bank at the same level with a stratum of charcoal and flint chips and hearth debris at 18 feet below the soil surface.

Recently another buried campsite was found in an eroded nearly vertical river bank situated on a stream bank 18 miles north of Abilene (Hodges Site). Three superimposed campsite floor strata lie exposed in a nearly vertical stream bank for a distance of 200 yards or more. The highest is 8 feet below the soil surface, the middle one is 14 feet below the soil surface, and the bottom stratum lies buried in clay 19 ½ feet below the soil surface. There is an abundant outcrop of several species of mussel shells in each of the charcoal strata. From the clay in the 19 ½ or bottom level, the writer dug out a mano or hand mill stone, which had been ground down by use on both faces to a thin edge on one side. At another place in the same level he dug out an embedded paleolithic type flint axe. Flint flakes, mussel shells, burnt hearth rocks, and charcoal were more abundant in all of the three levels at this site than any other. A number of the shells were removed and taken to "The International Symposium on Early Man" which met in Philadelphia at The Academy of Natural Sciences in March, 1937. The Secretary of The Academy, Edgar B. Howard, had these shells identified and his report is as follows:

May 3, 1937.

The following is a list of the shells which you left here to be identified. The work has just been completed by our Department of Invertebrate Paleontology.

Tritogonia verrucosa, (Raf.) 8 ft. floor level
Quadrula apiculata. Say 8 ft. floor level
Lampsilis coloradensis. Lea. 8 ft. floor level
Quadrula, apiculata. Say 19 ½ ft. floor level
Tritogonia verrucosa, (Raf.) 19 ½ ft. floor level
Lampsilis coloradensis. Lea. 19 ½ft. floor level
Quadrula houstonensis. Lea. 19 ½ ft. floor level
Quadrula houstonensis. Lea. 14 ft. floor level
Quadrula apiculata. Say 14 ft. floor level
Lampsilis berlandieri. Lea. 14 ft. floor level
Tritogonia verrucosa, (Raf.) 14 ft. floor level
Lampsilis coloradoensis, Lea. 14 ft. floor level

(Signed) EDGAR B. HOWARD.

This river bank site is located about a mile from the top of the highest, nearest hill on top of which were the graves previously described in this article, and within two miles of this site a total of twenty-three longheaded burials have been excavated from nearby hill tops by the writer during and since 1932. Of course there is yet no direct evidence to connect these long heads with any buried campsite except those usually found at depths of 7 and 8 feet (1) and (9).

The circumstantial evidence, however, would point to this type of man as the one who may have occupied all of these ancient buried strata.

More Flints in Gibson Deepest Site

During 1937 more flints were found in the Gibson deepest site than ever before. Many flint flakes have been found embedded in place in the deep charcoal strata each year since 1930, but these have been mainly scattered in, or just below, the hard gravel stratum at twenty-four and a half feet. Recently ten flint flakes were seen to be projecting from the charcoal stratum at thirty feet below the top of the bank. On digging into this area a depth of one foot, and a distance of 18 inches along the stratum, a total of 274 thin, man-made flint flakes were excavated, from a thin charcoal layer in the red clay. (Plate 36, Nos. 1 and 2).

PLATE 38.
No. 1. Front view of W. Myatt (2) Skull "Abilene Man."
No. 2. Lower maxillary Will Myatt (2) skull showing Dryopithecus dental pattern, and "Abilene Man's" huge third molars.

Flints Near Mammoth Bones

In the summer of 1934 the writer found two thin flint flakes projecting from a stratum 18 inches above the lower jaw and two teeth, ribs and portions of leg bones of a mammoth on Lick Creek located thirty miles southeast of Abilene. E. B. Sayles secured some of these bones and later E. H. Sellards secured part of them. Thus far six man-made flint flakes have been found in the same stratum. (See Plate 40, No. 1).

Oldest Terrace Hearth

In 1930 the writer found a highest terrace thirteen miles south of Abilene in which a hearth forty inches across projected five feet below the top. This hearth was composed of a solid layer of burned stones on top, underlaid by a thick layer of charcoal. The hearth was so inaccessible that a long ladder had to be used to reach it. This is the only place where any large stones occur in the bank, the rest of the bank seems to have been laid down in rather sluggish back waters, since it is composed of fine tan soil with horizontal lines of very small pebbles ribboning through it occasionally. For flood waters to top that bank now would first flood all of the area below the mountains. So the five feet of apparently water laid soil over the hearth must have been put there before the valley eroded out to its present depth. (See Plate 40, No. 2).

It would seem that the Abilene region would be the logical place for those who seek evidences of ancient man in America to look, instead of denying that such evidence exists, as some do, and then refusing to inspect the evidence. The evidence certainly was here many millenniums before any of those who say that it does not exist came on the scene, and in the main will continue to be here after they are gone, as after all there are few persons able to dig far into banks nineteen and a half, twenty-four, twenty-seven and thirty feet deep; and those who simply deny, without examination of the

PLATE 39.
No. 1. Side view of W. Myatt (2) “Abilene Man” skull.
No. 2. View of vertex of the W. Myatt (2) “Abilene Man” skull.

evidence are not adopting the scientific attitude of an open mind, but instead become propagandists of unproved theories.

Geologist Believes These Sites to Be Ancient

At least one geologist (Antevs) believed these sites to be of considerable geological age, and wrote thus concerning them: "Surely old and significant finds of artifacts and hearths have been made . . . near Abilene, Texas, in river terraces that record several distinct climatic and physiographic changes in the region since the arrival of man." In 1934 Mr. Antevs visited the above described deeply buried sites, discovered by this writer in 1929-30, in the company of a man who, among several others, assisted this writer in excavating several of his discovery sites five years before.

This writer was not notified of the Antevs' inspection of his sites until after it had been completed. This was unfortunate in that Antevs subsequently gave primary credit for the well documented discoveries, which this writer has made, to the wrong person in the article in the publication quoted above and to which citation is made (12).

P. O. Box 62, Abilene, Texas.

**Part of the expense of this digging was borne from a digging fund contributed by Mr. J. L. Bridwell of Wichita Falls, Texas.

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(12) Antevs, Ernst, *The Spread of Aboriginal Man in America,* The Geographical Review, American Geographical Society of New York, April, 1935, p. 309.

PLATE 40.

No. 1. Mammoth jaw and teeth, ribs and fragments of long bones, found embedded 18 inches below stratum containing six man made flint flakes. All are in same gray pleistocene deposit. Found 30 miles southeast of Abilene.

No. 2. Hearth 5 feet below surface on highest river terrace overlaid by quiet water deposited clay, 13 miles south of Abilene.

A CARANKAWA FIRE IMPLEMENT

By Clyde T. Reed

The broad level coastal plains of Texas, even more than the interior plains and hilly regions, were the "homeland"—if wandering races can be said to have a homeland—of many tribes of Indians. Among these many tribes was one of special interest, both ethnologically and historically.

This was the Carankawa tribe, or perhaps race; since, these Indians were quite distinct in both anatomical characters, and social or cultural traits. Their origin, and relationship with other primitive people of this region, are not known. They inhabited the coastal country from Galveston to unknown limits on the south. At a point on the Laguna Madre, or an embayment extending over considerable area and called Baffin Bay, I discovered a burial of these Indians.

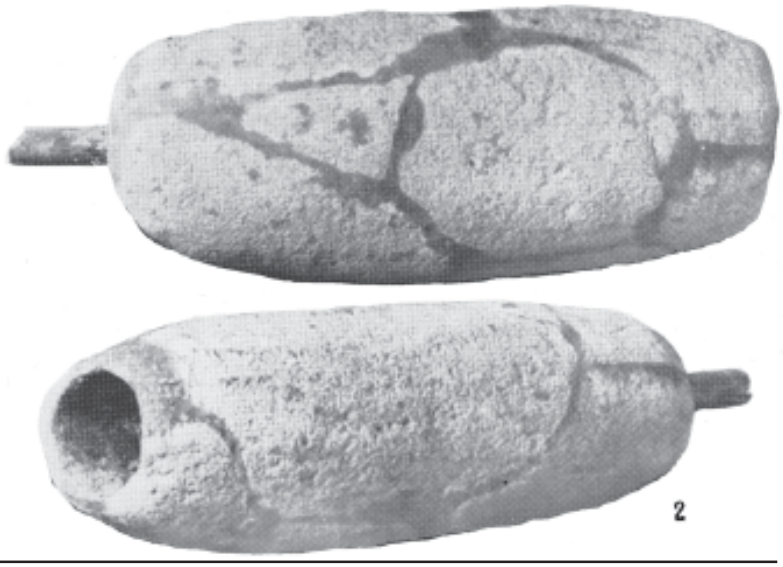

PLATE 41.
No. 1. A Picture of Carankawan fire making device.
No. 2. Another picture of the same device.

The site was one and a half miles by road, or about a mile along the shore, southwest of a place called Carolina Beach in Kleberg County. It was on a rather high point of land extending between two small creeks that flowed, or rather their basins spread out into the bay, and included the point between them. Here I found twenty-one skeletons. The count was based on certain skull fragments together with other whole skulls. In many cases the bodies seemed to be piled together. In others they were singly distributed. With two of these skeletons were found two tools, which can only be interpreted to be fire implements. They are of about the same size and are composed of some kind of plastic or cement. The skeletons were those of females and with one was also found two flint rocks of small hand size, which showed signs of active use in fire making. One of the tools—the one figured—contained about 250 c.c. of coarse bitumen and ashes. (See Plate 41, Nos. 1 and 2). The ashes were in the bottom and the unburned bitumen was on top, indicating that the fire was fed from the large open end. The bottom has a hole through it into which was inserted a short shaft of hollow bone about five centimeters long. The bone was highly polished and browned from heat. There were numerous other segments of hollow bone which without doubt were "spare" mouth pieces for these torches. These "furnace" torches were apparently means of transporting an effective source of intense heat. They were not connected in any way with ceremonials; but, rather with the very practical business of keeping the fire of the tribal colony burning. No other artifacts of any kind—except an arrow head between the ribs of this female skeleton—were found. Nearby are several bone and shell middens, but without sherds or other evidences of handiwork. These remains were exposed first by erosion and were excavated further during the early spring of 1927.

Cornell University.

BURIED MIDDENS IN THE FLOODPLAIN OF THE LITTLE WICHITA RIVER

By Adolph Henry Witte

The following report describes investigations made by the writer in a portion of the floodplain of the Little Wichita River that lies approximately twenty miles from its mouth. In this area the floodplain averages one mile in width, and the stratified silts and gravels are known to be fifty feet in thickness in certain stations. Necessarily, the data presented shall be brief since no excavations have been undertaken, and identifications of certain paleontological specimens from the middens have not been completed.

The writer and others have been collecting Indian artifacts in the channel of the Little Wichita River for a number of years. No special importance was attached to these river-bed specimens as rather similar artifacts could be picked up on nearly every farm and ranch within this locality. It was merely presumed that these articles had been lost by the aborigines on the floodplain and old stream terraces, and by erosion and flood had found their way into the river's channel. In 1930, Dr. Cyrus N. Ray of Abilene, Texas, published an account of the deeply buried middens discovered by him in Central Texas. (Note 1). The possibility of there being similar stratified hearths in this area was considered by the writer, but several years passed before an actual discovery was made.

Stratified Sites on The H. Body Estate

Site No. 1. A thick stratum of pleistocene gravel is exposed in the bottom of the Little Wichita River's channel at this spot. Almost a complete artifact of the type usually classified as Folsomoid, was found here. Fragments of the teeth of an extinct horse and one of the pleistocene elephants were found when the writer recently examined this location.

Site No. 2. Faint midden exposure 8 feet below the present surface of the Little Wichita floodplain. Worked flakes were found in situ. Additional artifacts found were a crude axe with sinuous edge, several oval manos, similar to those in use up to fairly recent times and a segment from the middle of a large knife or spear. Many broken hearth stones of local sandstone were observed.

Site No. 3. The midden horizon averages twelve feet below the present surface of the floodplain and contains a considerable amount of ash, charcoal and shell. Hearth stones and a broken mano were observed in situ. A few bones, apparently completely mineralized, were noticed. These have not been identified at this date. A leaf-shaped knife of local quartzite was found in the channel here.

Site No. 4. The migration of the Little Wichita River channel is eastward at this particular spot. The bank is 20 feet high and almost perpendicular. This site is exceptionally rich in finished artifacts of stone. A battered quartzite hammerstone was first observed in situ 15 feet below the surface of the floodplain. Various types of artifacts are represented. Part of the materials are not found locally. The tools from this deeply stratified site prove without question that tanged and barbed weapons have been in use for a vast length of time in this area. The few animal bones from this site have not been identified. One bone, apparently the ulna from a large bison, shows usage as a tool.

Burial Midden, Four Miles Southwest of Henrietta, Texas

The migrating channel of the Little Wichita River exposed this midden. The dark stratum of camp rubbish averages four feet below the present surface of the floodplain except in one small area recent surface erosion has exposed the horizon. Chipped and burned stones, ash and charcoal, are plentiful. Only a sparse number of animal bones were observed and these were mostly from the smaller fauna. A small cache below the main stratum contained a mass of small seeds, possibly from the hackberry tree. During the early spring of this year (1937), three local youths noticed that a human skull had become exposed just below the midden stratum

and near the south edge of the deposit. The youths hurriedly excavated the burial, but were disappointed when no mortuary articles were found. Several weeks later, two of the youths who had excavated the burial, accompanied the writer to the site. Since a few of the bones remained in situ, it was possible to determine the original position of the burial. The skeleton was closely flexed, lying on the left side with the head toward the west, and had been buried in a slight depression below the level of the midden stratum. The fill around the burial was the dark midden soil. An undisturbed stratum of light colored silt, four feet in thickness lay above the burial area. Two hundred feet down the channel from Burial No. 1, a depression filled with dark midden soil was observed. This proved to be a second human burial. Only a few long bone fragments and most of the pelvis were saved. The skull from burial No. 1 was sent to Dr. Cyrus N. Ray, for comparison with the ancient crania in his collection from Central Texas. (See Editor's note **, also Plate (42) Nos. 1 and 2).

Several additional stratified sites containing hearths and camp rubbish have been recently discovered in this area. Two of these sites are approximately twenty feet below the surface of the floodplain.

Conclusion

It is obvious that man occupied certain areas in the Little Wichita River floodplain during a geological period when the surface of the plain was at a much lower altitude. The evidence also shows that climatic changes followed the initial occupation, in some instances, many feet of slackwater silts were deposited upon the midden sites. Subsequent occupations of the floodplain were followed by reoccurring excessive humid conditions and additional strata of silts were deposited upon the midden sites. It is usually conceded that the climatic changes mentioned here occurred a number of thousands of years ago in the late pleistocene.

Henrietta, Texas.

Reference

Note 1. Ray, Cyrus N., Report on *Some Recent Archeological Researches in The Abilene Section,* Texas A. & P. Society's Bulletin, Vol. 2, 1930.

**The skull sent here for comparison is not near so long headed as the typical Abilene skulls, but the bones, have an appearance of age, and may be rather old.

C. N. R.

PLATE 42.

No. 1. Side view of skull found by Adolph Witte buried below alluvial deposit.
No. 2. Front view of the same skull.

REVIEWS

Analysis of Indian Village Site Collections From Louisiana and Mississippi, by James A. Ford, School of Geology, Louisiana State University; Anthropological Study No. 2, published by the Department of Conservation, Louisiana Geological Survey, New Orleans, Louisiana, November 1, 1936. It contains 285 pages which include besides the text fifty illustrations and graphs, a glossary, an index, and a bibliography.

The title of this treatise is somewhat misleading as one might think that the book concerned every type of archeological material obtained from a campsite since its author does not state what kind of artifacts or remains his collections consist of. The book is devoted primarily to ceramics both historic and prehistoric, and is a supplementary study to Mr. Ford's previous papers, *Outline of Louisiana and Mississippi Pottery Horizons* and *Ceramic Decoration Sequence at an Old Village Site Near Sicily Island, Louisiana.*

The author after having made both intensive and extensive studies of pottery throughout Louisiana and Mississippi has divided the material into seven decoration complexes: Choctaw, Caddo, Tunica, and Natchez which of course have historic affiliations; and the Deasonville, Coles Creek, and Marksville which apparently were entirely prehistoric in that area. He further subdivides these types. For example, the Coles Creek complex according to his studies consists of thirty-six subdivisions.

Fortunately, Mr. Ford has not been content with mere classification, but uses it as a means toward an end: the establishment of a chronology for the Lower Mississippi Valley. Herein lies the chief value of his work, and distinguishes it from any previous study made of aboriginal ceramics of this region. Until Mr. Ford began his work the publications which dealt with the ceramics of the Lower Mississippi Valley had been primarily descriptive, with apparently no aim in view other than to show what had been excavated. Naturally, while that attitude reigned sherds were of little importance, for they do not often make good illustrations and besides descriptions of sherds sometimes seem ridiculously insignificant when potsherds are considered separately.

By studying the horizontal and vertical distribution of sherds with their varying types of decoration, Mr. Ford has not only given the archaeological work of Louisiana and Mississippi a method, but he has also given the archaeologists of the Lower Mississippi region an aim. Whether future researches will confirm his conclusions (and the reviewer believes that his major ones will stand) or not, we must credit the *Analysis of Indian Village Site Collections from Louisiana and Mississippi* with being the first thoroughly scientific study of ceramic complexes in the Mississippi delta. By not contenting himself with descriptions the author has shown an intellectual maturity which has not been demonstrated by writers of the past who have dealt with the archaeological remains in the same region.

Throughout his treatise Mr. Ford distinguishes between the elements and the motif of decoration. By referring to the glossary the reader can understand what the author means by his use of those terms, but it is evident, nevertheless, that Mr. Ford has either created a terminology of his own or else has a confused idea of what a motif is. This terminology seems to be warranted neither by the terms of designers nor by the definition of the words in the Oxford and Webster dictionaries which define a motif as "a salient feature or element of a composition." The reviewer believes that Mr. Ford has used "motif" when he refers to the predominant element of decoration and "element" when he speaks of the subordinate ones. In the science of archaeology where there is generally a confusion of terms it seems advisable to avoid further complication, especially where the subject is related to another field such as design which already has a standard terminology.

The chronologic value of motifs which is stressed throughout this publication seems lessened when one realizes that the range of motifs both in primitive and modern art is decidedly limited. According to the designer, Best-Maugard, there are only seven motifs. A casual glance at the designs of ceramic collections in any museum will show that these same motifs have been used over and over again by various peoples, and that it is not the motif which is especially important in the differentiation of a decoration group, but rather the way in which the motifs are arranged to create a pattern, and the adjustment of the latter to a vessel or other object. Furthermore, rhythm, repetition, subordination, and balance should be considered when a pattern is studied, for they will constitute an integral part of every decoration. Unfortunately, sherds are frequently too small to show more than a part of a decoration, and the research worker has to content himself with the study of one or more isolated motifs, and is unable to get a proper conception of the rhythm, balance and repetition of the entire decoration. If, for example, oppositional balance should have been employed in the arrangement of motifs, as was done on several vessels of pre-Caddo ware from the Crenshaw Site, Arkansas, and the researcher found unrelated in the field a potsherd from different sides of the same vessel, he might easily drink he had specimens of several types of decoration. It is possible that Mr. Ford, because of having to confine his studies chiefly to sherds, has created too many subdivisions for his Coles Creek decoration complex.

Mr. Ford's book is not only a worthy contribution to American archaeology, but also it can well serve as a model for future publications in the field of prehistoric ceramics.

S. D. Dickinson,
State A. and M. College
Magnolia, Arkansas.

* * * *

Pleistocene Man in Minnesota, by Albert Ernest Jenks, Ph. D., Sc. D., Chairman of The Department of Anthropology, of The University of Minnesota, printed by The University of Minnesota Press, Minneapolis, 1936. Price $7.50. It contains 197 pages, including 183 drawings, and photographs, of which over fifty are photographs. It contains a bibliography, and an index.

When one observes the results of the finely detailed technical study which has been devoted to this skull of disputed antiquity, he is moved to a sad contemplation of the fact that in Texas he has found close to fifty, extremely dolichocephalic, and evidently otherwise more primitive type skeletons, buried on high bluffs, either immediately above, or not far from the deepest buried ancient floor middens, thus far found in America, and that on no one of these has there been lavished such detailed attention by any physical anthropologist so far as he knows.

Dr. Jenks has certainly gone minutely into every detail concerning this find. His industrious research is to be commended. The writer being a physician, and not a physical anthropologist, will necessarily confine his comment's to general observations concerning the skull as shown in the illustrations, and will make comparisons with Abilene skulls.

The skull as shown in the photographs in *norma lateralis,* or from the side, has a considerable resemblance to the numerous skulls of the excessively dolichocephalic race discovered by this writer near Abilene (Abilene Man), in two respects: first, it has the occipital bun or protrusion of the posterior portion of the skull characteristic of Abilene Man, and it also has nearly as much prognathism. However, its frontal region is not near so low and flattened. The lower maxillary appears to be shaped somewhat similarly. The chin of Minnesota Man seems more prominent than those of most of the local skulls.

The difference between Minnesota Man and Abilene Man is much more apparent in a vertical view of the Minnesota skull, which shows it to be a much broader skull, a cephalic index of 77.09 is quite broad-headed by comparison with Abilene Man, where one sometimes finds cephalic indices so low as 60.71. (Hooten, E. A., *Five Texas Crania,* This Bulletin, Vol. 5, 1933).

	Minnesota Man		*Will Myatt 2, Abilene Skull*	
	Left	Right	Left	Right
Antero-postero diameter				
L. M. 1	12.09 mm.	12.0 mm.	13.3 mm.	12.7 mm.
L. M. 2	12.0 mm.	12.0 mm.	Partly decayed	13.5 mm.
L. M. 3	12.8 mm.	13.1 mm.	15.0 mm.	12.7 mm.
Labio-lingual diameter				
L. M. 1	12.3 mm.	12.3 mm.	12.3 mm.	12.4 mm.
L. M. 2	12.1 mm.	12.1 mm.	Decayed 13.2 mm.	12.1 mm.
L. M. 3	11.8 mm.	11.6 mm.	13.0 mm.	11.7 mm.

The lower molar teeth of W. Myatt 2 (Abilene skull) were measured by Otto O. Watts, Ph. D., Professor of chemistry and physics in Hardin-Simmons University, and the following table was prepared of these measurements, and those of Minnesota Man. Only crown widths are shown.

From the above table it will be seen that the diameters of the crowns of most of this Abilene Man's molar teeth are much larger than those of the Minnesota Man's teeth. Insofar as the long bones of Minnesota Man are shown, there appear to be no remarkable features in them, such as the unusual antero-postero curvatures of femora, and the very platycnemic tibiae (shafts markedly flattened from side to side) to be found in Abilene Man skeletons.

Cyrus N. Ray.

EDITORIALS

The Amateur in Archaeology

Any discussion of amateurs and professionals in archaeology becomes intelligent only after these two classes are defined. Simply stated, the amateur differs from the professional in that the latter is paid for his services, whereas the former is motivated by interest only. Both categories fall under the general head of "students"; otherwise, use of the term "archaeologist" is hardly permissible. A collector of archaeological materials may or may not be a student, depending upon the purposes underlying his collecting activities and the use he makes of the valuable data so acquired.

Use of the term "amateur" sometimes carries a different significance. According to Funk and Wagnall's Standard Dictionary, 1933, a second definition is: "Often, one who amuses himself with an art, but is not a master of it; one who makes more or less pretense to practicing an art without having undergone professional preparation." In this article I am less interested in such a definition, since it does not describe the student type of amateur with whom I am solely concerned. Moreover, I doubt if any of us can more than presume to be "masters" of our subject, regardless of "professional preparation." Personally, I should much rather be called a student than an authority, since a student is capable of learning whereas an authority presumably already knows it all. A student may uncover new facts, but one who is merely an authority can only cite previously established facts.

American archaeology is destined to progress only if it is kept alive through the activities of students, whether they be professional or amateur. In fact, leaving out of consideration the matter of financial remuneration, which has nothing directly to do with the subject of archaeology, we are all in the same boat and headed in the same direction. Granting that some are more experienced sailors than others, it does not necessarily follow that the professional in every instance is the better sailor. Nor does it follow that an amateur cannot equip himself with training sufficient to render his potential services inferior to none.

The question, therefore, is not: what can the amateur do, but rather: what can any student do toward advancing American archaeology. The answer to the question, regardless of how it may be stated, is always the same: the service that any student can render is in direct ratio to the sum of his archaeological training and his supply of "horse sense." Regardless of the salary he may or may not receive for his work, the student's usefulness depends upon his ability to define problems, and to employ technical methods tending toward the solution of those problems.

It should be apparent to all that one should not attempt the impossible by engaging in phases of the work for which he has received no adequate preparation. A man without surgical training would hardly attempt a major operation; if he did, the results would: probably be fatal to the patient. Similarly, one without sound training both in archaeological theory and practice should not attempt a major archaeological excavation; to do so would without doubt result (as in thousands of instances it has resulted) in the destruction and permanent loss of archaeological information, the securing and preservation of which would comprise the only legitimate purpose of the excavation. A knowledge of facts and methods, and thorough experience in practice, are just as necessary for successful work in archaeology as in any other highly technical profession.

It follows that a student of archaeology should properly confine his research activities to a field well within the limitations of his acquired ability. At the outset, the major portion of his task is that of learning facts and theories, relating to his and related fields, that have accumulated from previous work. Collecting surface materials and studying materials existing in available collections should work in well with this initial study period. The saving of accidentally disturbed artifacts, for

example: stone points unearthed by the plow, and any associated information that otherwise might never be recorded, resulting in a permanent loss of the scientific value of the specimens, is a service of no small importance that can be rendered by relatively inexperienced collector-students.

Some students will become interested in archaeological survey work. The crudest map showing surface features in a certain area is of some value, and the value is augmented proportionately with increased care and precision, and the adoption of improved technique by the surveyor. Copies of maps and charts, and written reports on observed phenomena should in all instances be sent to local societies or institutions of a nature to be interested in their study and preservation. The man who secretively withholds such important information from sincere fellow students may be the finest gentleman in the world, but he is defeating the essential interests of the archaeology of his district. The advance of knowledge is never promoted through the hoarding of information.

As a student gains in his store of facts, methods and experience, through training acquired directly or indirectly under more advanced students, his potential usefulness and range of research activities is increased. The ultimate degree of his ability to serve depends entirely upon his aptitude and application. It should be remembered that scholastic training supplies the essential background more quickly than it can be acquired by any other method. There is no short-cut substitute for a university course in anthropology, of which archaeology is one of three closely interdependent major divisions. Students who cannot take advantage of regular courses of instruction cannot reasonably expect to advance in their ability to serve as rapidly as those who are more fortunate in this respect.

In any case, the training in background, however acquired, can serve only as a basic foundation upon which the student, so long as he remains a student—that is, so long as he remains useful in archaeology, builds a constantly strengthened and perfected superstructure of facts and conclusions.

Amateur students in other scientific subjects, geology and astronomy for example, have in instances achieved marked success and well-earned renown in their selected fields of endeavor, as, indeed, they have in archaeology, but only after long years of specialization, involving plenty of hard work. It is to be hoped that all amateur students of American archaeology will meet honestly and without illusion the issue of study and training required for any worthwhile participation in research. It is entirely worth the effort, if one is interested.

W. C. McKern,
Editor *American Antiquity,*
Public Museum, Milwaukee, Wisconsin.

More Pueblo Pottery Found Near Abilene

Three more local potsherds which resembled Pueblo sherds were sent to Dr. H. P. Mera for identification during the past year. No. (1) was found thirteen miles south of Abilene, on Elm Creek. No. (2) was found by Mr. Jeff Davis of Sterling City, Texas, near that place, which is about eighty miles southwest of Abilene, on a branch of the Colorado River. No. (3) was found by Dr. Raymond H. Tull, sixty miles south of Abilene, near Ballinger, on the Colorado River. The Mera report follows:

"Sherd No. 1—This sherd is from an olla representing a type in use in the Rio Grande area roughly between the first part and middle of the 18th Century.

"Sherd No. 2—Also a Rio Grande type very similar to that in use today. It first appears about the same time as the type represented by Sherd No. 1 but continued in use nearly up to the present. There is not enough of the design visible to judge the pueblo or period at which it was made.

"Sherd No. 3—Chupadero Black-on-white. This type is thought to have continued in existence from about the middle or latter part of the 13th Century up to a time at least after the middle of the 16th Century."

Dr. Walter Hough's Visit

In May, 1929, Dr. Walter Hough of The National Museum visited Abilene, and was shown various sites here. Among others visited he was conducted to the huge Indian Red Paint Mine described in the Vol. 1, 1929, Bulletin of The Society. While returning from that site, one of the party, E. B. Sayles, photographed those present. It so happened that most of the officers of the Society then, and since, were in the party. Only three of the then resident directors were absent, the absent ones being Dr. R. N. Richardson, Dr. W. C. Holden, and Mr. H. G. Payne.

From left to right: 1. Dr. Cyrus N. Ray, President; 2. Prof. Leroy C. Glass; 3. Dr. Walter Hough; 4. Dr. Julius Olsen, Vice President; 5. Dr. Otto O. Watts, present Secretary-Treasurer; 6. E. B. Sayles, Secretary-Treasurer at that time; 7. Dr. Olsen's son, Julian C. Olsen.

Texas Should Retain Its Scientific Finds

In the week of March 17-20, 1937, the Editor attended The International Symposium on Early Man, held by The Philadelphia Academy of Natural Sciences, in Philadelphia, Pennsylvania. A museum case full of the skulls and long bones of Abilene Man were put on exhibition there. This meeting was composed of several hundred delegates from all parts of the world, which included many of the leading anthropologists of the world. The exhibits afforded a wonderful opportunity to those attending to see the skeletal material of the most ancient human types known.

The lectures were by the world's leading experts in such fields, and were equally instructive. Afterwards the Editor visited five museums while away, in Philadelphia, New York, Washington, and St. Louis, three of which were among the world's largest. Texas .has the money, and should build one real first-class museum. Rare fossil skeletons of

PLATE 43.

Picture made in May, 1929, during a visit of Dr. Walter Hough of the National Museum to Abilene sites. The above picture was taken at the Indian Paint Mine south of Abilene. Left to right: 1. Dr. Cyrus N. Ray, 2. Prof. Leroy C. Glass, 3. Dr. Walter Hough, 4. Dr. Julius Olsen, 5. Dr. Otto O. Watts, 6. E. B. Sayles, 7. Dr. Olsen's son, Julian C. Olsen.

prehistoric animals from Texas occupy prominent places in these museums. A place should be made in Texas for such fossils. The Editor at that time gave to the National Museum, in Washington, three of his rare Abilene Man skulls. According to one of the staff, there were about twenty thousand' skulls in the Museum's collection, but previously no examples of this Texas type had been placed there. He hopes that it will not be necessary to place all of these Abilene Man skulls in museums outside of the State of Texas, because of a lack of interest in the State in providing proper places for them. Millions of Texas money is going into grandstand sports, and carnivalistic exhibitions of doubtful, if not harmful values, and into other such trivial things, while practically no provision is being made for visual education. Some one has said that one picture is worth five thousand words, which is doubtless true, but it is also true that one good look at an object by an observant person is worth more to him than is a book on that subject. The schools of Texas will never be what they should be until they provide museums so that the minority who really desire an education in something aside from football, will be enabled to get the exact knowledge to which they are entitled. Properly educate these few, and the mass of those who throng our educational institutions can well be left to their own devices, because from these few alone will proceed all of the future culture, progress and development of Texas. The world is already doing too much for the never-do-wells, the misfits, the lazy louts, and the enemies of Democracy. It needs to seek out and comb the population for the worthy, industrious, and talented few, and really give them the opportunity to fully capitalize their talents. As it is now whenever an unusually brilliant person develops in Texas we have provided an environment which usually causes him to leave for New England or other eastern States, where he finds both the encouragement and the physical equipment with which to carry forward his research. As a State we need something to awaken us to the fact that daily our mental resources slip away from us.

C. N. R.

REPORT OF THE TREASURER OF THE TEXAS ARCHEOLOGICAL AND PALEONTOLOGICAL SOCIETY

Report for the period from the annual meeting on October 24, 1936, to October 1, 1937.

RECEIPTS:

Balance on October 24, 1936	$485.41
26 Memberships for 1936	78.00
58 Memberships for 1937	174.00
Sales of Bulletins to others	129.00
Sales to Institutions and purchasing agencies	93.00
Collections	20.60
Total	$980.01

DISBURSEMENTS:

Printing 1936 Bulletin	304.38
Engravings in 1936 Bulletin	107.95
Postage, stationery and supplies	44.46
Expenses for the annual meeting from collections	14.00
Total	$470.79

Bank Balance on Oct. 1, 1937 ---------- $509.22

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Eli Lilly ---------- 5807 Sunset Lane, Indianapolis, Ind.
Dr. Charles H. Mayo ---------- Mayo Clinic, Rochester, Minn.
W. G. McMillan ---------- 1020 7th St., Lubbock, Texas
Metropolitan Museum of Art Library ---------- New York City
George L. Minter ---------- Abilene, Texas
Dr. Warren K. Moorehead ---------- Phillips Acad., Andover, Mass.
Charles W. Motz ---------- Abilene, Texas
New York Public Library ---------- New York City
Northwestern University Library ---------- Evanston, Ill.
Dr. Julius Olsen ---------- Hardin-Simmons Univ., Abilene, Texas
Peabody Museum of Archeology and Ethnology ---------- Cambridge, Mass.
H. A. Pender ---------- Abilene, Texas
Dr. J. E. Pearce ---------- University of Texas, Austin, Texas
Judge Hermon C. Pipkin ---------- Amarillo, Texas
Omar Radford ---------- Abilene, Texas
Dr. Cyrus N. Ray ---------- P. O. Box 62, Abilene, Texas
Dr. Thomas L. Ray ---------- 1805 Fair Bldg., Fort Worth, Texas
P. M. Rice ---------- Hamilton, Texas
Dr. R. N. Richardson ---------- Hardin-Simmons Univ., Abilene, Texas
Thomas E. Roberts ---------- Abilene, Texas
E. B. Sayles ---------- Gila Pueblo, Globe, Ariz.
Henry Sayles ---------- Alexander Bldg., Abilene, Texas
W. W. Shields ---------- Roscoe, Texas
Dr. Ellis W. Shuler ---------- Southern Methodist Univ., Dallas, Texas
Judge O. L. Sims ---------- Paint Rock, Texas
Prof. Victor J. Smith ---------- Sul Ross State Teachers Coll., Alpine, Texas
Smithsonian Institution ---------- Washington, D. C.
Russell Stephens ---------- Abilene, Texas
Floyd V. Studer ---------- 635 Amarillo Bldg., Amarillo, Texas

Mrs. Maud Durlin Sullivan ---------- El Paso Library, El Paso, Texas
Texas Library and Historical Commission ---------- Austin, Texas
Texas Technological College Library ---------- Lubbock, Texas
The Rice Institute Library ---------- Houston, Texas
Dr. Raymond H. Tull ---------- Mims Bldg., Abilene, Texas
Tyrrell Public Library ---------- Beaumont, Texas
W. J. Van London ---------- 712 W. 17th St., Amarillo, Texas
Waco Public Library ---------- Waco, Texas
P. H. Walser ---------- 306 Robertson Ave., Bryan, Texas
Dr. Otto O. Watts ---------- Hardin-Simmons Univ., Abilene, Texas
Dr. C. H. Webb ---------- 911 Medical Arts Bldg., Shreveport, La.
C. L. West ---------- Hamilton, Texas
Ernest W. Wilson ---------- Abilene, Texas
Dr. M. L. Wilson ---------- 21 E. Bradley Lane, Chevy Chase, Md.
A. H. Witte ---------- Henrietta, Texas
Lester B. Wood ---------- Box KK, Breckenridge, Texas
Yale University Library ---------- New Haven, Conn.
University of California Library ---------- Berkeley, Calif.
University of Chicago Library ---------- Chicago, Ill.
University of Illinois Library ---------- Urbana, Ill.
University of New Mexico Library ---------- Albuquerque, N. Mex.
University of Oklahoma Library ---------- Norman, Okla.
University of Texas Library ---------- Austin, Texas

PROGRAM OF

The Ninth Annual Meeting of

The Texas Archeological and Paleontological Society

Which Will Be Held at The Hilton Hotel on

Saturday, October 30, 1937

Morning Session– 9 :45 to 12 :00.

1. Address of Welcome
   ---------- Dr. Julius Olsen, Hardin-Simmons University, Abilene

2. A Possible Explanation of Deep Mortar Holes
   ---------- Dr. Otto Watts, Hardin-Simmons University, Abilene

3. Copying Texas Pictographs
   ---------- Mr. Forrest Kirkland, Dallas

4. Archeological Sites in Lake Buchanan
   ---------- Mr. A. T. Jackson, University of Texas, Austin

NOON LUNCHEON– 12:00 TO 1:00
Dr. Rupert N. Richardson in Charge

Recognition of Visiting Members.
Business Session.
Afternoon Session– 1:30 to 4:30.

5. Review of The Murrah Cave on the Pecos Expedition
   ---------- Dr. W. G. Holden, Texas Technological College, Lubbock

6. Motion Pictures of The Murrah Cave Expedition
   ---------- Mr. W. G. McMillan, Lubbock

7. The Origin and First Home of Man
   ---------- Dr. J. E. Pearce, Dept. of Anthropology U. of T., Austin

8. Recent Archeological Finds Related to Ancient Man in the Big Bend
   ---------- Prof. Victor J. Smith and Mr. Charles Kelly, Sul Ross State Teachers College, Alpine

Committee On Arrangements:

Russell Stephens Otto O. Watts R. B. Leach