ARCHAEOLOGY

OF THE

ARKANSAS RIVER VALLEY

DEPARTMENT OF ARCHAEOLOGY
PHILLIPS ACADEMY · ANDOVER · MASSACHUSETTS

ARCHAEOLOGY

OF THE

ARKANSAS RIVER VALLEY

BY

WARREN KING MOOREHEAD

WITH SUPPLEMENTARY PAPERS ON

The Prehistoric Cultures of Oklahoma

BY

JOSEPH B. THOBURN

AND

The Exploration of Jacobs Cavern

BY

CHARLES PEABODY

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ACKNOWLEDGMENTS

The writer is greatly indebted to a number of persons who contributed largely to the success of our preliminary examination of Indian sites in the Texas Panhandle.

Mr. Eldridge R. F. Johnson generously supported the survey and also accompanied the expedition of 1920. We acknowledge his kindness and cooperation with gratitude.

Professor J. B. Thoburn of the Oklahoma Historical Society was a member of the survey and re-visited the region subsequently, placing at our disposal his observations.

Mr. Floyd V. Studer, residing in Canadian at the time of our visit, rendered us assistance. After we had returned East, Mr. Studer devoted a great deal of time to the inspection and mapping of numerous ruins within a radius of 100 miles of Amarillo, his present home. Much of the new material presented in this volume is due to the kind assistance afforded us by him. He obtained many photographs and sent us pottery fragments and chipped objects for examination from 12 or 15 sites. Mr. Studer has written several pages for us and in these he presents his observations, for all of which we sincerely thank him.

Dr. W. C. Holden permitted quotations from his reports, both published and unpublished, and read our conclusions, offering valuable comments. We are much indebted to him.

Messrs. Sam and Oscar Handley allowed us to examine the ruins on their property, entertained us, and extended many favors.

Mr. C. B. Franklin journeyed by team throughout most of the Arkansas Valley and while he made no claim to archaeological training or knowledge, the diary he compiled was of value and we hereby accord our appreciation.

Many land owners, cattlemen and others helped us. Throughout the entire preliminary inspection, no one refused permission to explore upon properties. I desire to thank Mr. Pat Landergin and Miss Harriet Corbin, owners of the Landergin ranch. We acknowledge the assistance of Mr. W. L. Bass of Rosalia, and Mr. W. J. Martin of Leon, Kansas, Mr. C. M. O'Donnel, proprietor of the Bell Ranch near Tucumcari, New Mexico, Mr. Archie King, and many others.

We are also under obligation to Dr. A. V. Kidder for identification of pottery fragments from the region. The late Mr. William E. Connelly, Secretary of the Kansas Historical Society furnished us with information concerning the Quivira and Harahey sites, as did Mr. Paul A. Jones of Lyons, Kansas.

Dr. F. W. Hodge, Museum of the American Indian, Heye Foundation, New York City, kindly gave us his views concerning Quivira and Harahey.

Mrs. Paul Huntley of Canon City, Colorado, visited numbers of sites in her region and sent us photographs of them, and of petroglyphs.

Finally, the writer desires to thank Professor James Hardy Ropes for permission to include this report in the series of publications issued by Phillips Academy.

It is proper that recognition be accorded my secretary, Mrs. Gladys Dill Salta, who devoted a great deal of time in the preparation of this report and bibliography, and also Mrs. Vernon M. Bartlett of our office force. Mr. Abbott Cheever of Andover made our maps and drawings.

Warren King Moorehead

Director, Department of Archaeology, Phillips Academy, Andover, Mass.

December 20, 1930.

PREFACE

Nearly fifteen years ago some stone artifacts from the Arkansas valley were sent the writer for examination. Most of these came from the middle Canadian River basin, others represented sites in western Kansas. The specimens were not numerous, yet they suggested an important and extensive archaeological field, since they appeared to be somewhat different from types east, west or south of the region. In subsequent years, three journeys through Arkansas drainage areas were undertaken. One of these might be considered an expedition, whereas the other two were reconnoissances.

Readers will understand that the following pages are in no sense a complete exposition of the archaeology of this great river valley, rather is it the purpose of the writer to indicate the importance of the field, and to suggest future and thorough exploration.

Our presentation is based upon the Indian sites and artifacts. Three or four locations on the river, or its tributaries, the author considers significant, particularly Yell County, Arkansas; upper Canadian, northwest Texas, and in Kansas, where, probably, there are several cultures. Aside from Harrington's description of the cemetery at Dardanelle, in Yell County (page 8) we are chiefly dependent on large collections of artifacts from the lower river region, hence a somewhat lengthy and detailed description of types. There should be far reaching excavation of mounds and village sites throughout this county and up river through Oklahoma.

With two or three exceptions, we have not been able to present maps locating various mounds, village sites or ruins between the mouth of the river and the Rocky Mountains, since data has been insufficient for this purpose. Many sites were observed by Mr. Franklin and other persons. Obviously, the entire river valley and tributaries should be archaeologically mapped at some future time.

Oil was discovered in the upper watershed of the Canadian River a few years ago, the usual rush occurred, and thousands of persons poured into that section. Our commercial friends would consider this movement a great blessing to the region. Archaeologically, it was a tragedy. Many small slab houses, or rudimentary pueblos, have been destroyed, or badly damaged, by curiosity seekers. Since origin of the Pueblo culture is now under discussion, it is of utmost importance that these remaining buildings and sites be surveyed and studied. Dr. W. C. Holden in Volume I, Bulletin of the Texas Archaeological and Paleontological Society, pages 30-31 comments upon the necessity of preservation.

Mr. Studer knows the region and in cooperation with him some institution should at once send into eastern New Mexico, the Texas Panhandle, and western Kansas a large expedition in order that we may have a complete and technical study of these very interesting, primitive and important remains. There are six or seven "foundations", heavily endowed, engaged in research. One may, with propriety,

direct their attention to the fascinating Pueblo origin study. In a few years many of these smaller ruins will have disappeared.

Last summer the University of Pennsylvania sent a field party into the Panhandle of Texas. Doctor Jayne, Director of the University Museum, called upon the writer, and Dr. Mason, who was in charge of field operations, was furnished with certain information concerning sites which we discovered in previous years.

The University, in its Journal, September-December 1929, publishes an account of this expedition.

In a communication dated December 29, 1930, Mr. Studer states that he prefers the term "Post Basket Maker sites" to "slab house sites." At the archaeological conference held in 1929 at Pecos, Mr. Studer was present. He heard research students apply Post Basket Maker Culture to slab house and other simple ruins of New Mexico. Mr. Studer retains this term, although the author of these pages prefers to designate the ruins as "Texas Panhandle Culture."

Mr. Thomas Galey of Independence, Kansas, sent photographs and description of two interesting "council" or medicine rocks in the Verdigris Valley, near the town of Liberty. Unfortunately, this information came after the final revision of our page proof. We present two of Mr. Galey's photographs in Figs. 75 and 76.

The Treaty Rocks (Fig. 75) stand out prominently on the Plains, and appear to have been a favorite Indian resort, as they are covered by petroglyphs. There is evidence of considerable vandalism on the part of white persons. One and one-half miles distant are better preserved Indian designs, and these are shown in Figure 76.

Both these sites should be preserved from further injury, and we have suggested to Mr. Galey that he urge upon local clubs and organizations immediate action looking toward this end.

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In the reprint of Jacobs Cavern we have retained maps, drawings and illustrations under the notation established by Dr. Peabody.

ARCHAEOLOGY OF THE ARKANSAS RIVER VALLEY

General Observations upon the Arkansas Valley

The Arkansas River passes through the states of Colorado, Kansas, Oklahoma and Arkansas. Streams from the north drain sections of Missouri. Probably the Canadian is its largest tributary, and this river, rising in northeastern New Mexico, flows through the Panhandle of Texas, and joins the Arkansas east of the center of Oklahoma. Thus, one observes, the river under discussion drains considerable portions of seven states, and, exclusive of tributary streams, is nearly fifteen hundred miles in length. One might safely assume that in extent of watershed it ranks sixth, and possibly fifth in the entire United States. In order of importance, the Mississippi, St. Lawrence, Missouri, Ohio, Colorado, Arkansas, Columbia, Rio Grande. In area there is little difference between the Colorado and Arkansas valleys.

In company with the Colorado and Rio Grande our river rises in the Pueblo-Cliff-dweller cultural area. The Colorado empties into the Pacific, the Rio Grande into the western portion of the Gulf of Mexico. These flow, for the most part, through mountain and desert regions, whereas the Arkansas, coming out of the eastern slope of the Rocky Mountains, crosses an arid belt, then passes for some hundreds of miles through the heart of the old buffalo country, includes in its drainage a sizable tract in which caverns and rock shelters are found and enters the Mississippi in the southern Mound-builder area. In brief, the Rio Grande and Colorado in their upper watersheds were inhabited by tribes who erected stone houses, further down by Desert Indians, but not by tumuli-building Indians. This striking archaeological difference in the drainage basins should be remembered. Neither river gives evidence of mound-building stocks. We are of the opinion that the Arkansas, although shorter, touches as many different Indian stocks as the Missouri and played a very important part in pre-Columbian times.

All three forks—Canadian, Cimarron and North Canadian flow nearly east for some distance. The main Arkansas changes to a southeast course in central Kansas. Considering that the total length is some fifteen hundred miles, the watershed's width (north and south) seems rather narrow when compared with other great river basins. Its diameter varies from two hundred to three hundred miles. While it is seen that the Arkansas is one of the larger rivers in this country in watershed drained, yet in actual volume of water it is outranked by many shorter streams. The main river and tributaries, through much of the area mentioned, transverse an arid, sandy region and there is loss through both evaporation and seepage. Otherwise, the measure of water carried by the Arkansas through Oklahoma would be greatly augmented. The main river has its rise in the Rocky Mountains in Chaffee County, Colorado. There are small entering streams south of Leadville, but the river does not carry much water until it reaches Salida. Between there and Canon

City in Fremont County, there are tributary mountain streams; at the famous Royal Gorge of the Arkansas it is fairly large. From this point on eastward into Kansas loss of water volume due to the amount removed for irrigation and from evaporation is very large.

While the bed in places is wide, except in the early summer when the mountain snows melt, or immediately following torrential rains, there is not much water to be

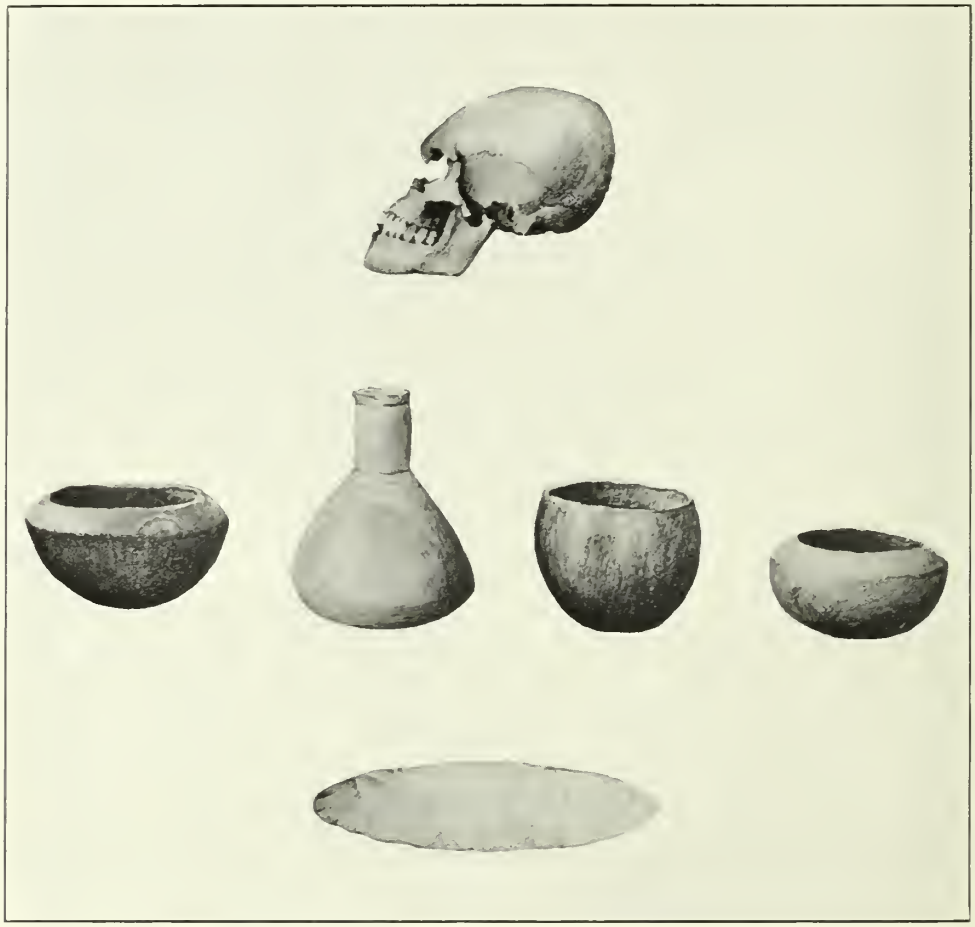


Fig. 1. Six specimens found by G. E. Berson, November 1927, in an Indian grave on the banks of the Arkansas River some 12 miles from Fort Smith. S. about 1-5.

observed upon the surface. However, experts in the Reclamation Service claim that the vast bulk of water is carried below in the sands. There is one large tributary, the Big Sandy, which rises a little east of Colorado Springs. Another one, the Purgatory, rising in the south near Trinidad, comes into the river at Las Animas. The source of the Cimarron is in the eastern slope, Rocky Mountains, Union County, New Mexico. Where it passes into the Panhandle of Oklahoma it is a sizable stream. As we re-

marked, its most important branch is the Canadian. The upper forks of this are the Red and Mora rivers which rise in the mountains of Mora and Colfax counties. It is not quite clear why writers and geographers call the upper portion of the Canadian the Red River. The Canadian, in its upper course, was called Rio Colorado by the Spanish-Mexican people. This was later translated literally into Red River. The name Canadian was given to the same stream at its lower extremity by French traders and trappers from Canada. Substitution of another name for the same stream carries confusion, since there is a Red River farther south. The smaller tributaries of Red and Mora Rivers drain the east side of the Pecos National Forest, and the famous Pecos Pueblo is located just over the Continental Divide, some seventy-five miles westward.

At the town of Canadian, in the Texas Panhandle, a steel bridge spans the river. This is almost three hundred miles by water from the head of the stream. The bridge affords one a good picture of river conditions. There are wide expanses of sand waste, and flats both above and below. Occasionally, and notably in the spring freshet, and after heavy rains in other seasons, as well, the river bed is entirely covered, and muddy, sand-laden waters rush by. For the most of the year the stream bed appears to be almost devoid of water. Here and there one observes a little pool in the sand, and there is a dark ribbon of moist sand far up and down stream. Before our people settled the country and developed irrigation it is quite likely that the channel carried, throughout the year, much more water.

Taking the main river and tributaries as a whole, the Arkansas may be said to pass through four climatic zones; those of mountain, semi arid plain, prairie and forest.

Archaeology of the Lower Arkansas Valley

After due consideration it has been thought best to treat of our well known Mound-builder culture first. We shall, therefore, begin at the mouth of the Arkansas, where it joins the Mississippi near the Louisiana border, and work gradually upstream until we reach the head-waters. This method, the reverse of which is usually followed in describing a river valley, has a distinct advantage, to the effect that we begin with cultures well known and which have been commented upon in detail by several writers and explorers. Our little expedition, therefore, moving steadily upriver, obtains a clearer perspective of that which is to come if we begin with the high and well-established Mound-builder culture.

We all know that Professor William H. Holmes in his volume on the Ceramics of the Lower Mississippi Valley, Bureau of American Ethnology Annual Report IV, 1882-83, sets forth in considerable detail that dominant characteristic of lower Mississippi tribes; their pottery art. Indeed, the term "pottery belt" as applied between St. Louis and New Orleans and extending back some distance from the main channel of the Mississippi is not a misnomer. Throughout this region pottery vessels of every description predominate over artifacts in bone, stone, or shell. Even as in the Pueblo-cliff country where the ceramic art of the Pueblo people is the chief factor next to their architecture, so in the lower Mississippi the ceramic art of the Mound-builder women is apparent everywhere. This does not apply to other great

river valleys, such as the Missouri and Ohio, nor entirely to the Arkansas itself, for by the time one reaches eastern Oklahoma we have passed out of the "pottery belt."* Professor Holmes, and also that well-known explorer and archaeologist Clarence B. Moore, Esq., sensed the chief characteristic of the region—the ceramic art. In the winter of 1908, Moore in his steamer ascended the Arkansas to the town

Fig. 2. Types of arrowpoints mostly from Yell County, Arkansas. S. 3-4.

of Natural Steps, a distance of some one hundred and ninety-four miles. His observations and researches have been set forth in Part I of his "Certain Mounds of Arkansas and of Mississippi."

Many vessels have been illustrated in our literature and it is therefore unnecessary that we present more than a few pictures. An inspection of ceramic and other art exhibited in public and private collections together with a perusal of the

*The "pottery belt" extends at least 40 miles up the Arkansas River, above the Arkansas-Oklahoma boundary. It also extends an equal distance into Oklahoma in the valley of Red River. (Note by Professor Thoburn)

literature, leads one to the conclusion that the cultural status of Indians living in the lower Arkansas was, in general, not very different from that of other mound-building tribes within a radius of two hundred miles. Our statement does not include the inhabitants of cavern and rock shelters to the northwest, but is confined to those who erected tumuli. That there are some cultural differences, even throughout the entire "pottery belt," seems quite obvious. We will suppose that all of these are to be worked out by other observers at some future time. Briefly, one might suggest that although the ceramic art in many instances is high, art in shell or stone does not compare favorably with Mound-builder art in southeastern Missouri, western Kentucky and southern Illinois.

Mr. Moore carried a large crew and dug rather thoroughly. He concluded that the river, constantly changing its channel, probably obliterated many mounds and cemeteries. Excepting Toltec and the large Menard mounds, he says the elevations are insignificant and cemeteries not numerous. Above Natural Steps there are numbers of burial places, as we shall observe. We quote from Page 481 of Mr. Moore's report:—

> "When Marquette,* the first of the French explorers of this region, visited the aborigines not far from the Arkansas River, in 1673, he found them cooking Indian corn "in large earthern pots very curiously made." "They have also," we are told, "large baked earthern plates, which they use for different purposes. . . . The men go naked and wear their hair short. They pierce their noses, and wear rings of glass beads in them."

He presents a footnote on page 482 of the work cited to the effect that in another translation of Marquette's the word "glass" is omitted. Probably beads of shell or pearl beads were worn, as suggested by Mr. Moore.

In the lower Arkansas on the village sites small chipped celts occur in numbers, and some polished chipped celts are found, also great quantities of projectile points. The grooved axe is not common. There are fine examples of skill in flint chipping. Yet there does not appear to be much evidence of art in stone. While Mr. Moore discovered some decorated bone hair pins of considerable length with a burial near the Menard mound, neither he nor the other excavators appear to have found much variety in mortuary offerings. This is rather common to most of the burials in the "pottery belt" between Cairo and Natchez.

Proceeding up the Arkansas Valley, one observes a change after we have passed Dardanelle. On the general village sites are occasionally found spades and hoes or agricultural implements of yellowish chert, but they are not at all common and disappear as we proceed up-stream.

As to mortuary customs, the people buried in both mounds and village sites or cemeteries, probably more skeletons are found in the latter than in the tumuli themselves. The majority of the skeletons have been flexed, sometimes we find

*B. F. French, Historical Collections of Louisiana, Part II, p. 295. To those who have not access to the original French in Margry's "Decouvertes," the "Historical Collections of Louisiana," edited by B. F. French, will be of interest. The five parts appeared, respectively, in 1846, 1850, 1851, 1852, 1853. The reader, however, must bear in mind that the "Collections" contain misprints and mistranslations.

bunched burials, yet a great number were interred full length. Near the Menard mound, some fifteen miles up-river from its mouth, Moore says:—

> "Burial No. 69, two feet down, was a bunched burial, very symmetrically arranged, the long-bones parallel, smaller bones stowed in between, the presence of fifteen humeri showing that the remains of at least eight individuals were represented in the burial. Though a number of lower jaws were present, only a single fragment of any other cranial part was found."

Some of his pottery was beautifully painted with red and yellow, occasionally with white bands. Of one specimen of ceramic art he says:— (Page 494)

> "This beautiful bottle is one of the very few vessels found by us on the lower Arkansas river showing in two colors a design other than the

Fig. 3. Selected points from Yell County, Arkansas and adjacent regions. S. 3-4.

scroll. The ware is light yellow. The body is globular, but projects somewhat at the base, which is flattened. The long, graceful neck, flaring toward the aperture, is coated with pigment, brick-red in color. Around the body are spaces of the yellow ware, defined by white pigment. These spaces, circular on top, with extensions tapering downward, have precisely the shape of the copper pendants found by us in the great prehistoric site at Moundville, Ala., the circular portions of which contain either swastikas or stars. On this vessel similar spaces enclose five-pointed stars on the upper row, and figures somewhat resembling an arrowhead on the lower tier. All these stars and projectile points (if that is what the latter represents) are colored with brick-red pigment."

Other specialized forms were of the "teapot" variety having a spout or neck which was hollowed and through which fluid might be poured. Another probably represents the sunfish. It is well executed and painted a brilliant red. Other pottery does not vary especially from that general in the region. He found a few celts or ungrooved hatchets, also an interesting effigy of a frog which was colored red on the upper portion, yellow below. As he proceeds up the river he finds near Douglas numerous beads of brass, shell and sheet copper. Also near that place in one of the mounds he discovered an example of high ceramic art almost shell-shaped in outline and cream colored without, coated with carmine in the interior.

On numbers of the bottles were scroll designs often executed with skill and convincing artistic ability. Of one of these illustrated in Mr. Moore's report, Fig. 79, he says:

> "The design varies somewhat from that on any other vessel found by us along the Arkansas River, though it is of the same general character. Partly interlocked scrolls of white and of red form the decoration, the scrolls having fenestrated ends filled with color—the white scrolls with red, the red scrolls with white. As the paint formerly on this bottle has been considerably worn away, we have attempted in the figure to show the design as it originally appeared, the dark shade representing red; a lighter shade showing the yellow of the ware; the white, of course, being represented without color."

A number of amateur investigators interested in the lower river region, reported their observations to us. Mr. C. T. Prescott of Little Rock excavated in one of a group of 5 mounds, which were placed in a semicircle. He found a skeleton, 3 clay vessels, a polished bone needle, some shell ornaments and other objects, near the remains. Occasionally, when exploring in heavily timbered regions, we find that tree roots have caused damage. In this particular mound he reports that the skeleton was found beneath a large tree. A mass of roots surrounded the skull, which was at least 3 feet from the rest of the body.

Cemetery Near Dardanelle

Early in January, 1924, the Museum of the American Indian received several letters from Yell County, Arkansas, to the effect that pot-hunters were destroying a large and important cemetery. Mr. M. R. Harrington, representing the museum, went from Dardanelle, in company with Mr. Pilquist, to the site. It was on a ridge between Petit Jean Creek and the Arkansas River in the region of Havana, where the writer had done some work years ago.

It seems that some of the poorer class people, known as "renters" had discovered several pottery vessels, hence what Mr. Harrington terms "a miniature gold rush" occurred. The interesting account which he published in Vol. I, No. II, 1924, of Indian Notes of the Museum of the American Indian deserves to be inserted here. It conveys a lesson which should be heeded by the National Research Council and Committees on State Archaeological Surveys, or scientific organiza-

tions interested in archaeological matters. We can do no better than to quote portions of Mr. Harrington's description:—

> "As we approached the ridges the little groups of diggers made a weird picture as they toiled in the mud, unmindful of drizzling rain and flurries of snow. Crops had been poor last year, money was scarce, and so they were improving every moment of daylight. But it was sickening to an

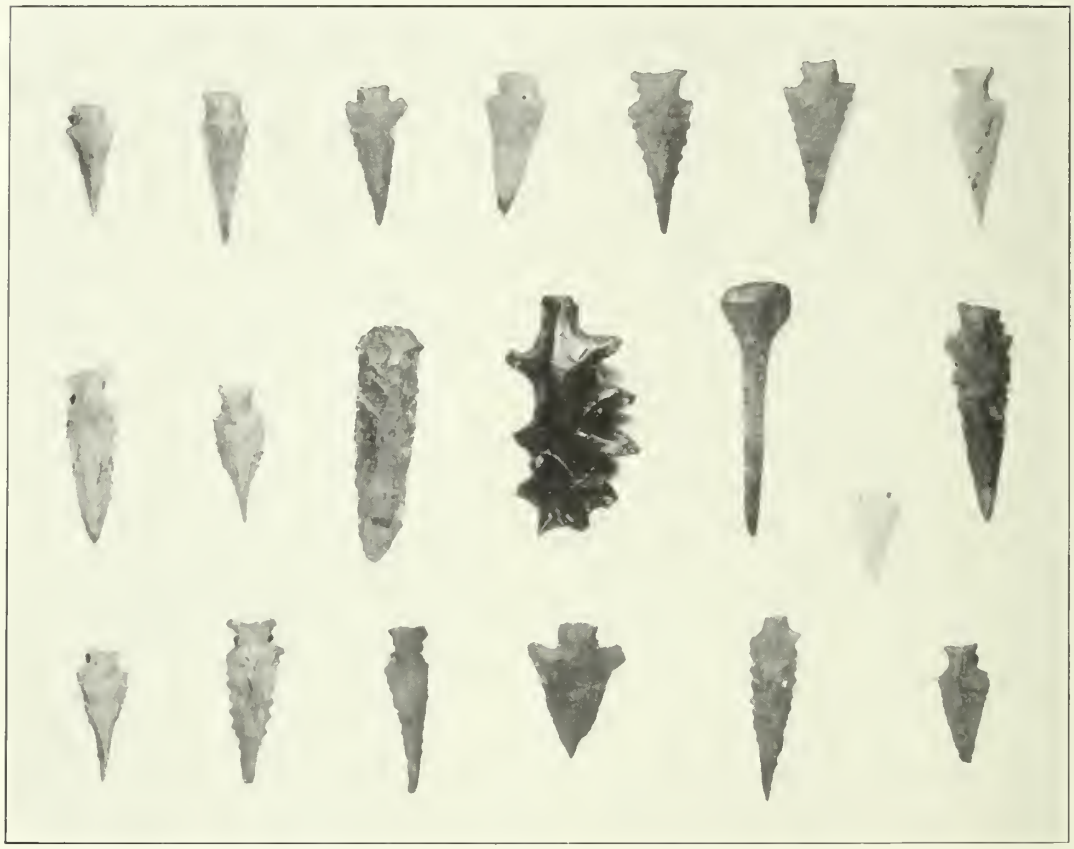


Fig. 4. Minute points and several specialized forms from Yell County, Arkansas. S. 3-4.

archaeologist to see the skeletons chopped to pieces with hoes and dragged ruthlessly forth to be crushed under foot by the vandals—who were interested only in finding something to sell, caring nothing for the history of a vanished people. Of course, no record was kept of the burials, and any information that might have resulted from careful work has been lost forever. Unskilled hands have probably ruined a large part of the pottery while trying to remove it from the graves, and untrained eyes have doubtless overlooked a great proportion of the smaller articles laid away with the dead. . . .

"I was impressed first of all by the great quantity of pottery found—wagonloads of it, complete or nearly so,—literally hundreds of vessels of different types. Pots, bowls, jars, bottles, eccentric forms, animal and human effigies—all were well represented.

"These collections consist mostly of plain or nearly plain pots, bowls, and water-bottles, for daily use; but there are also several different styles of decorated ware—one of them a gaudily painted variety, with scrolls, suns, and other figures in two colors (red and white) and some with three (red, white, and black, or red, white, and brown). Then there is a type showing intricate designs engraved on the surface of the vessel after firing, and then rubbed with red paint to emphasize the patterns; a third variety is decorated with curved or angular patterns drawn with a sharp point, while the clay was still soft, before it was dried or fired; and a fourth has been painted a solid red, and fired, then portions of the surface have been scraped away, leaving a design in red standing out in bold relief. Still another method of decoration was to model the handles of bowls or the necks and bodies of bottles into the form of some animal, or of man himself.

"Many of the vessels are first-class examples of the potter's art—graceful in outline, symmetrical and carefully finished, the ware thin and uniform; but others are coarser, and some are plainly the work of beginners—probably the first efforts of little girls learning their mother's craft.

"By contrast with the best of the pottery, the smoking-pipes are commonly crude—merely two hollow cones of fired clay attached at their points, at right angles, one cone serving as a bowl, the other as a socket for the stem of wood or cane, which of course has disappeared. A few show two little projections like animal ears—these are called "horse-head pipes" by the pot-hunters.

"Little in the line of stone implements has been found in these graves; still a number of small arrowpoints have appeared, all of one type—slender, delicate, leaf-shape, without stem or notch—many of them sharp as razors. A few flint knives, a celt-axe blade or two, a single grooved axe-head of stone, some soapstone beads, a few discs of stone, perhaps used as pot-covers, and one unique tube, carved and engraved, complete the list.

"Like most tribes living along the larger rivers flowing into the Mississippi, the Indians of Carden Bottoms used many beads, pendants, and ear-ornaments made from conch-shells originating in the Gulf of Mexico and either traded in from tribe to tribe or brought up in canoes by certain Indians who made a business of this kind of traffic. Hundreds of these ornaments have been found in the graves, some of them well preserved, others crumbling through age and the action of acids in the soil where they lay.

"A few awls and bodkins of various forms, and tools intended for chipping flint, all made of bone or of deer-horn, were found where they had been placed in the graves with their owners, that he or she might not lack tools to work with in the Land of Spirits; but of course the baskets,

the woven sacks and garments, the bowls, war-clubs, and axe-handles of wood, the rich furs of otter and beaver, the garments of deer—and elk-skin, the headdresses of feathers,—all have disappeared without leaving a trace.

"Who were the Indians of Carden Bottoms? The question is difficult to answer, for the very evidence that might furnish the clue has been destroyed by the pot-hunters.*

"It is certain, however, that a considerable part of the pottery is typically Caddo, especially the ware engraved after firing and much of that

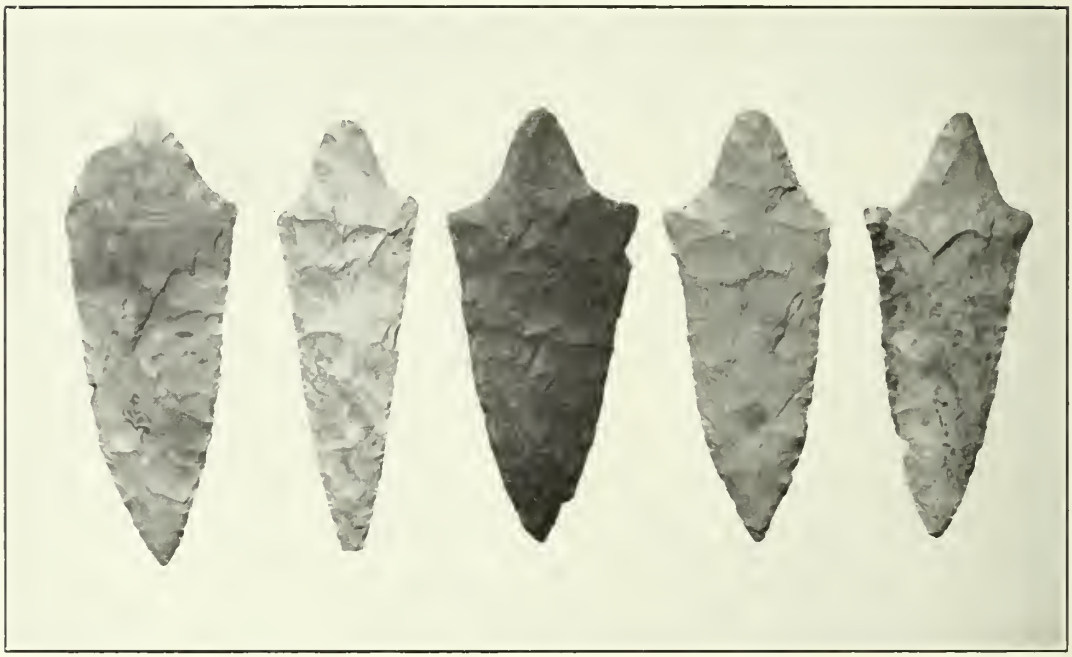


Fig. 5. These lozenge-shape spearheads are selected forms. The shoulders are pronounced yet we have retained the term lozenge-shape although the majority of this general type is more like the specimen to the left. S. 3-4.

with patterns incised before heat was applied. Another large element, dark, and not so well made, with occasional animal effigies, resembles the typical pottery of eastern Arkansas, which may be Quapaw; the painted ware may belong to this group, and it may not,—the exact connection has not yet been satisfactorily worked out. Certainly the impression produced by the Carden Bottoms collection as a whole is that it was made by at least two or perhaps three separate peoples.

"Careful work would have proved or disproved the possibility of this, and very simply. If some graves contained only Caddo pottery, others only painted ware, and still others only ware of the eastern Arkansas type, we might hope to show occupancy by three different peoples; but if

*Professor Thoburn believes the Dardanelle site is Caddoan.

all classes of pottery are usually found together in the same grave, there would be ground for assuming that one people of mixed culture had lived in Carden Bottoms."

Yell County, Arkansas

We study in detail this region because of the large Indian population everywhere in evidence. Not only Mr. Harrington's report but our own researches indicate Yell County as a favorite Indian resort. It is drained by three tributaries to the Arkansas—the Dutch, Fourche and Petit Jean creeks. In walking over the fields for some days the writer was impressed by the large number of broken and burned stones, arrow and spear points, and pottery fragments. Village site debris is very heavy and extends into the soil a foot or more. On two sites near Havana in less than three days there were collected more than 500 chipped objects, some 20 larger tools and numerous pottery fragments.

Between Dardanelle and Fort Smith are many sites of which over 40 were entered by Mr. C. B. Franklin upon his map (Figure 13). This does not include 10 somewhat north of Havana.

When we decided to study the Arkansas Valley in 1915 the writer spent considerable time along the main river and upon tributaries in both Arkansas and Oklahoma, but in the latter state he was chiefly dependent upon the labors of Professor J. B. Thoburn, Curator of the Oklahoma Historical Society, and a student of the archaeology of Oklahoma for more than 25 years. Mr. Franklin spent four months travelling through the valley, from Havana to above Canadian, Texas. His field diary mentions many Indian camp or village grounds.

After we had returned East Mr. Franklin employed young men to search the fields and he secured an extensive collection of objects, the greater part of which were projectile points. No excavations were attempted. Our field notes, somewhat condensed, are:—

"Mr. Jefferson Davis of Havana, owns a farm on which are three village sites. These occupy points of land or slopes overlooking the Petit Jean valley. His plantation includes about 400 acres. It, and the Berry farm about 2 miles west of Havana, are the two largest sites in the neighborhood. It seems that there are cemeteries on each of these places, as local testimony is to the effect that bones have been plowed up, and pottery vessels and pipes found. A few of these have been preserved, but are in the hands of persons living at a distance.

"Thursday morning we went over to the Chickalah valley about 20 miles away. There, on the farm of Mr. Bonaparte Rutledge, is a site where Mr. Harkey of Belleville claims that he found skeletons and pottery vessels years ago. About half way between the town of Belleville and Havana there is a site on the farm of Shelby Buckman, where numbers of implements in various stages of manufacture occur.

"Two or three miles southeast of Belleville, Arkansas, is the farm of a Mr. Saddler. He is an old Confederate soldier, and the writer had a most

interesting chat with him. There is a site covering several acres on his farm from which many implements have been taken, including pipes. The soil is black and the surface covered with flint chips, broken pottery, hammerstones and so forth.

Fig. 6. Six knives more specialized than the average knife blades. Region between Little Rock and Havana, Arkansas. S. 2-3.

"On the Davis plantation the writer spent two and a half hours searching and secured about 157 specimens. There are small broken human bones scattered through the soil.

"The Berry planation, west of the town is probably the most interesting. There is a long ridge flanking Petit Jean stream distant a mile farther south. This ridge is intersected by a road, Mr. Berry's property being on

the west side and Mr. Walkup's plantation on the east side. Where the road cut through the brow of the hill skeletons were uncovered, and we discovered one protruding from the bank. Whole pottery has been found on the Berry place, and the village debris is thick.

"On the largest site, about two miles from Havana, and upon the second terrace, and at another site some three miles upstream (both on Petit Jean creek) the writer dug a number of test holes, finding ashpits extending from one or two to three feet in depth. All sites appear to be prehistoric and up to the present time no glass beads or European objects have been discovered. Probably one should assign the occupation to members of Caddoan stock, although the Bureau of Ethnology linguistic map includes this region under the area assigned to Siouan culture."

January 1st, 1930 Mr. Franklin, who is now located in California, sent us an outline map of Yell County, showing sites as he recalled them. He, having lived at Havana for many years, claims that the locations are approximately correct. We have thought best to enter his original lettering and legends. We have redrawn Mr. Franklin's map. It is to be observed (Figure 13) that a village, almost continuous extended from the northwestern portion of the county to near Danville, a distance of some 15 miles. This is intersected by the usual ravines and lowlands. The eastern and southern portions of the county are not known to Mr. Franklin, neither is the region north—Logan County. Some notes were received from a gentleman living near Fort Smith who locates in Logan County, and immediately across the river in Johnson and Franklin, 20 sites, and reports there are many more. Some are on creeks but numbers of them along the Arkansas itself. One does not wish to repeat, but we again emphasize the importance of the Yell County sector and urge its careful exploration. Possibly we have two cultures although, apparently, Caddoan influence prevails.

Franklin's Description of Sites, Yell County

"a. Series of village sites, mostly on north side of Petit Jean, extending west to lowlands in Logan County, very prolific in specimens of all kinds.

b. Location on Jeff Davis' farm where boatstones and skeletons were found.

c. 320 acres of upland, paralleling Cedar Creek, flints plentiful, no tools found.

d. Series of mounds, one opened contained some bones and pottery, some on south side of river caved into river, revealing much pottery.

e. Cultivated land around Belleville, much scattered flint.

f. Village sites along Dutch Creek,—flints, pottery, and implements.

g. Very large village site evidently occupied a long time from appearance of kitchen middens.

h. Village site across Fourche from Bluffton.

i. Numerous sites from west of river to Plainview.

j. Spring near Ola where stone Indian head was found.

k. Land on west side Chickalah Creek, is old cultivated ground, but at one

time must have been thickly inhabited by aborigines, for the amount of flints and implements (practically all broken) is very large.

"I am not marking anything in Carden Bottoms and Greasy Valley in the Dardanelle region, close to the Arkansas River. There are 11 large mounds near Point Remove Creek, north of Morrillton."

Old residents state that on the arrival of white settlers they found the bottoms covered by heavy canebrakes. All villages were located on ground some 30 to 50 feet above the marshes. From large fragments of clay burned to brick color, in which are embedded sections of cane, one surmises that the wigwams did not vary from those generally in use in the South where canebrakes predominated, that the walls were built up around uprights of cane and other reeds. That is, our present method of construction in which we employ cement and insert steel or wire reinforcement does not vary in principle from our Indians' ancient method of house building.

Study of Stone Material, Region of Fort Smith and Yell County

In the vicinity of Little Rock, and also at Hot Springs not far distant, there are various outcrops of almost true flint and rose quartz, and various shades of quartzite. The colored quartz material, particularly a fine grained quartzite characterized by beautiful shades or bands of pink or yellow, was highly prized by the Indians. Numbers of bipennate problematical forms are made of this material and Mr. Moore's discovery of some 25 in a mound on Green River, Kentucky, has been set forth in his Journal, Academy Natural Sciences, Second Series, Vol. XVI. Upon village sites and in graves a few of these have been found in various portions of the middle South, occasionally in Ohio, Indiana and Illinois. The source of supply, so far as we are aware, was from the region cited. Should one tabulate all rose quartz problematical forms in our various museums, it is the writer's prediction that we shall discover these forms in highly colored material were rather widely distributed through an area approximately 400 miles in diameter. In extent of distribution they do not equal the monitor or platform pipe, yet they constitute a factor in aboriginal barter and exchange which is to be taken into account. Collectors have highly prized these objects and this has encouraged deception. Therefore in studying collections, particularly those in the hands of individuals who have purchased rather than secured specimens locally, great care should be exercised.

It is one of the anomalies in mid-Mississippi valley archaeology that our ancient Indians made rather limited use of this beautiful material. Do not misunderstand. There are not wanting great numbers of highly colored flint or quartzite objects of the projectile class. These, however, must not be confused with the rose quartz itself. Some Arkansas colored material was carried to a distance and one finds evidence of it in southern Indiana, Illinois and particularly in Missouri, yet projectile points and knives of this stone, well fashioned though hundreds of them are, were not as widely distributed as the problematical forms to which we have referred. This is quite understandable, and one might draw a parallel between Ohio monitor pipes and Flint Ridge material. That famous quarry in central Ohio furnished a superior stone, frequently in colors, yet to distant Indians the monitor

Fig. 7. Upper row, chipped and notched axes; below, polished celts. From Ola, Arkansas. S. 1-2.

pipes and other characteristic lower Scioto types were much more precious and important. Banded and colored quartz or quartzite, as we proceed up the river, gradually disappears and local cherts are substituted. This emphasizes another and very important factor in the lives of the Indians that although when possible they

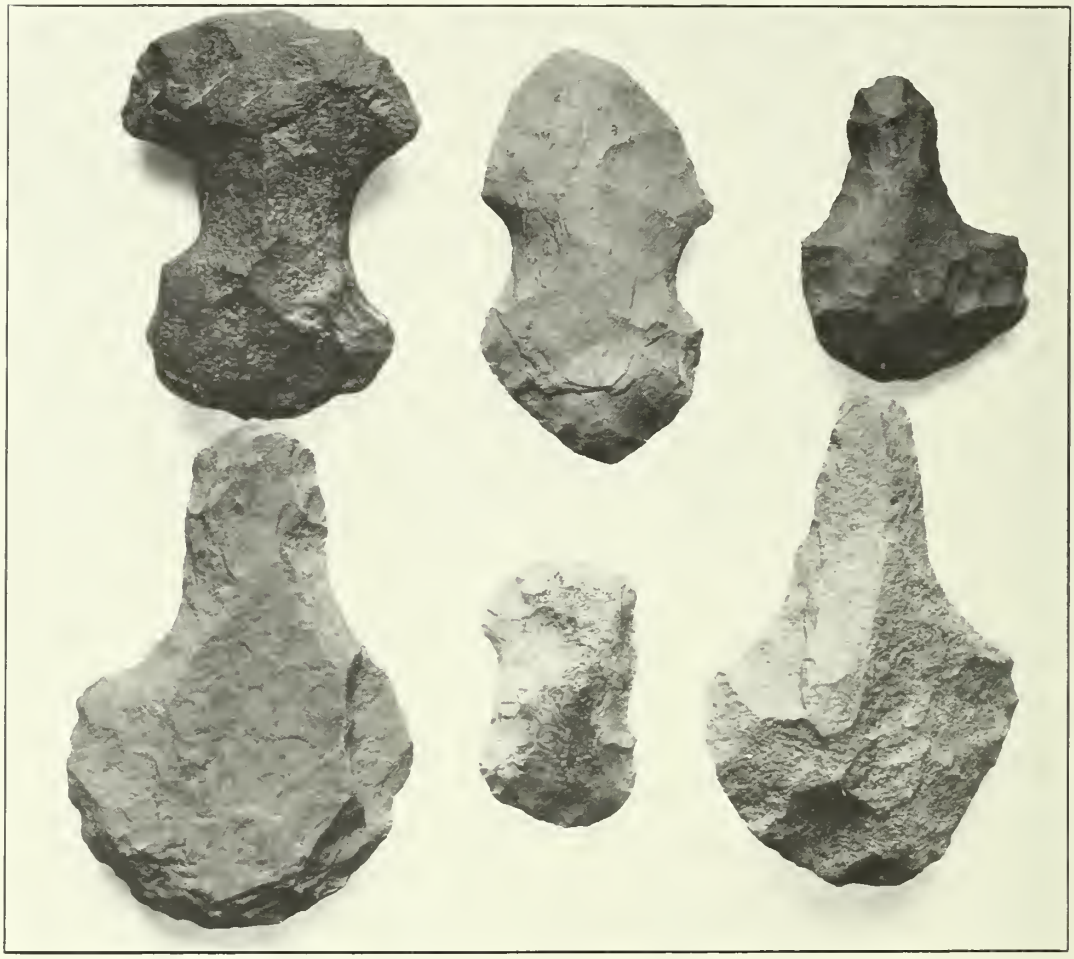


Fig. 8. Chipped axes and hoes typical of the region between Little Rock and Fort Smith. S. 2-3.

sought and used superior flint materials from a distance, they were chiefly dependent on regional supply.

We begin to find, as we approach Fort Smith, common chert and quite a few of white or gray material indicating contact with tribes to the north (Missouri). Here as elsewhere in Arkansas there are not wanting very small arrowheads such as we present in Figure 4 which Professor Thoburn calls blow gun points. There are now and then examples of art in flint chipping, but the average is not at all high.

The 9,318 specimens secured by Mr. Franklin, the writer, and others, if com-

pared with a similar total from Ohio, Kentucky, or Tennessee, would indicate a superiority on the part of natives of the latter states. The large bulk of the points varied from an inch to an inch and a half in length, the barbs are not pronounced, the bases are rounded, pointed or straight, and there is little indication of specialization. Large spearheads and knives constitute a rather low percentage.

Grooved axes are not at all common in the entire valley and above Fort Smith they are scarce, although a few have been found in Oklahoma.* There are polished stone hatchets, or celts, but most of the hafted tools worked from chert and quartzite are chipped rather than ground or polished. This is important and should be noted. From the Havana-Dardanelle region up to Fort Smith and beyond, and for some distance in Oklahoma, we found an increasing number of chipped, hafted tools, some of which might serve as axes (See Figures 7 and 8) although many of them probably were hoes. They vary from 3 to 8 inches in length, very few exceeding that size. While pottery continues to be present, when we have passed central Oklahoma it diminishes, becomes inferior in texture and design.

Upon sites in the Havana region there are numbers of grinding and rubbing stones, a few of which have begun to assume, in a small measure, the form of the Pueblo mano. This does not imply that there is any direct connection, the writer hastens to explain, but there is a decided change. Bell-shaped and elongated roller pestles are exceedingly rare in the region under discussion. In brief, the form of stones used in crushing grains has been altered. Mortars are also very rare save in the rock shelters. It is to be supposed that these Southern tribes prepared sections of logs, which they hollowed out and used as mortars. Speaking of these in general, one might here record that throughout that great expanse of flat plain known as the buffalo country, mortars are small and rather insignificant. Usually flat stones were preferred, although the Indians frequently selected curved slabs. Professor Thoburn comments on this in his paper.

A number of boatstones are presented in Figures 11 and 12. These differ from New York or Indiana types, and nearly half are not hollowed. Comparisons will indicate that Arkansas boatstones are narrow, and V-shaped depressions exist. We might qualify the statement to the effect that a few similar to Northern forms have been found. One is shown in Figure 11. Prevailing forms are shown to the left in Figure 12. Perforations are rare. In western New York, Ohio, and Wisconsin a majority have holes a short distance from either end. Why the natives should have preferred boatstones to ordinary tablets and pendants, which were more easily manufactured, is not apparent.

There are so few perforated gorgets that we might practically eliminate them. That is, they are not absolutely absent, but not at all common. A few earrings or nose rings and large beads of stone occurred in the graves, but not in quantity. Mr. Franklin, after completing his work for us, went into the region for himself, and the total of boat or canoeshaped stones secured by boys he employed to hunt fields, and those that our party found, numbered some 24. About half of these have been included in our tables.

*Mr. Franklin, although collecting extensively for a year or two after we departed, reports but 14 in addition to our total.

One notices another peculiarity—the rarity of pipes. Added to our grand total, 9,318 objects, Mr. Franklin's subsequent finds, which were not tabulated, there are somewhere between 10 and 12 pipes. Compared with the same number of specimens from elsewhere in the South or central portion of our country, that is, again, a very low percentage.

On all sites observed by our parties are a prodigious number of rejects, unfinished objects and general indication of hasty or poor workmanship. It has occurred to the writer, when inspecting sites which present features difficult to understand, that the explanation lies in the fact that these Indians possessed a very large number of wooden tools of various kinds, all of which have disappeared, leaving for our consideration objects of indestructible material.

Reference to the table (p. 21) indicates that we have at Andover 3,439 objects found on the surface along the river and tributaries between the points named. We may learn something by a somewhat detailed study of this material.

5,879 objects were sent to museums or students who cooperated in the Arkansas Valley surveys. Of these, 689 were large objects, the remainder, 5,190, chipped projectile points and knives.

Confining our observations to the Andover collection, there were 19 drills, or perforators, which ranged from 1 to 2½ inches in length. This is a small number in a total of 3,439. It is difficult to distinguish between hafted points, as to whether they should be classified as spearheads or arrowheads. Assuming that the heavier or larger ones were used to tip lances and spears, there are 117. Of the knives we possess 217, none of which are large and few specialized; notched or barbed arrowheads, 912. There were 1,155 lozenge-shaped arrow points. 30 of the chipped projectile points were indented at the base. Of the minute, or blow gun arrowheads, there was a total of 56. In the entire collection, there were not over 60 or 70 chipped objects which indicate artistic skill, or true art in flint.

Interesting is the preponderance of lozenge forms. They constitute nearly 40 per cent of the total. This indicates that a small form, easily made, was preferred by the natives of Yell County. Few scrapers occur.

Careful tabulation of large series obtained from other sites in this region may somewhat change our observations, although that is doubtful. In our studies is noted a special collection of 432 objects from one site at Ola, western part of Yell County. Included in this Ola collection, were 6 boat-shaped problematical forms (not hollowed) and 8 polished celts, also 27 of the notched, chipped axes. The writer is informed by the finder, who had searched fields near the village, that his collection represents all finds except broken material. There are only 2 scrapers and 2 drills among the entire 432. Of the lozenge shaped small points there are 63, and 11 larger ones 2½ to 4 inches in length. Flint celts occur on this site in numbers, there being 25. There are 48 knives. The residue consists of ordinary arrowheads, not specialized, with notches, barbs or shoulders which are not pronounced. The most interesting feature of the entire series of 432 lies in the fact that practically all of them, save 20 or 25, are of a yellowish chert, of the same texture and color as if removed from one ledge, quarry or deposit. The chipping and form in the entire series is uniform.

Fig. 9. Three mano stones and rubbing stone. Yell County, Arkansas. S. 2-3.

The situation here is similar to Etowah, Georgia, where less than half a mile from the parent village we found a sizable camp which furnished a high percentage of quartzite and other material, practically absent from the main village.

Fig. 10. Four objects from village site and cemetery, Havana, Arkansas. Bone object exhibiting four lines of perforations; peculiar slender object of flint; an arrowhead notched on one side and a wide, rather shallow boatstone. S. 1-1.

That which strikes the writer as significant is the small percentage of unhafted or un-notched forms, commonly called knives. In the total of 5190 chipped objects sent away, there are about 264 knives. The Baltimore classification was followed, but it was difficult to obtain exact percentages for the reason that many of

the objects might be placed in a certain division by one observer, and in another division by his fellow worker. For instance, although three of us, familiar with forms in flint, worked upon the collections, there is a difference of opinion as to classification of 100 in a series of 1,000 objects, or about 10%.

Totals of surface finds remaining in the museum at Andover from the Arkansas between Fort Smith and Dardanelle.

Grooved axes	3
Notched axes (chipped)	31
Shouldered hoes	14
Mano or grinding stones	43
Celts or polished hatchets	35
Boatstones, 3, ornaments, 2	5
Projectile points, knives, etc.	2876
Special collection from Ola, chipped objects of all kinds	391
Boatstones shaped, not hollowed, from Ola	6
Rough celts and polished celts, Ola	8
Notched, chipped axes, Ola	27
Total of objects in the museum	3439

Totals of surface finds from the Arkansas between Fort Smith and Dardanelle, sent to museums or students.

Arrow points of various forms	1866
Unfinished, broken, or rough projectiles	2595
Large chipped objects or spear heads	234
Minute, delicately chipped points, one half to one inch in length	129
Knives of chert, chalcedony or quartzite	264
Scrapers (estimated)	50
Drills or perforators	52
Total	5190

Ground and polished tools, or large chipped objects.

Celts or polished hatchets	44
Grooved axes	10
Mano or grain crushing stones	158
Notched axes	62
Problematical forms (ornaments)	5
Boatstones	5
Pipes (two whole)	5
Hammer stones (estimated)	200
Turtlebacks (estimated)	200
Total	689
Chipped objects	5190
Objects sent to other museums Total	5879
Objects remaining in Andover museum	3439
Grand total	9318

Summary

On passing Fort Smith we are out of the main "pottery belt." In the entire region described very few truncated pyramids occur and now even mounds become rather scarce. In his paper, Professor Thoburn briefly describes a small truncated pyramid near Muskogee, but in general the tumuli are much smaller. Both pottery and tumuli degenerate as we enter the Great Plains. Mounds of size are in evidence up the Mississippi through Iowa and into Wisconsin. Yet they do not follow either the Missiouri or Arkansas for considerable distances. Mound culture, whether of Etowah, Hopewell, Cahokia or Fort Ancient, is clearly and unmistakably confined to the main Mississippi, eastern tributaries and southeast rivers—a significant fact which cultural students should not ignore. Small house or lodge elevations common in eastern portions of the buffalo country cannot be considered true mound cultural units. There is a similarity between Etowah, Fort Ancient, Cahokia or Hopewell because all comprehend mound art and concept. There are far greater differences between the tribes of western Oklahoma, central and western Kansas and those of the area just described than between the four extensive mound areas mentioned above.

Just why truncated pyramids should have occurred far to the north, as at Cahokia, and one or two in distant Wisconsin, and not on the lower Arkansas or Missouri, are questions which will be answered when intensive, comparative studies of cultural areas are undertaken by competent observers at some future time. It is well, however, to offer some comments in advance of such work.

As to the theory that our mound building tribes came from Mexico and thus brought in knowledge of truncated pyramids, it is suggested that through 1500 miles of territory—northern Mexico to eastern Louisiana—there are none of these. Truncated pyramids, with very few exceptions, are found within an area some 400 miles east and west, and 600 miles north and south. That is, they extend from eastern Louisiana to eastern Georgia, northward into Tennessee, then into southern Illinois. Even in this area there are sizable sectors in which truncated pyramids do not occur, and they are practically absent in the state of Ohio. We should not forget that southern Indian material was present in northern tumuli, whereas, excepting copper, northern forms do not occur in southern mounds. We shall in our Etowah exploration report, now in preparation, present considerable detail upon this interesting and important subject.

It is clear that mound art—if that term is permissible—does not occupy the bulk of Arkansas drainage.

We now diverge from the main river northward into a mountainous country and there find a totally different culture from that existing to the southward in our valley. Indeed it is distinct from the Great Plains culture.

Artifacts from the Rock Shelters Compared with Lowland Finds

From the Arkansas at Fort Smith it is but 50 or 60 miles to the first rock shelters, and a journey of 100 miles would include most of them. The difference between

artifacts found on sites near the river and numerous objects recovered in the caverns by Harrington, Nelson, Peabody, the writer and others, is striking. Let us leave the Arkansas flats and pass into this broken, almost mountainous region suggestive in some respects of the Southwest. Here we find instead of mound-building people, men of the hills who resorted to overhanging cliffs or caverns in limestone ledges and there made their homes.

Before presenting a synopsis of the work of the observers named, it is well to consider the material from rock shelters and now in the collection at Phillips Academy. From Jacobs, Kelly, Ash, and other bluff dwellings there are approximately

Fig. 11. Boatstone, 6 inches in length, found by C. B. Franklin, near Havana, Arkansas.

5,000 chipped objects. Most of these were studied by the writer and his assistants. We did not prepare complete tables,—that is possible at some future time. Interested persons are welcome to come to Andover and examine these artifacts.

After inspecting all this material and comparing it with chipped objects from the river valley proper one is justified in presenting certain observations. The great bulk of the chipped material, with some exceptions, from rock shelters and also from surface village sites within a mile or two of such appears rather inferior in workmanship to chipped objects from sites upon the main river. Or, considering both the hill country and the river valleys, the general average of all artifacts is below that of similar specimens from the Ohio, Cumberland, or Wabash basins.

One observes that average chipped objects from the hill regions are much larger than those found upon river sites. The material utilized by rock shelter

people is rather inferior and the types do not cover a wide range. The favorite stone was gray or brown chert, and seldom clear quartzite or chalcedony. Our statement does not imply that all the objects are either of poor workmanship or material, but on the contrary, that the average, or the totals, indicate the truth of

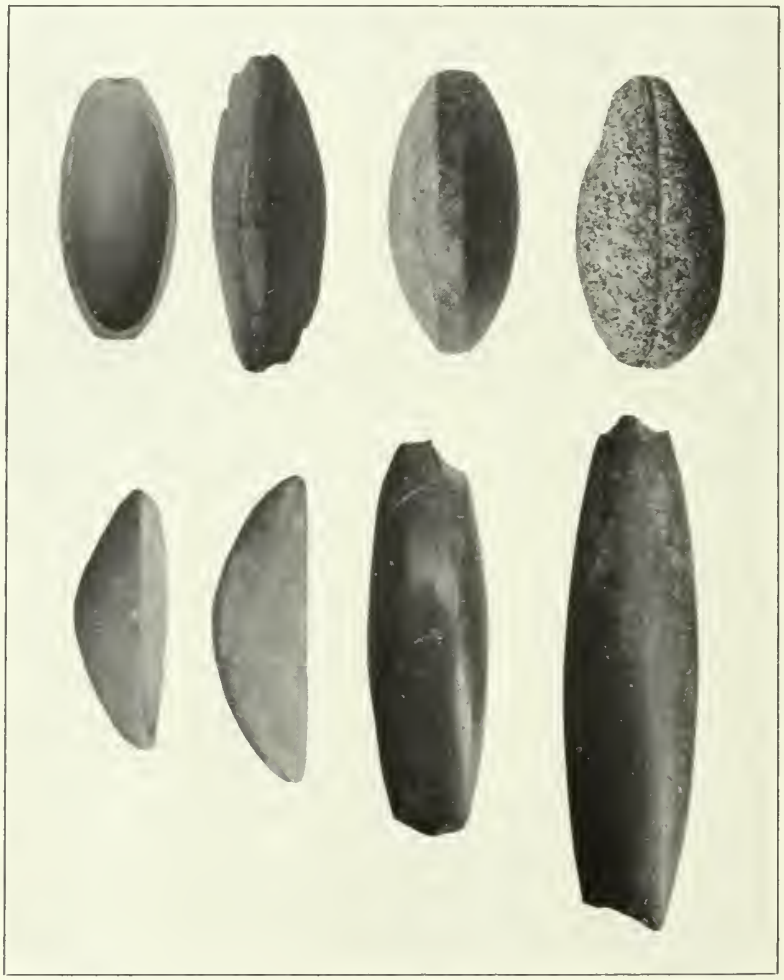


Fig. 12. Eight boatstones and a grooved stone from sites in Yell County, Arkansas. S. 2-3.

this observation. Whether one should maintain that crudeness of forms indicates greater age or lower culture, it is impossible to state with any degree of accuracy. Yet our opinion is that these primary forms indicate low cultural status, and in the case of Jacobs Cavern considerable antiquity.

Let us examine the matter in some detail. It would appear that the Ozark dwellers employed very few celts, grooved axes are almost absent, problematical forms are seldom found, and while pottery is present, it is not common. In some of

the sites examined by Harrington, more pottery was discovered than by our field parties.

A rock shelter in Delaware County, Oklahoma furnished 3 complete vessels according to Thoburn, Kentucky and Tennessee caverns a total of 4 or 5. Considering the number of rock shelters in central United States pottery was not a dominant factor in the lives of the bluff dwellers.

Numbers of large knives and spearheads were taken from rock shelters or adjacent villages. A few are well made and all are serviceable. We find many unhafted or unnotched forms. The reverse is true of the river sites. Arrowheads are not in great profusion, whereas they constitute the bulk of the chipped material from the lowlands.

We selected for special study 2009 chipped objects exclusive of the finds from Jacobs Cavern which have been tabulated by Dr. Peabody, and are presented in his report, as an appendix to this volume. Eliminating 460 objects, which are in small groups from various localities, we have 1329 from rock shelters or sites adjacent to same. There are 70 spearheads, mostly large, of which 31 are broken, in nearly every instance, across the center. Twelve of these are rough and shouldered and 14 lozenge shaped, the others are slightly barbed. There are 40 more chipped objects, ranging from 1½ inches to nearly 3 inches in length, which might be classed as spearheads, although some of them are sufficiently light to serve as arrowpoints. In this series of 40 the lozenge form predominates. We have 141 arrowpoints, about 20 percent being lozenge shaped and the rest shouldered and barbed; also 37 knives from 2½ to 4 inches in length.

Of the remaining 1,041 chipped objects, nearly all of them are roughly made, with few exceptions, and may be entered as thick, clumsy knives, flint hatchets, or turtlebacks. Unfinished, or heavy blades of this class seem to constitute the bulk of the material. It is rather curious, however, that while most of the objects indicate rejects or poor tools, or incomplete objects, in the whole collection of 1329 specimens there are 110 objects above the average of similar types from the Arkansas Valley. There are also 2 rather large drills and 2 knives deeply indented at the base. In the entire series no scrapers were observed.

It will thus be observed that the percentage of large objects in this collection of 1329 chipped objects is much higher than was found on the sites along the Arkansas River.

The Ozark Rock Shelters

Dr. Peabody, former Director of the Department of Archaeology, Phillips Academy, visited the Ozarks on several occasions. In 1908 he and the writer explored Kelly Cavern, Madison County, and in 1915 he and Mr. E. H. Jacobs inspected Ash Cave, Barry County, Missouri. From Kelly Cavern a total of 1104 objects was secured, mostly chipped implements. Ash Cave produced 2632 objects. Dr. Peabody gives the dimensions of Ash Cave in his field notes as 18 meters in length, 13 meters in width. Going back 5 meters from the overhang, he measured the distance from the top of the ashes to the roof and found it about 4 meters. According to local tradition, great quantities of ashes had been removed from the cave, and


CHICKALAH
CR.
CEDAR
CR.
HAVANA
BELLEVILLE
SEAN
CR.
PETIT
DANVILLE
DUTCH
CR.
WALNUT TREE
ROVER
LA
BRIGGSVILLE
TOURCHE
BLUFFTON
STEVE
ONYX
ALY
CHOLA
STILLWATER

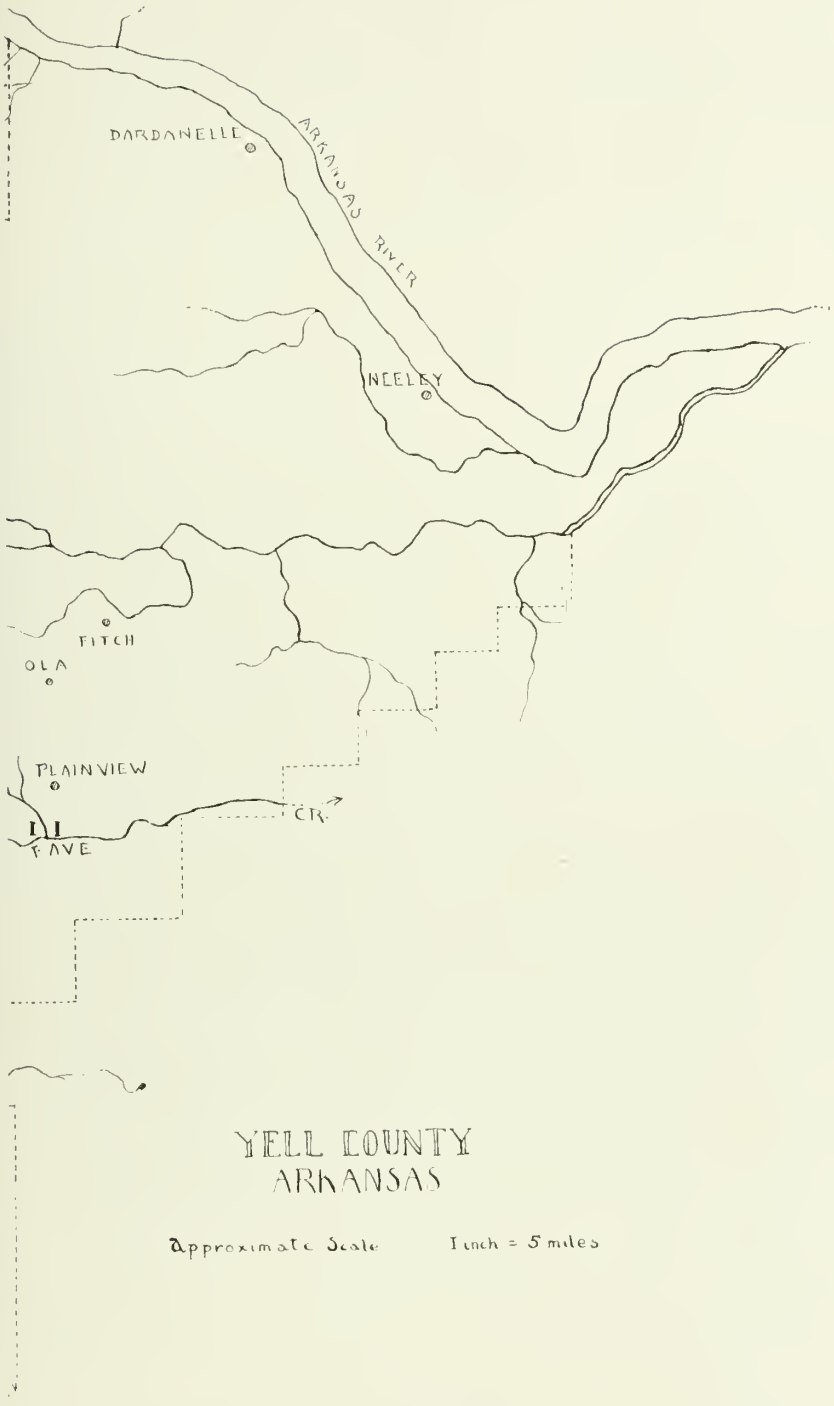


Fig. 13. Map of prehistoric sites in Yell County, Arkansas.

there was considerable disturbance on the part of treasure seekers. Something like 40 pottery fragments were recovered from the upper layers. Figure 15 presents the exterior of Ash Cave.

In a letter, August 1, 1915, Mr. Jacobs states, "The singular fact about Ash Cave is that we did not find a single bone that we could definitely say was human." The material from Ash Cave is mostly composed of chipped objects. There did not appear to be quantities of textiles and other perishable materials such as Harrington found elsewhere. It is assumed that Peabody and Jacobs explored the cavern thoroughly.

Dr. Peabody presented a brief paper before the Second Pan American Scientific Congress, Washington, December 1915, in which he made the following statement:—

> "In Ash Cave a little breccia, showing human agency in its composition, adhered to the walls of the rock shelter at a height of a meter and a half above the highest 'ash' floor observed in that place. This phenomenon was repeated at a corresponding level on the opposite wall of the cave. It seems unlikely, however, that the deposit ever filled the cave to that height and the occurrence remains unexplained."

Kelly Cavern was rather unusual in that at this place we found about 35 flat or slightly hollowed slabs of sandstone, upon which corn or nuts had been ground. None of them were true mortars, yet several were hollowed to the depth of 2 or 3 inches. But 2 shallow mortars, one broken, were found at Jacobs Cavern. The notes left by Dr. Peabody covered in great detail various trenches in which he found objects.

Subsequent to the exploration of Jacobs, Kelly and other caverns, but prior to excavation of Ash Cave, Mr. E. H. Jacobs of Bentonville, Arkansas, was employed for some time to study the region. The writer has before him Jacobs' interesting notes which cover a reconnoissance through April and May, 1914, in southwest Missouri and northwest Arkansas. We assume that Jacobs and his party inspected a region 50 miles in extent. Whether some of the rock shelters he located were subsequently examined by Harrington, we do not know. It seems advisable to present a list of these shelters with brief comments and also a map, Figure 15A, for the benefit of future explorers. To save repetition we have omitted Jacobs' frequent statement that while there has been some disturbance of sites by amateur collectors, or treasure seekers, yet the lower layers or levels were found more or less intact in 1914. Generally the pits did not penetrate to the floors of the shelters. In the entire number of some 20 large and small bluff habitations inspected by Jacobs, it is his opinion nearly half of them merit careful exploration.

Indian Bluff. Located on Little Sugar Creek, McDonald County, Missouri, 8 miles from Bentonville. Large deposit of ashes.

White Bluff. McDonald County, Missouri. A large site, much disturbed. Near this extensive shelter is a small one, the floor covered with fragments of limestone and there were little or no indications of ashes on the surface. Jacobs comments at some length, stating that below the floor he found a bed of dry ashes extending

down some 2 feet and containing flint flakes, chips and implements. He had been directed by Dr. Peabody to merely test the shelters, map same but not explore. He recommends that this interesting site be carefully investigated.

Salt Peter Cave. Not far from Pineville, McDonald County, Missouri, on Little Sugar Creek a short distance from famous Jacobs Cavern.

Bone Cave, McDonald County, Missouri. Located on Big Sugar Creek.

Big and Little Sugar Creek valleys were much inhabited by the Ozark Bluff Dwellers.

Referring to Bone Cave, Jacobs' notes state: "Three facts chiefly make it interesting. It faces almost directly north; it has never been disturbed so as to hurt it for scientific work; and it closely resembles Jacobs Cavern in its general form, and probably contains true cave breccia. One stalagmite projects above the surface of the ash bed."

Not far from the town of Powell, on Big Sugar Creek, a Mr. Lett, who owns considerable land, informed Jacobs that in the summer of 1913 he found human skeletons in shallow graves along the base of bluffs.

Rock House Cave, Barry County, Missouri—apparently an important site.

Not far from Berryville, Carroll County, Arkansas, on the summit of Osage Creek bluff, Jacobs observed thin slabs of limestone set in the ground. The tops protruded slightly. He believes these are similar to stone grave burials in southern Missouri and Tennessee.

Wilsons Shelter, on Kings River, Carroll County, Arkansas. As in the case of several other shelters, there is an extensive overhang extending along the face of the mountain. There is no evidence of occupation farther back than 80 to 100 feet in any of these shelters. Wilsons Shelter is higher up on the bluff than other sites. Jacobs considers it important.

Austin Shelter. War Eagle Creek, near the town of War Eagle, Madison County Arkansas. Several other shelters were reported to Mr. Jacobs.

The first publication issued by Phillips Academy in 1904 was prepared by Dr. Charles Peabody, who was assisted by the writer in exploration and study. This bulletin entitled "The Exploration of Jacobs Cavern" has long been out of print. It was the first detailed account of cavern exploration in our entire country, and we have thought it best to reprint from the original plates and insert it as an appendix. Jacobs Cavern, the past 25 years, has been under discussion by subsequent explorers—Doctors Allison, Nelson and Wissler. Brief reference to their work, as well as the views of Mr. Jay L. B. Taylor, the present owner, are on page 41.

Many of these rock shelters and overhanging bluffs are upon tributaries of White River. In preparing our manuscript there was some discussion as to whether we should treat White River drainage in these pages. In ancient times it came into the Arkansas some distance above where that river joins the Mississippi, and should be included in this volume.

Harrington's Observations

Mr. M. R. Harrington, spent several seasons in the Ozarks, and published a paper entitled "The Ozark Bluff Dwellers" in the Anthropologist for January-

Fig. 14. Series of large, roughly chipped objects from rock shelters near Cassville and Pineville, Missouri. S. 2-3.

March, 1924. His researches were on the upper waters of White River in Arkansas and in McDonald County, Missouri, along the Cowskin and other streams which are in the Arkansas watershed. He and his associates were in the field longer and covered more ground than Dr. Peabody and the writer. A recent letter to him elicited the reply that his complete observations, covering some hundreds of pages, are still in field notes and not available.

We herewith insert a considerable portion of his excellent paper, omitting some descriptions. A few of his illustrations have been redrawn and are presented in the following pages. We have changed the figure notations in his text to correspond with our own numerical series.

. . . "Many of these occupied shelters were damp, hence only artifacts of stone and of bone had been preserved; but in a few cases the shelters were entirely dry, so that basketry, textiles, and wooden articles were also found. Fortunately for our studies, the ancient inhabitants were accustomed to dig storage-pits between the rocks and in open spaces of shelters of this kind, where they stored the product of their harvests, and sometimes other materials. These yielded a great part of the collection. In long-occupied shelters of this class projecting corners and edges of rocks were literally polished by contact with the feet, the bodies, and the garments of the ancient dwellers; in some shelters angular markings were seen scratched into the rock, and in one case the figure of a man, rudely painted in red, decorated the back wall.

"In the second kind of shelter, which may be called the 'shale-talus' type, most of the rocks that had fallen from the roof had rolled completely out of the shelter and down the hill; in these shelters the refuse of ancient camps was found in the sloping shale talus, beneath which the storage-pits had been dug into the solid shale beds.

"The typical refuse deposit found in all these shelters was an unstratified mass of dust, ashes, fragments of limestone and shale, dried grass, leaves, sticks, pieces of cane, cane basket splints, numerous corn-cobs, acorn and nut-shells, wild-grape stems, bark and Indian hemp in various stages of preparation, fragments of baskets, bits of woven bags and mats, flint chips, the bones of food animals, and sometimes even fish-scales, feathers, deerhair, and scraps of skin and sinew.

"It was soon discovered that, so far as the shelters on upper White river were concerned, and with the exception of a few articles found only on or near the actual surface, we were dealing with a single culture, for the character of the specimens was quite uniform throughout the deposits from top to bottom. For this reason, and because the cliffs are locally known as 'bluffs,' it was decided for convenience to apply the term 'Ozark Bluff-dweller' to their ancient inhabitants. When we later moved to Cowskin River in Missouri, however, it was found there that the alien surface objects became more numerous, and in two rock-shelters a distinct stratum containing such articles could be distinguished, lying above the Bluff-dweller

layer. This new culture will be called, for the present, at least, the 'top-layer culture.'

. . ."A combined tool and weapon useful in hunting, as well as for other purposes, was the axe or hatchet, Figure 18A. For a long time we wondered what kind of axe the Bluff-dwellers used, as no celts nor grooved axes appeared in the excavations. We considered the occasional large, oval,

Fig. 15. View of the exterior of Ash Cave and the ravine.

chipped flint blades occasionally found to be unfinished spear-heads, perhaps, or rejected forms, and it never occurred to us that these were the standard axes of the people until one was found attached to its original wooden handle the tip of the flint blade being thrust through a hole in the haft and tightened with small wooden wedges. Another possible weapon or skinning-tool is a knife-like implement of buffalo or elkbone, about 10 inches long.

. ."The most interesting agricultural implement found was a complete hoe with its perforated mussel-shell blade lashed fast to its wooden handle with bark thongs and native string, but various digging-sticks—plain sticks

about 2 feet long, some nicely rounded and worked, and all showing wear at the ends—also appeared. Some hoe-blades of stone were procured.

"The typical method of storing corn, or, at least, one of the methods, was to cache it in a pit in a dry rockshelter. Such pits were often circular,

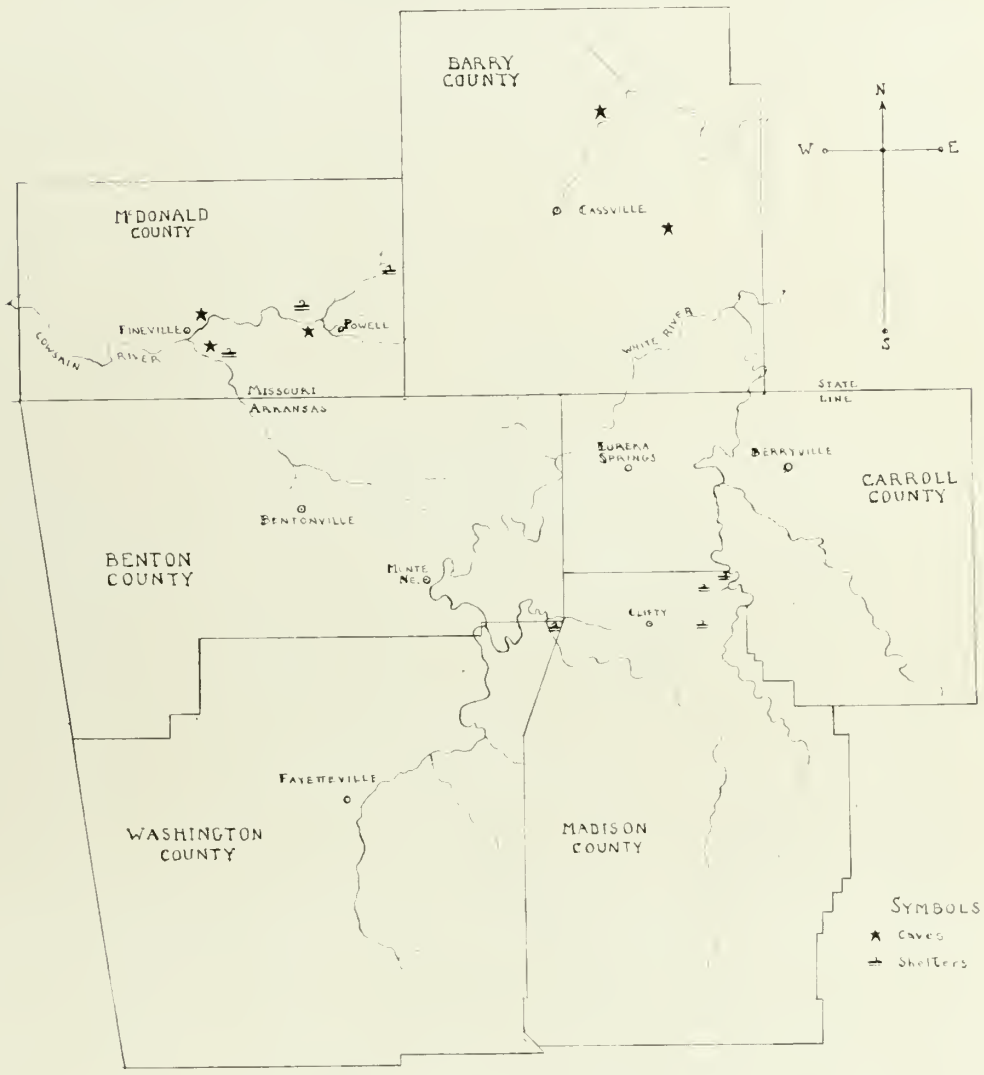


Fig. 15A. Map of rock shelters located by E. H. Jacobs.

in which cases they averaged about 3 feet in diameter and 2 feet deep; others were oblong in form, about 2½ feet wide and 4 feet long, with a depth of 2 to 3 feet. Many of the older pits were dug into the solid undisturbed stratum of shale, which evidently had been pried out with digging-sticks, deer-antlers, and the like; later ones were dug, partly or wholly, in

the refuse left by earlier dwellers. Almost always a three- or four-inch layer of long grass was used as a lining, which often was supplemented with pieces of old woven bags, baskets, or mats; but sometimes leaves, leafy twigs from trees, pieces of bark, or thin slabs of limestone were used as lining. Among the crops stored in such pits were corn, beans, sunflower seeds, and some of the unknown seeds; for sometimes scattered examples of these had been left in the grass lining. The purpose of the inner lining made of pieces of old bags and baskets, however, was apparently to prevent this loss of loose grains. Seeds for spring planting were kept usually in woven bags, (Figure 16) or in packages, sometimes a number of species together, the bags being placed in nests of grass under the edges of rocks or in the pits themselves, and in one instance a whole warty squash had been allowed to dry on the vine and then stored away for spring use.

"The only corn-preparing implements found by the expedition were grinding slabs, or 'metates,' simple flat stones with shallow depressions, showing use, employed with a flat, oval or rectangular hand-stone, or 'mano,' to grind corn, and sieve-baskets for sifting the meal. Pieces of flat cane baskets indicate the possible use of the winnowing-basket as well, although of course, these may have served other purposes.

. . ."Turning from the foods to the clothing of these people, we found no head-gear, although 2 woven caps have been reported one from White, the other from Cowskin River; but robes of several classes were uncovered. One was made of a large deerskin with the hair on, sometimes of two such deerskins stitched together; but feather robes were almost as common. A long fiber cord was first made, then wound with downy feathers until the result was a fluffy rope, like marabou, only not so thick. This formed the warp of the robe. The weft was composed of fiber or deerskin cords, without feathers, twined in pairs, the rows of twining being perhaps an inch or two apart. This made a warm, light, strong robe. In a few robes, of which fragments were found, strips of furry skin, possibly rabbit-skin, had been wound around the foundation cords in place of feathers. Pieces of what seem to have been woven fiber robes without the addition of feathers or fur were also found. The deerskin robe, at least, was sometimes belted about the person with a fur girdle, the ends of which were perforated and provided with tying-thongs. Only one breech cloth was found in place on a desiccated body, this was a bunch of long grass knotted at one end. First, apparently, a fiber cord had been wrapped around the waist five or six times to serve as a belt; then the knot in the bunch of grass had been slipped under this belt in the back, and then the loose grass was brought forward between the legs and the ends tucked under the belt in front.

"One semi-mummified human body was found still wearing tanned deerskin leggins and moccasins; the leggins were of a wrapped type, suggesting those worn by some Pueblo women today, and were attached to the moccasins, which, although patched almost beyond recognition, were

soft-soled, and seem to have been originally puckered in front to an instep piece, somewhat like the present northeastern Algonkian type, yet differing from anything now used. Small fragments of deerskin moccasins were quite common.

"In bad weather, thick, clumsy overshoes woven of grass were worn, perhaps over the deerskin moccasins; fragments of these were fairly common, and one, still caked with the mud of some forgotten Ozark winter, was nearly perfect. It had a bunch of loose grass for an insole, matted and flattened by use. Sandals also were much used, probably in warm weather, woven of some tough native grass. One of these, found entire, tie-strings and all, exhibits a double weave, presenting one kind of weaving to the ground, another to the foot of the wearer. Ornaments were not abundant; but a few bundles of feathers tied with string may have been kept as adornment for the hair; and white, yellow and red mineral paints were found.

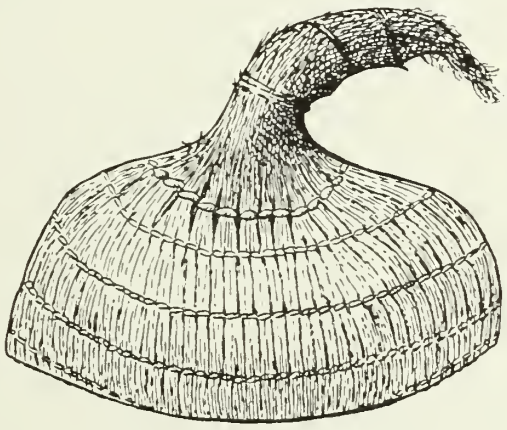


Fig. 16. Bag woven of grass, containing seeds.

A number of large beads were really made of shell, from the columella or core of some species of conch found no nearer than the Gulf of Mexico—the only objects discovered indicating direct trade or communication with distant regions. Fans were made of feathers, strung together with fiber cords or strips of quill.

"Turning to the utensils and implements not hitherto discussed, we find the basketry among the most interesting. Thanks to the Bluff-dweller habit of lining storage-pits with old baskets (especially pieces of them), many specimens were gathered, constructed chiefly of thin splints peeled from the rind of the wild cane, and made usually in twilled, but sometimes in plain checker, weave. A few have intricate patterns woven in, similar to those still seen among the Chitimacha Indians of Louisiana, for example. Black and red dyes were occasionally but not commonly used. The borders are often intricate and ingenious. A type of coarse basketry was made from the split canes from which the splints of rind for making the fine bas-

kets had been peeled, and occasionally narrow wooden splints—split shoots resembling willow—took the place of cane splints.

"Four principal types of cane baskets were collected—one a flat, dish-like form, another similar but with an open weave at the bottom for use as a meal sieve; then there is the deep basket which varies in size from a tiny specimen holding about a cupful, to large pack-baskets with a capacity of a bushel or more. A fourth style is oblong in shape, with a diagonal twilled weave.

"Made of basketry, but still hardly a basket, is the typical cradle-board, or baby-carrier of this people, of which one nearly complete and two fragmentary specimens, were found. This was made by bending a cane to form a kind of truncated, triangular figure of suitable size (about $2\frac{1}{2}$ ft. long), and tying the ends together; this was then covered on both sides with a webbing of split cane, made in the open cross-warp weave, like a chair seat. Near the larger end two little arms in the same weave were made to support the hood, intended to shade and protect the infant's face. This hood was made also of basketry, but in the more ordinary twilled weave. On this cradle were found a few bones of a very young infant, imbedded in the draggled small feathers and vegetal down which had composed its bed. The cords used in binding the baby to its cradle were attached to the cross-sticks, but were so badly cut by rats that they could not be preserved in place. In point of numbers, coiled basketry came next to the twilled and checker weave made of cane. These coiled baskets were all bowl-shaped and sometimes large, but without decoration of any kind. One complete example was found. The foundation is made of slender wooden rods resembling willow-shoots, while the stitching seems to be of bark thongs. Still another type of basketry was woven of split shoots resembling willow, in the form of oval trays, and suggesting a type of wicker baskets still seen in certain Southwestern pueblos. At first we were inclined to attribute the cane twilled, coiled, and wicker types of basketry to different peoples, but when we found examples of all of them used to form the lining of the same storage-pit, we decided that all these forms were made by the same people at the same time.

"Of basketry also is a type of water bottle lined with pitch on the inside; of this we found only a fragment, but it is noticeable that the weave resembles the twined weave of the present Paiute water-bottles rather than the coiled type of the Apache, for example. Perhaps for carrying water were bucket-shape vessels of bark (of a species not yet identified), shaped and sewed somewhat like the birchbark 'nagon' familiar as a modern Indian maple-sugar receptacle in the Great Lakes region. Of these, one small specimen was recovered nearly entire. Gourds were probably used largely as water-bottles, although no perfect examples were found, and were also employed extensively for cups, bowls, and dishes of different kinds. When cracked they were repaired by stitching with fine fiber thread, and sometimes were provided with fiber-string handles.

. . . "The use of gourd dishes has been mentioned. In addition it was found that very large mussel-shells were prepared for use as receptacles by grinding off the hinge and the rough, dark-colored exterior. Smaller mussel-shells seem to have been often adapted by a little grinding for use as spoons, but no trace of either wooden bowls or wooden spoons was discovered. The carapace of the 'land turtle' seems to have been quite generally

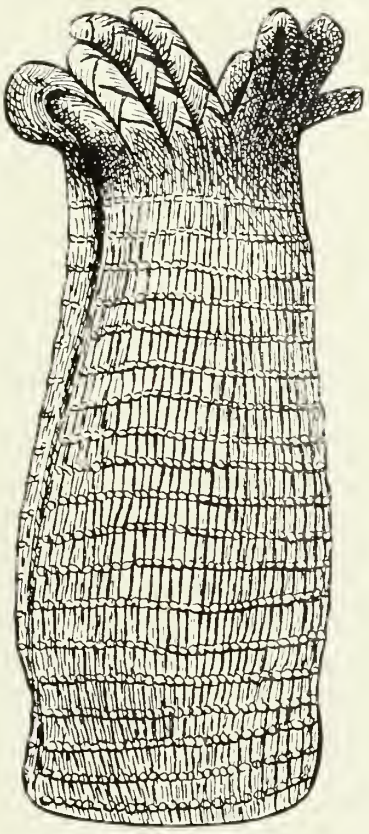


Fig. 17. Woven bag.

used as a bowl also, sometimes with little elaboration, again with all the interior bony processes ground off and the whole shell carefully smoothed and polished.

"During the early part of the explorations it was believed that the Bluff-dwellers had used no pottery, for some long-inhabited shelters yielded little or none of it, and the few fragments found appeared on or near the surface; but from the occasional association of typical Bluff-dweller spear-points, and the like, with a certain class of pottery, it was finally decided that they used such ware, probably taking it up toward the end of their stay. . . .

"Only two articles were found possibly pertaining to the ceremonial life of the Bluff-dwellers—one a stick carved in a peculiar way and painted white, to which no practical use can be assigned; the other, the remains of a 'medicine-bag', or sacred bundle, found where a burial had evidently lain. This consisted of a woven bag of Indian hemp, containing articles used probably as charms, including two beaver-teeth (one wrapped with

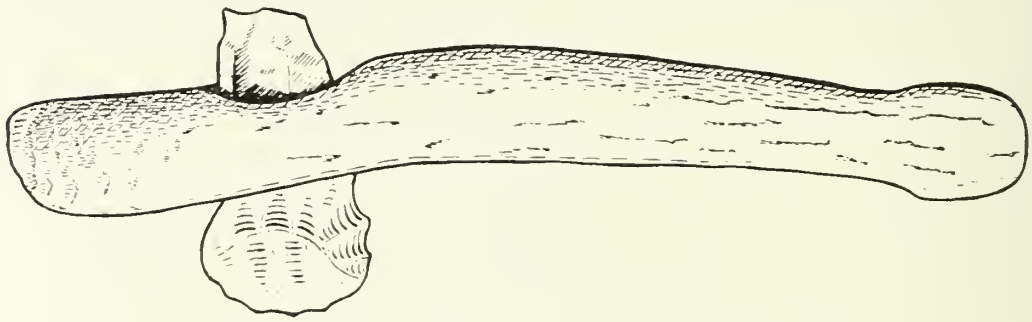


Fig. 18A. Axe with chipped flint blade and original wooden handle.

deerskin at the base), the beak of a bird, other bird bones, some worked pieces of calcite, and the like. No pipes were found, but two of tubular form have been obtained in the region by local collectors, one of these in Jacobs Cavern near Pineville, Missouri, which has yielded typical Bluff-dweller stonework. This pipe is engraved with fine zigzag lines.

"The typical manner of burying the dead practised by the Bluff-dwellers was to dig a hole, much like a storage-pit, between the rocks of the shelter or between the fallen rocks and the back wall; this hole was lined with grass, on which was spread a deerskin robe with the hair on, a feather robe, or both, or sometimes a plain fiber robe; then the corpse was

Fig. 18B. Atlatl or spear-thrower.

laid on its side on this bed, with knees drawn up and arms flexed. A covering of pieces of old bags, mats, or grass was sometimes laid over the body; next came a layer of poles and sticks, preferably of cedar; then dust, ashes, and small rock fragments, and finally, in some cases, large pieces of rock. Double and triple burials were made at times, and occasionally burials of cremated remains. In very dry spots the remains were mummy-like, much of dried skin and tissue being preserved, with portions of clothing, but often cave rats had picked some of the bones clean, or had even eaten many of them outright."

Great quantities of acorn cups and shells, together with walnuts, hickory and hazel nuts and masses of wild grape stems were taken from the various deposits.

As to the fishing industry he found fragments of nets, some very fine, and others coarse mesh, and all constructed of Indian hemp. He comments that these might have been rabbit nets such as have been found in the Southwest, and wonders how the Indians caught fish in case these nets were employed to ensnare rabbits. Whether weirs were in use in the Ozarks we do not know, but in many portions of our country Indians depended upon the use of weirs rather than nets for taking of fish. He found no fishhooks, which is not surprising since in explorations of many village sites through the middle and southern portion of our country few fishhooks have been secured in comparison with totals of other artifacts.

Mr. Harrington's final paragraph is extremely interesting and we give it in full.

"*Traces of Other Cultures*

"On the bottom lands along both Cowskin and White rivers we found occasional sites, the specimens from which did not fit in with either our Bluff-dweller or our 'top-layer' cultures. Grooved axes of ordinary type were characteristic of these sites, and projectile points of various forms, rather lacking in character. We were unable to enter into a further study of this culture to determine its relationships.

"The possibility of the existence of a very ancient culture, perhaps even older than that of the Bluff-dwellers, is suggested by the discovery, lying on the surface of the gravels constituting the bed of Clifty creek, in Carroll and Benton counties, of a number of artificially shaped flints, all more or less water-worn. Some might have been merely the rejects of the comparatively modern Indian flint-chipper, but others resembled completed implements of crude and early types suggesting certain European paleolithic forms. An implement of the latter type was picked up also in the bed of Spider Creek, near Busch, Carroll county. Such objects are interesting and suggestive, but unfortunately prove little unless found *in situ* in deposits whose antiquity can be demonstrated."

Harrington's rather extensive researches in many rock shelters enabled him to present a complete life history of these people, yet he found no place of the size of Jacobs Cavern and the question of breccia and stalagmites scarcely entered into his observations. His report should be read in connection with our reprint of Jacobs Cavern, he having found many more objects of widely diversified character than those recovered by us. He believes the Bluff-dwellers depended chiefly upon hunting, although they were agriculturists to a limited extent and gathered many natural products. His comment that true arrowpoints are found on or near the surface rather than further down, is interesting. He did discover many heavy flint points, too large to be attached to arrows and pieces of cane shafts, probably spears, and a wooden atlatl (Figure 18B) 19 inches long which he illustrates and comments that it is similar to one found in the ruins of a temple in Mexico City.

Jacobs Cavern Revisited

Dr. Peabody never claimed thorough exploration of this cavern, desiring to leave considerable breccia and stalagmites for future res arch. There are in the collections at Andover a number of chipped objects and bones embedded in breccia; also a considerable series of objects on which are heavy encrustations. Illustrations of objects presented by Peabody in Plates 5 to 11 show some of these, but they are not very well done. In short, the plates do not do the artifacts justice. The writer has carefully studied our collection and compared it with 32 trays of European objects. Obviously, no great age can be proven in the same sense that European archaeologists substantiate the antiquity of their finds, yet to the writer many of

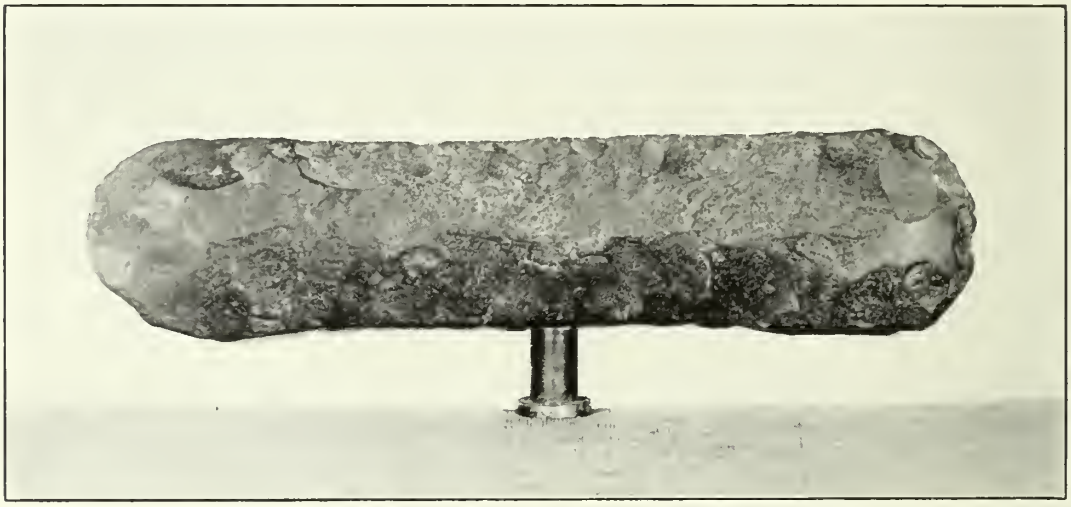


Fig. 19. Large chipped tool polished at either end. Made of black argillite. From village site two miles north of Spiro, LeFlore County, Oklahoma. S. 1-4.

the Jacobs Cavern chipped objects appear as much weathered and look quite as old as Solutrian or Magdalenian forms from caverns in the south of France.

Since the exploration conducted in 1903 there have been several investigations. Mr. J. L. B. Taylor, engineer, purchased a tract of several hundred acres, including Jacobs Cavern. He and his friend, Mr. Vance Randolph, excavated to some extent in April, 1921, and found in a small heap of ashes and earth a portion of the left humerus of a deer upon which appeared an outline of a mastodon. This bone is illustrated on pages 327 and 329 of Dr. Vernon C. Allison's paper published by the American Museum of Natural History, Volume 19, Part 6, 1926. Dr. Allison discusses in detail his own explorations, and the observations of Dr. Nelson and Dr. Wissler at Jacobs Cavern. In the American Anthropologist for April-June 1928, Dr. N. C. Nelson replies at some length to Dr. Allison. It is not necessary for us to follow the arguments of these gentlemen. Readers are referred to their able papers. Frankly, Nelson does not believe in the authenticity of the carving upon the bone—

Dr. Allison does. Students, carefully perusing the pages, pro and con, may be mystified. There is evidence of much erudition on the part of each of these learned gent emen—tables, data, chemical and geological analyses, and special pleading.

What says the owner of the cavern, himself the author of three books—forestry, physics, astronomy—and an engineer of standing? In a letter dated July 13, 1929, Mr. Taylor comments:—

> "As to the Nelson-Allison controversy over the engraved bone; you will find the former expressing an opinion—implied, at least, that the whole thing is a fake. Allison subjected the bone to various tests, gave it several analyses, and took X-ray photos of it, all of which he discusses in a paper. So the argument resolves itself into personal opinion by Nelson and chemical and photographic findings by Allison."

Actually, the writer does not know whether the carving is genuine or otherwise. However, we might ask several questions. Mr. Taylor lays no claim to archaeological knowledge and seeks no publicity. What would he gain by carving the outline of a mastodon upon a bone and burying it in his own cavern? Recently he was in charge of work on the Illinois River for two lengthy seasons under the writer's direction. Discussing Jacobs Cavern one evening in camp he was asked point-blank concerning the bone. He answered positively that he did not make the carving, nor did he know other than that he and Randolph found it in the debris. Personally, he regretted the entire incident, since it had brought him, as owner of the property, unpleasant notoriety.

Many years have elapsed since the Peabody explorations. Subsequently the author has done work in rock shelters and caverns as well as in other sites. Personal opinion counts for little in modern science. The writer will state, however, that of all the sites examined by him during 40 years in 21 states, with the sole exception of graves or deposits of the so-called Red Paint People of the state of Maine, that no place has the appearance of real antiquity comparable to that exhibited by Jacobs Cavern and the artifacts therefrom.

Observations in Oklahoma

Mr. Franklin in travelling through Oklahoma found some mound groups, occasional large mounds, and many camp sites in Sequoyah, Cherokee, Muskogee, and Wagoner Counties. He reported a group of 14 small mounds upon the top of a high ridge or mountain not far from the town of Braggs. Mr. Franklin continued his scouting trip through to the Kansas border. No attempt at excavation was made, and his notes are in the form of a diary, as previously stated. Before presenting Professor Thoburn's paper, one might refer to flint quarries which have been reported from the region of Hardy and Kay counties. These are important, and it is understood that Thoburn intends to make a detailed study.

Franklin saw indications of a village site north of the Arkansas not far from the town of Salisaw. He worked northward some distance up the Grand River, finding a few mounds and several village sites in Cherokee County on both the

Illinois and Grand Rivers. In Rogers County on the Verdigris according to local testimony there are 4 or 5 cemeteries. On the upper waters of the Verdigris in Nowata, near Goodys Bluff, there are 3 mounds in triangle formation and also a burial site. Quite a number of specimens have been found here.

All through the Oklahoma region there are a prodigious number of small mounds concerning which there has been discussion as to natural or artificial origin. Thoburn refers to these in his paper, and the writer has believed that certain of them are artificial. One should differentiate between the few mounds surrounded by village sites and those of small and rather uniform elevations. The writer has observed great numbers of them in locations where there is little or no evidence of Indian life. The question as to human or natural origin of these could be easily determined did we have sufficient funds to trench several hundred of the structures.

Much of archaeological value is hidden away in our official reports. So far as the Arkansas Valley is concerned, one of the most important discoveries is that made by Professor Holmes some 28 years ago.

During the summer of 1901 Dr. R. H. Harper of Afton, then Indian Territory, called the attention of the Smithsonian Institution to an important spring located near that town. Professor Holmes visited the site and sets forth his studies in an interesting paper. Before surrendering the pen to Professor Holmes some observations should be offered. He was long associated with Powell, McGee, Thomas and others—distinguished, able and conscientious workers, men who did much through their labors to make the Smithsonian Institution our ranking scientific body. During 40 years Holmes played a conspicuous part in archaeological activities. Following the lead of Major Powell, the entire Washington clientele (with the exception of Dr. Thomas Wilson) did not assign Man antiquity on the American continent, but rather inclined toward a "recent origin theory." It is interesting, therefore, to note Professor Holmes' conclusions on his rather remarkable discovery. These are set forth in the following paragraph:—

> "The association of human relics with the remains of extinct animals is always a matter of much scientific interest, but it appears that in this case the association has little significance, the fossil bones belonging in the original geological formations of the region, while the human relics are of recent introduction into the spring."

*Fossil Remains**

"Our examinations developed the fact that the fossil remains were much more numerous in the spring and near it than elsewhere. There were more mammoth and mastodon teeth within a radius of three feet from the spring basin and between four and seven feet in depth than in all the other material examined. In this restricted area there were at least one hundred mastodon teeth and perhaps twenty mammoth teeth, besides considerable numbers of teeth of fossil bison and horse, as well as the

*"Flint Implements and Fossil Remains from a Sulphur Spring at Afton, Indian Territory." American Anthropologist, Jan.-Mar. 1902. By W. H. Holmes, pp. 115-129.

Fig. 20. Caddoan pottery from eastern Oklahoma. Waterbottle 9 inches high; bowl 8 inches high.

whole deposit of implements and recent bones. In the excavation north of the spring, twenty feet long, four feet wide, and thirteen feet deep, not half a dozen teeth of all varieties were found. In all the excavations outside of the spring the distribution of fossil remains was apparently quite uniform throughout the sand and gravel. Some of the teeth were beautifully preserved, others were so disintegrated as to fall to pieces on being touched, while fragments were common and presented the appearance of attrition from water transportation.

"In seeking an explanation of the prevalence of mastodon and mammoth teeth in the spring, several surmises may be made. Possibly, if the spring is very ancient, the great pachyderms mired more frequently in its basin than elsewhere, leaving their bones in the muck. Possibly the spring funnel was a receptacle for such bones as were weathered out of neighboring formations and carried by water or by gravity into the opening; and possibly movements of the soft deposits, on occasions of particular disturbance or strong pressure from beneath, have been toward the points of least resistance at the spring. The finely comminuted materials, the sand and clay, would be carried away by the strong flow of water, and the great teeth and the coarse gravel would remain in the basin. At least one instance was observed of such movement in the deposits near the spring. A year or two previous to my visit to Afton, and during the wet season, a body of liquid and semi-liquid material suddenly broke through the surface of the ground near the spring, like a bursting bubble, leaving a little hillock which is still distinctly visible. Such movements may have occured from time to time, the direction being horizontal and toward the spring or directly or obliquely upward.

"But perhaps the most plausible theory that can be advanced to account for the accumulation of bones in the spring, is that when the place became an object of special attention on the part of the native tribes, such bones as were exposed in the vicinity were gathered and cast in as appropriate offerings to the beings supposed to inhabit it. This suggestion is strengthened by the fact that the ancient bones are more plentiful in exactly the area in which the bones of modern creatures and Indian implements are found. Indeed, it is not improbable, as elsewhere remarked, that the occurrence of these huge bones gave rise to the superstition in the native mind that powerful spirits made this their dwelling-place—that the spring was the doorway to the realm beneath. The remains of recent forms were nowhere more than four or five feet in depth, except in the immediate vicinity of the spring funnel where they were deeper and the teeth of a modern horse were, as already stated, found associated with mammoth teeth seven feet deep.

"It is clear that in the formations outside of the spring remains of the ancient creatures are quite uniformly distributed, and it appears that everywhere they are fragmental, the bones being separated and broken up as if subjected, at some past period, to vigorous transportation by water or to crushing under the feet of monsters trampling in the muck. In some instances two or more teeth were so related as to show that they had been in place in the jawbone when carried to their present position.

"The remains of tusks were also fragmental, and in all cases in a state of disintegration so advanced that only small portions could be saved. The bones are

Fig. 21. Mound-builder pottery, from Cowskin River, Delaware County, Oklahoma. S. 1-4.

broken with a sharp fracture as if already brittle from decay or silicification when the disturbing agencies were active. In the neighborhood stories are told of the discovery, about the spring, of bones of great size, but the largest piece encountered in our excavations was half of the lower jaw of a mastodon.

"The largest mammoth teeth are a lower tooth sixteen inches in length, and an upper tooth eleven inches in length and very massive. Dr. Lucas, observing the differences between two specimens (the one being finely and the other coarsely ribbed), expresses the opinion that they may possibly represent two varieties of mammoth—Elephas primigenius and Elephas imperator, the latter species, proposed by Cope, not as yet having been generally accepted.

"Associated intimately with the flint implements in the spring were some of the leg-bones of two or three buffalo, four or more deer, one elk, half a dozen wolves, and one or more horses. These were a little more widely distributed than the flints, but were distinctly a spring deposit, and it is not unlikely that their presence also was in part or altogether due to human agency.

Implements from the Spring

"The implements found in the spring had been subjected to so much disturbance before my arrival that the exact nature of the original deposit could not be determined. They were in compact order as if dumped in a body, but much the same result would have followed from the casting in of single specimens or small lots at various times, since all would settle to the deepest possible point in the spring basin, the position and character of which has probably remained unchanged for a long period. It is impossible to say whether or not the native tribes ever took the trouble to excavate the basin, either for convenience in using the water, to increase the flow in dry seasons, or to facilitate the introduction of the implements; but if the objects deposited were, as we suppose, in the nature of offerings, the spring was a sacred place and no one would venture to disturb it under any circumstances.

"It was noted that the remains of buffalo, deer, and wolf were intermingled with the implements and that they were not associated as though the animals had died on the spot, but rather as if the separate bones or dismembered parts of the creatures had been thrown in with the implements. I am inclined to the view that they were cast in as offerings, since there seemed to be a very large and disproportionate number of bones of one kind; for example, not fewer than twenty or thirty of the large, straight leg-bones of the deer were associated directly with the flints.

"If statements coming from apparently reliable sources be correct, more than half the deposit of implements had been removed before my arrival. I obtained altogether, counting fragments and partially shaped pieces, upward of eight hundred specimens, not quite half a bushel; so that there must have been at least a bushel (some say a barrel) of implements in the original deposit, the number reaching somewhere between fifteen hundred and two thousand. They include arrowheads, spearpoints, knives and unspecialized blades, besides some roughed-out forms, and fragments. All were shaped by flaking, and the work is for the greater part exceedingly well done. The finished forms appear to be such as would be

Fig. 22. Earthenware water-bottles from mound. S. 1-3.

appropriate to the buffalo hunter equipped for the chase. The spear was, I believe, the main reliance of the Great Plains hunter; but bow and arrow were also in general use, especially for the smaller varieties of game. To pierce successfully the tough hide of the buffalo and penetrate to a vital part, the projectile point had to be thin, long, sharp-edged, and incisive, and the sulphur spring has furnished many perfect specimens. Our museum collections contain nothing comparable with them, and, excepting such as were probably broken by our excavating tools, all are in perfect condition, as if just from the finishing shop. It is a noteworthy fact that a large number of the spearpoints, as well as knives, had been freshly sharpened when the deposit was made, the old discolored surface being easily distinguished from the more recent chipping.

"The knife also, of which there are many specimens, was of prime importance to the hunter. The thin blades are from three to six inches in length, from one inch to four inches in width, and show various stages of specialization and wear. Many are, apparently, freshly made leaf-shaped blades, while others have been sharpened and resharpened on one side so as to be scarcely more than half the original width. One end of the blade is in all cases wider than the other, and, taking the narrow end as the point of the implement, the sharpening is such as to indicate a right-handed use in nearly all cases.

"The chert of which the implements are made is of excellent quality: is white and bluish-gray in a majority of cases, but some specimens are quite dark. It is not of the variety found so plentifully in the quarries of the region about Afton, but is of finer grain. The quarries four miles south of the village, as well as those on the Peoria reservation, twenty-five miles to the northeast, furnish a coarser material, generally somewhat yellowish in color. It is manifest that the flint is nearly all from a single quarry or from a group of sites yielding identical material, and there is no doubt that these quarries will be found in good time and not far distant from the Afton springs. A very few pieces are of other varieties of flint, such as are sometimes found scattered over the surface of the country, and some of these may have been brought in from distant points.

"One of the most striking features of these implements is that many of them show distinct evidences of recent reshaping. The old surfaces are quite dark, while the new flaking exposes the clean white material. Many arrowheads and spearpoints have been retrimmed, some slightly, others over a large part of the surface; while the knives have been carefully sharpened along one edge. Strangely enough, there were many fragments and chips of chert scattered through the spring deposits, as if work had been done on the spot or near at hand and the flakage thrown in along with the shaped objects. Traces of what appeared to be arrowshafts of reed were also found.

Bone and Antler Implements

"The bone implements were not at first recognized as such, and probably many were thrown away, being taken for mere fragments of bone. There are three varieties of these objects—two made of antler and the other from leg-bones of deer and birds. The most numerous are from the heavy end of the antler, and the length

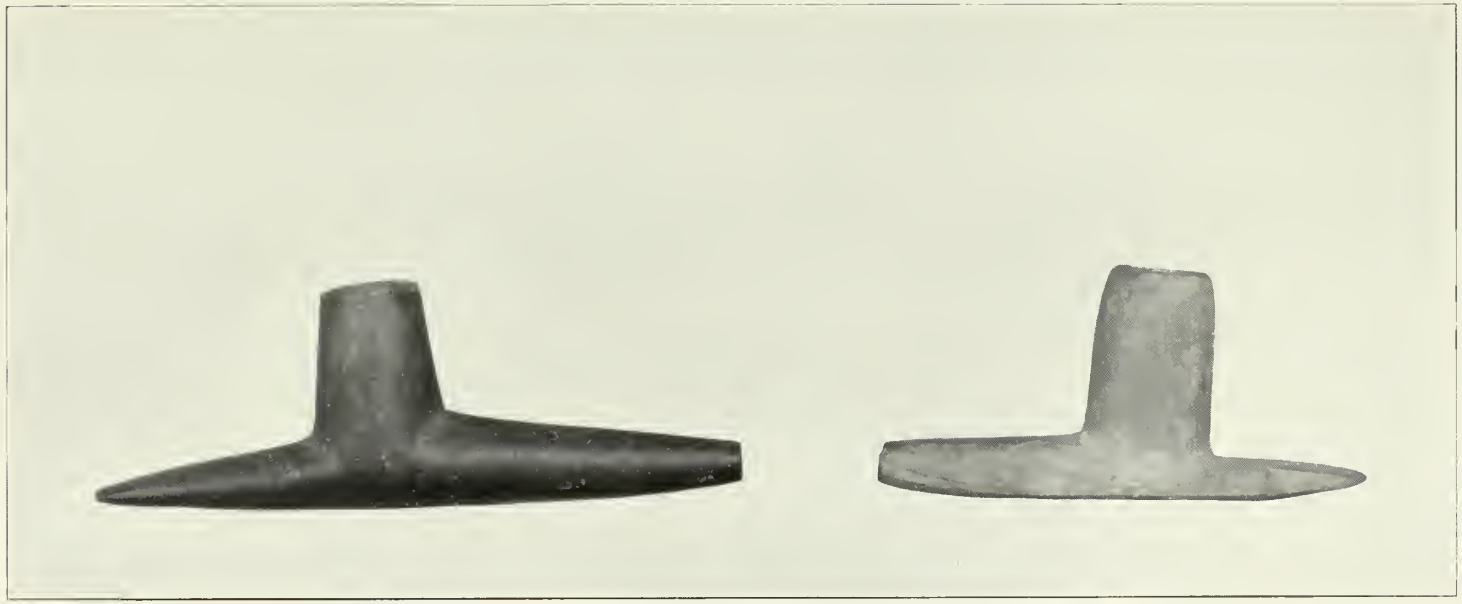


Fig. 23. Siouan ceremonial stone pipes from Caddoan ruins. The one to left from Bayou Manard, Muskogee County, the one to right from near old Fort Coffee, Le Flore County, Oklahoma. Material fine-grained siliceous limestone. S. 1-2.

varies from four to seven inches. The base retains its natural form and the other end is slightly rounded off. These objects are of the type known as flint-flakers in the Middle-West, and were probably supplied with handles fastened about the middle portion, making them available for roughing-out the flint blades by percussion.

"A second form is such as would be produced by dividing longitudinally the implement described above and rounding down the ends and edges. They were associated with the flint knives, and in such an intimate way as to lead to the supposition that they may have served as handles. They could have been set together in pairs enclosing the upper edge or back of the knife blade and lashed or cemented firmly in place. In two or three cases pairs were found so nearly matching in size and curvature as to have been successfully employed in this way. It is to be noted that these objects are very like implements used in some regions for pressure-flaking in the final trimming and sharpening of flint implements. Such implements would naturally form a part of the set of tools carried by a hunter of the Stone Age when about to set out on a prolonged expedition.

"Among the many partially decayed objects of bone there were specimens resembling awls. The larger are made of the lower leg-bone of deer or antelope, and the smaller of the leg-bone of some large bird—a heron or sand-hill crane. Such utensils were an essential feature of the outfit of the lodge-dweller of the Great Plains, whose clothing and dwellings were necessarily made of skins sewn together.

Significance of the Deposit

"As already indicated, the conclusion was reached at the outset that the casting of implements into the spring was not a caching or hiding of these precious objects, much less an idle, meaningless act. Stone implements were the most important possessions of the hunting tribes. Stone was their iron and steel. A vast amount of labor was expended in digging it from its bed in the hills and in reducing it to the forms desired, a work necessarily performed by men possessing great skill. The placing of these articles in the spring must, therefore, have been an act of great importance to the people concerned, and was doubtless in response to the demands of superstition. Water, and especially sources of water supply, have ever been regarded by primitive men, and even by some more advanced peoples, as dwelling places for spirit beings, and when sacrifices were believed to be necessary, the most precious possessions were cast in and no one was sufficiently bold to molest them. In fact, such a spot was generally regarded as sacred, and was avoided by all save those who were properly qualified to approach and make the offerings—the medicine-men or priests. One of the most striking facts connected with the Afton spring is that, although tradition indicates that it was a great gathering place for the native tribes, no traces of camping or dwelling were found in the vicinity.

"That sacrifice to spirit occupants of springs was a widespread practice among the tribes of the west is clear, although observations of the fact are somewhat rare. Dr. J. Owen Dorsey tells us that the Dakotas believe the buffalo to be of subterranean origin and refers to a tradition which asserts that one day when a principal man of one of the tribes was fasting and praying to the Sun-god, he saw the ghost of

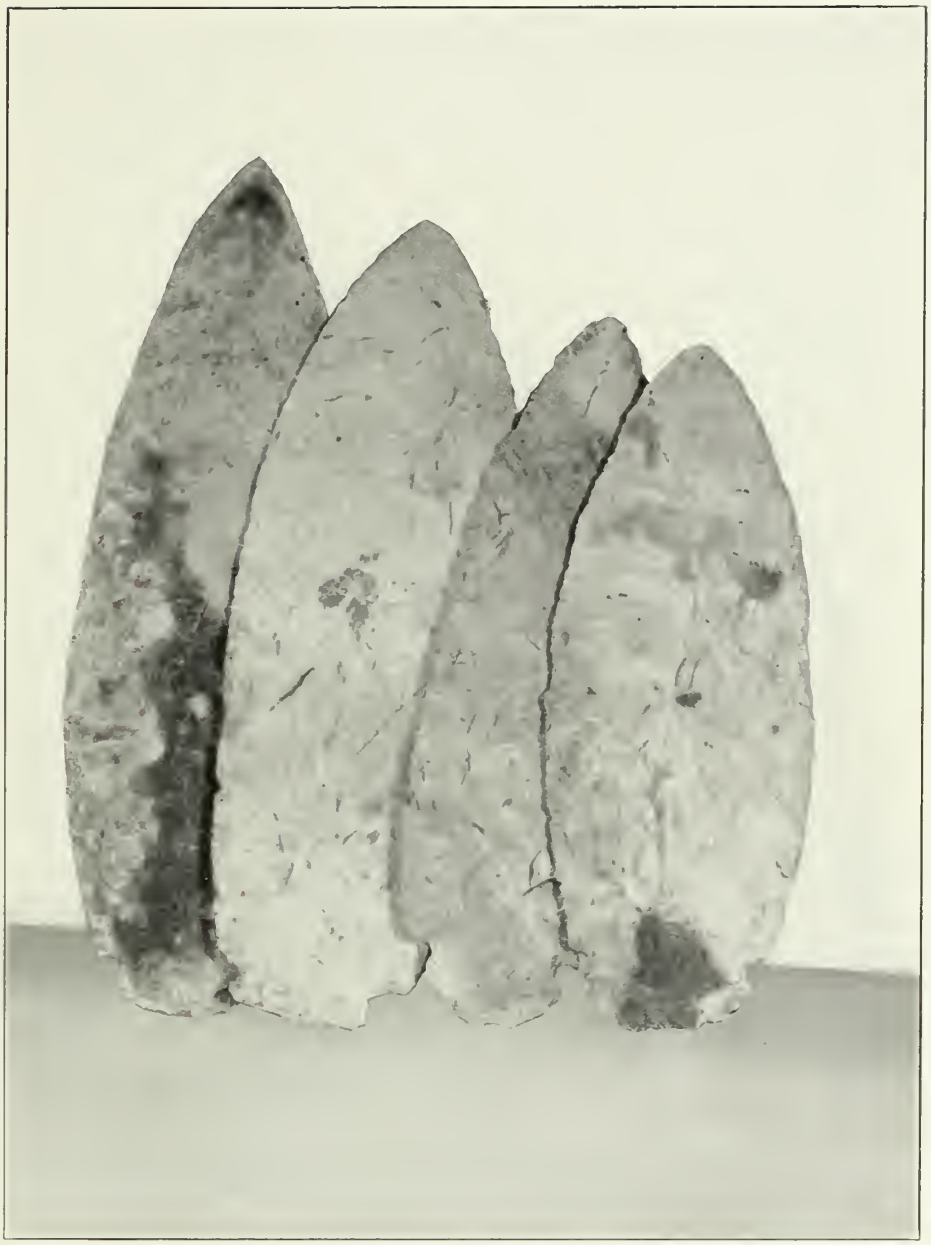


Fig. 24. Ceremonial blades with remains of an intrusive burial (Siouan-Osage) which had been found on the surface of a domiciliary mound formed by the collapse of an earth-covered Caddoan lodge, while still occupied—interesting because of the stratification of two cultures in a single ruin. When found these blades were lapped like shingles, as shown in photograph. S. 1-2.

a buffalo rising from a spring. The Sioux have also water-gods and mystic beings associated with bogs."

Professor Holmes devotes several pages to quotations from Dr. Gatschet and others concerning sacred springs, not merely in the buffalo country, but in the Southwest and elsewhere. His observations are very interesting and significant. In view of recent finds of chipped objects associated with fossil remains of bison near Folsom, New Mexico, his lengthy quotation from a letter written by Mr. A. R. Graham of Ferro, New Mexico, is pertinent. It seems that a large spring near

Fig. 24A. Chipped object found near Eufaula, Oklahoma, on the South Canadian river. Length, 19 inches. A similar one, 23 inches in length, was found with it. The ends of each object are worked to a sharp cutting edge.

Deming, New Mexico, was frequently visited by the Indians. Mr. Graham excavated it, finding large numbers of artifacts, together with a skeleton and portions of several skulls. Some of the objects were found at the depth of 28 feet, according to his letter.

We have already quoted one of Professor Holmes' concluding paragraphs. One would hesitate to dispute with the distinguished dean of American archaeologists, yet a careful reading of Professor Holmes' important paper leads one to the conclusion that while he pays the Indians deserved tribute for their flint art and freely admits that both objects and extinct mammals are found together, yet to his mind the find is not indicative of antiquity. In Florida some human artifacts occurred associated with extinct elephant remains—the discovery at Folsom has been carefully inspected by experts in both geology and archaeology. Three definite sites have been discovered and carefully worked out. Among European archaeologists any one, or all of them, would have been accepted as indicative of the presence of man in times of some antiquity.

THE PREHISTORIC CULTURES OF OKLAHOMA

By Joseph B. Thoburn

The prehistoric cultures of Oklahoma may be divided into three classes as to time, namely; (1) Ancient, dating back 2,000 or more years; (2) Mediaeval, probably dating back from 7 to 18 centuries; and (3), Recent, dating back from the beginning of the Historical Period to 3 or 6 centuries.

As yet, comparatively little has been accomplished in the determination of the scope and extent of the Ancient Period, in Oklahoma. Traces of very ancient human occupancies and activities have been found in numerous parts of the state, though, as a rule, such discoveries have been so rarely made and so remotely connected, if at all, as to afford no basis of correlation and it is not possible to draw much if anything in the way of definite conclusions as to age or cultural identities. Among the most ancient of these might be mentioned the discovery of certain mortars, or metates, from the lower levels of the extensive gravel pit at Frederick, Tillman County, together with specimens of chipped chert. This gravel pit is pronounced by geologists to be the deposited drift contents of an ancient river bed, which, resisting the process of erosion, now appears in the form of a ridge, and which extends northward from the site of Frederick for many miles toward the Wichita range of mountains, that, apparently, must have been partially included within the drainage area of this ancient river. While no skeletal remains have been definitely identified as those of human beings, the presence of the artifacts already mentioned seems to point to the possibility of the presence of man in southwestern Oklahoma, in Pleistocene times.

Numerous other instances of the discovery of artifacts so deeply embedded in the earth as to attest great antiquity, might be cited. A few of these must suffice, however. In the eastern part of Washita County, near the village of Colony, a sand pit was opened on the brow of a prairie hill. From this deposit of sand several granite mortars, or metates were taken, the granite evidently having been transported at least 60 miles from the nearest spurs of the Wichita Mountains. In Greer County, a metate was excavated from a point 5 feet beneath the surface of the prairie loam in digging a basement. Near Oklahoma City, a stone arrow point was found beneath 5 feet of sand which, in turn, was overlaid by 3 feet of red clay loam. In the northwestern part of Logan County, a very large earthenware jar, or urn, was excavated from beneath several feet of sandy loam soil. This receptacle contained a number of bones, supposedly human. Unfortunately this last find was not called to the attention of any one especially interested in such matters until after all specimens had been lost or carried away.

Cave-Dwelling Stocks

Of the cultures of the Ancient Period which have been partially differentiated and separated, though not yet fully described, or definitely identified as to classifica-

tion, there are at least two, namely: (a) a Cave-Dwelling stock of the western portion of the Ozark uplift which occupied the caves and rock shelters of the Boone chert formation and, (b) the Basketmaker stock which occupied small caves in the Wingate sandstone, in the canyons of the Cimarron River region, in the western part of Cimarron County. Some work has been done in the first mentioned of these two cultures and the caves and rock shelters of northeastern Oklahoma and of Arkansas and southwestern Missouri. The writer has personally directed some work in Oklahoma and Arkansas. The archaeological material of this culture was secured by excavating the accumulation of ancient kitchen refuse from the floors of the caves. This kitchen refuse, consisting of wood ashes, charcoal, mussel and clam shells and broken bones, was carefully sifted and searched for artifacts and other vestigia. On the first expedition into that field, numerous specimens of bones, teeth

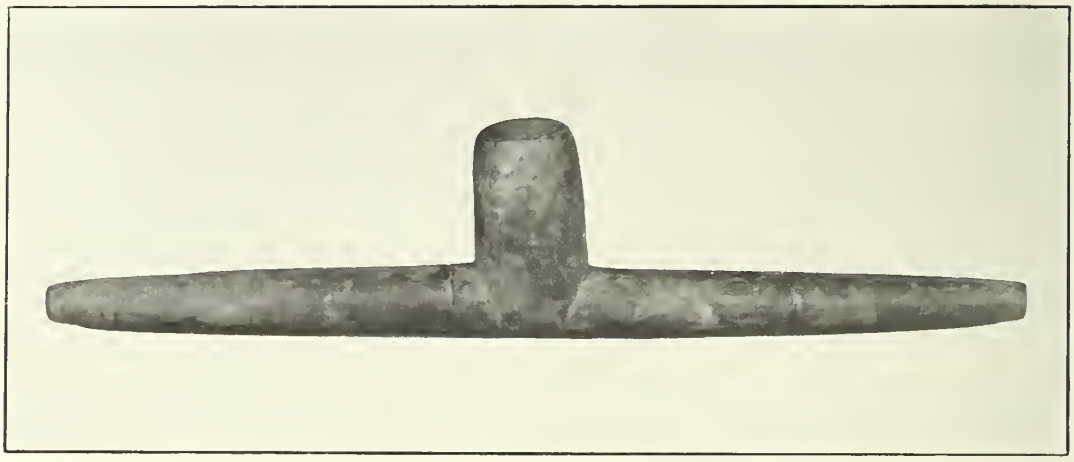


Fig. 25. Large Siouan ceremonial stone pipe, found with an intrusive burial near the surface of a domiciliary (Caddoan) house-ruin mound, near old Fort Coffee, Leflore County, Oklahoma. Length, 18 inches.

and bivalve shells were gathered for examination and identification by biologists. These specimens attested the fact that the bill of fare of these ancient Cave People was greatly varied. With 20 species of mammals, including those from the size of a squirrel to those of the bison, or buffalo and the elk, the bones of several species of game birds and fishes were identified, and with these no less than 26 species of bivalve mollusks. In addition to these, the presence of stationary mortars, *in situ*, for the grinding of grain and the finding of charred specimens of maize or Indian corn in the ear, corn cobs, beans and the seeds of pumpkins, melons, and gourds, gave further evidence of the habits and customs of the Cave Dwellers of northeastern Oklahoma and adjacent portions of Arkansas and Missouri.

The artifacts of this Ozark Cave-Dwelling stock, included the sherds of well burned pottery (in some instances sufficiently numerous to make possible the restoration of entire utensils), implements and ornaments of shell, bone and stone. Shells seem to have frequently been used for scrapers. The bone implements included needles, awls, and shuttles. The stone implements included arrow, javelin,

and spear points, knife blades, scrapers, and ceremonial blades. Pipes, so far as found, were of burned clay though of varying patterns. The most interesting pipe discovered was an almost exact imitation of a modern calabash pipe in size, shape and color. Some of the bone needles were beautifully wrought and highly polished. Many of the chert blades were also beautifully wrought. These included large numbers of bird points (blow-gun points), some of which are very minute, though perfect in outline and finish. Many others are finished with a very accurately flaked sagittate edge on either side.

The work of Mr. Vernon C. Allison, being a determination of the age of a stalagmite which had protruded upward from the floor through the deposit of prehistoric kitchen refuse, in Jacobs Cavern, near Pineville, Missouri, was rather enlightening in this connection, because of the evidence which it seemed to present as to the chronology of such human occupancy in that underground retreat. This stalagmite, which was still in process of formation at the time of its removal, was found in an open-mouthed cave, or rock shelter and, because of the dust accumulation during the windy season, in March and April, it showed a discolored deposit in a series of annual rings, not unlike those of a tree, when a cross section was made. It is hoped that further work may be done in this line, as opportunity is afforded, in the future.

The Basket-Maker People of the Upper Cimarron

The rough and broken region, through which the course of the upper Cimarron makes its way across the northwestern part of Cimarron County, Oklahoma, abounds in mesas and canyons, with many outcrops of the Dakota and Wingate sandstone formations. Small caves are to be occasionally found in the massive ledges of the latter and in these are to be found the winter refuges and shelters of the Basket-maker people who, so far as our present knowledge extends, were the earliest human inhabitants of Oklahoma and certainly the most primitive of all of the prehistoric stocks that have been definitely identified. They knew nothing of the manufacture or use of pottery and they seem to have been unacquainted with the use of the bow and arrow. In lieu of the latter, they used a throwing-stick, somewhat after the manner in which an Australian savage throws a boomerang. How they succeeded in killing buffalo is not readily apparent. That they did so, however, is evident. Despite their lack of development in the arts and crafts, they were skilled in the beginnings of agriculture, for they grew maize, or Indian corn, beans, pumpkins, and gourds. We know this, for the reason that some of the seeds of these crops, which they had put away for the next season's planting, thousands of years ago, have recently been secured, apparently in perfect condition, though, of course, no longer germinable. They were especially skilled in the weaving of basketry, generally using the leaves or blades of the yucca, or Spanish bayonet, for that purpose. The writer spent the greater part of the summer season just closed (1930) with a small field party at work in that region, where a very interesting collection of the vestigia of that ancient culture was secured. He had previously seen traces of the same or a similar culture, beneath the remains of the Cave-Dweller culture, in a

cavern of the Boone Chert formation, in Delaware County, in northeastern Oklahoma, proving that it is far more ancient than the Cave-Dweller occupancy. The vestiges of these ancient inhabitants are of very rare occurrence in Oklahoma but none the less interesting on that account.

The Mound-Builder Cultures

The Mediaeval Period would include the eras of the Mound-builders, proper, and those of other people, or peoples, of equal or similar cultural development. They all tilled the soil, their implements of tillage usually being fashioned of stone, either by flaking, pecking, or grinding by means of abrasive sandstone or by a combination of two of these processes. They were also advanced, at least as far as the beginning of the Bronze Age, since they knew something of the art of working in copper.

Mounds of the True Mound-Builders

The Mounds of the true Mound-builders occur sparingly along the valleys of the principal rivers of eastern Oklahoma, including those of the larger tributaries of the Red and Arkansas rivers. Whether each of these monuments to the constructive genius of the prehistoric inhabitants of eastern Oklahoma and adjacent portions of neighboring states are all representative of a single culture, has not yet been determined. There is at least a possibility that these mounds may represent two or three distinct cultures. This is a matter that can only be settled by very thorough and extensive investigation and at a considerable outlay of expense and labor.

Mounds of this class and age vary greatly in size, form, grouping, etc., as they probably also did in the various purposes for which they were severally designed. Possibly most of them are conical in shape. In one case, near Muskogee, there is a very fine specimen of a mound in the form of a truncated pyramid, approximately 60 feet square at the base and 10 feet high, with the lines following the cardinal points very closely. Others apparently were merely heaped up into an elevation without seeming regard to form.

The largest mound which has been inspected by the writer, in Oklahoma, was of the last mentioned type. It is located in the valley of the Neosho, or Grand River, in the western part of Delaware County. Its extreme height is 48 feet and its basic area probably covers a space of more than 2 acres. Its bulk is composed of material carried from a decomposing bluff of the Boone chert formation situated half a mile from the location of the mound. The mound was completed by covering this material with a foot or more of black river-valley loam soil, which now supports a rather dense growth of forest vegetation. A mound even larger than this is reported to be located near the valley of the Illinois River, in the northern part of Adair County. Of course, large mounds of the true Mound-builder type are much more numerous in Arkansas than they are in Oklahoma.

The writer has only been privileged to be connected with the dissection of one mound of the true Mound-builder type. This mound was located at a point where the flood plain of the Elk, or Cowskin, River merges with that of the Neosho, or

Fig. 26. Group of stone ear ornaments, plain and decorated, secured from ruin of earth-covered Caddoan lodge, near old Fort Coffee, northern part of LeFlore County, Oklahoma. Showing variation in pattern, decoration, etc. S. 2-3.

Grand, River, on the boundary-line between Ottawa and Delaware counties. It was a small mound of the shapeless pattern just described. Its original altitude was about 14 feet and its basic diameter was approximately 35 feet. A party, operating under the direction of the writer, dissected only about one-third of the contents of this mound, for the reason that the poachers had broken into it at the instance of a commercial collector, and this had been followed, later, by further work under the supervision of the owner. Consequently, many finished implements, ornaments, and utensils were removed several years before the party operating under the direction of the writer undertook to complete the dissection.

The purpose for which this mound had been erected is believed to have been ceremonial, this inference being drawn from the fact that it contained numerous utensils, artifacts, and ornaments which were evidently deposited, during the course of its construction, as votive offerings. What the poachers, already mentioned, secured is not known. The owner obtained some very fine specimens of earthenware pottery, including vases, urns, and water bottles, which are now in two large eastern museums. The specimens secured by the expedition of the Oklahoma Historical Society of which the writer was in charge, in the spring and summer of 1925, included similar ceramic products. Most of the pottery had been broken by the expansion or constriction of roots of trees growing on the surface of the mound, but all of the fragments were saved and eventually each of these works of art was restored. Other items secured included ornamental sheet copper, partially decomposed beads of shell or pearl, and pulley-shaped, disk ear ornaments, made of polished stone and partially encased in copper. These last came in pairs and are similar to the disk-shaped ear ornaments once commonly used in tropical America.

The bulk of this mound was composed of clay with considerable gravel content, evidently excavated near at hand, but it had been finished with a heavy covering of black river valley loam soil. This clay content was compact and because of its contour, very dry and hard to excavate. But few traces of human remains were found in the body of the mound and these seemed to indicate at least partial incineration. Surface interments were much more numerous, however. These were all of a shallow nature, so that the process of decay had been very nearly complete. From the number of these shallow, surface burials on the part of the mound dissected by the Oklahoma Historical Society's field party, it was inferred that there had been no less than 50 such interments on the surface of the whole mound, before it was disturbed by the poachers. Such shallow burials indicated the presence and mortuary visits of people of the southern division of the Siouan stock, presumably Osage or Quapaw, within the past two or three centuries. That the intrusive burials thus made were of such origin was further evidenced by the finding of stone pipes of the modern Siouan type.

At a point supposed to represent the exact center of the base of the mound, there was found a fragment of a very large clam or mussel shell, with concave side uppermost. In the hollow of this shell was found a group of three small stone pipes, one of which was partially decomposed and the other two slightly so, as if it had been deposited with organic matter. These pipes are similar to stone pipes which were found in the valleys of the Ohio and some of its principal tributaries. The

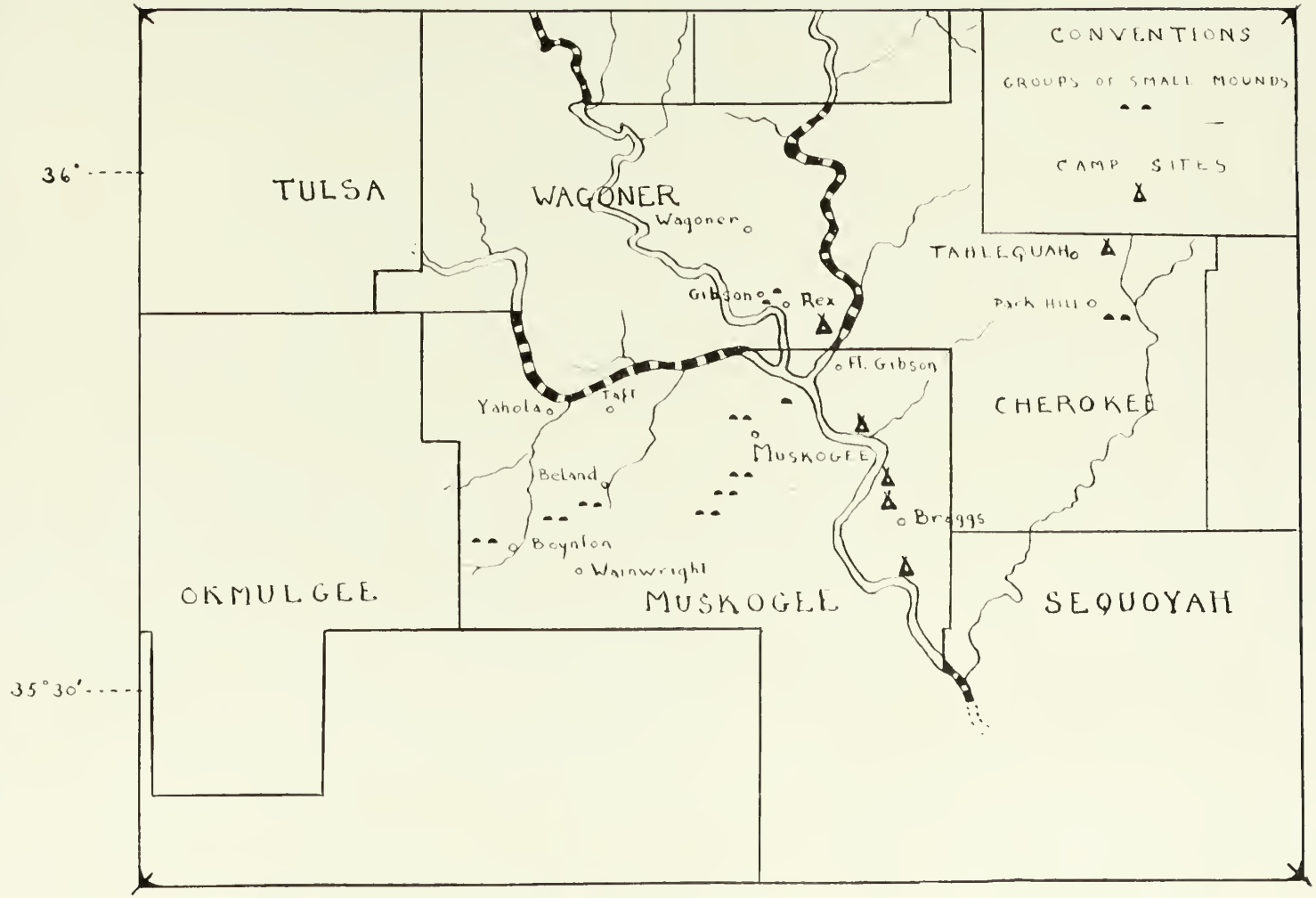


Fig. 27. Map of sites, eastern Oklahoma.

writer inclines to the belief that they are of proto-Siouan origin. If this conjecture is warranted, then there is at least a possibility that the people of the whole Siouan stock passed through eastern Oklahoma, before they reached the valleys of the Mississippi and its eastern tributaries, in the course of their migration to the Piedmont Plateau of Virginia and the Carolinas, and several centuries before their retrogressive migration to the West. In this connection, it seems an odd coincidence that the Osage or Quapaw people should have found their way back to bury their dead upon the earthen pile that had been built by their own people, if not, indeed, by their own direct ancestors, at a period of not less than six or eight centuries antecedent to their own time.

What the careful dissection of other mounds in eastern Oklahoma and Arkansas may disclose along similar lines, is still a matter for conjecture. If, as has already been intimated, two or three distinct cultures should be found as representative of as many separate mound-building stocks, then the separation and identification of each of these stocks would seem to be in order.

The Cultural Remains of the Caddoan People

One of the most important archaeological fields in the United States, and one of the most recent of the Mediaeval Period in the lower valleys of the Mississippi and its western tributaries, the Red, Arkansas, and Missouri rivers, is that of the Caddoan peoples, who, while not Mound-builders themselves, were at least on a basis of cultural equality with the mound-building peoples, and who, incidentally, but not intentionally, left more mounds to mark the face of the land within limits of their prehistoric habitat than all the mounds of all of the true mound-building peoples combined.

Beginning at a point on the Gulf Coast, at or near the mouth of the Colorado River of Texas, and extending eastwardly along the Coast, beyond the Calcasieu Pass, in southwestern Louisiana; thence to a crossing of the Mississippi in the vicinity of Vicksburg; thence extending northward, a few miles east of the course of the Mississippi, to a point approximately opposite the mouth of the Missouri River; thence recrossing the Mississippi, and extending southwestward, past the corner of Kansas, to a point near the mouth of the Cimarron River; thence southward to the mouth of the Washita River, and thence back to the point of beginning, roughly marks the bounds of the prehistoric habitat of the Caddoan peoples. Throughout this region a very frequent and, indeed, in many places, an almost constant landscape feature consists of multitudes of low, circular mounds, about the shape or contour of an ordinary saucer turned upside down. These low, circular mounds vary in diameter from 20 to as much as 140 feet in extreme cases and, in central height, from a barely perceptible swell of from 4 or 5 inches to as much as 5 feet in the case of the larger specimens. Most of these tumuli, however, are nearly of the average, or type size, which is from 40 to 45 feet in diameter, and from 20 to 24 inches in height at the center.

Throughout the years since the first explorations and early settlements of the region in question, approximately two centuries ago, there has been much puzzle

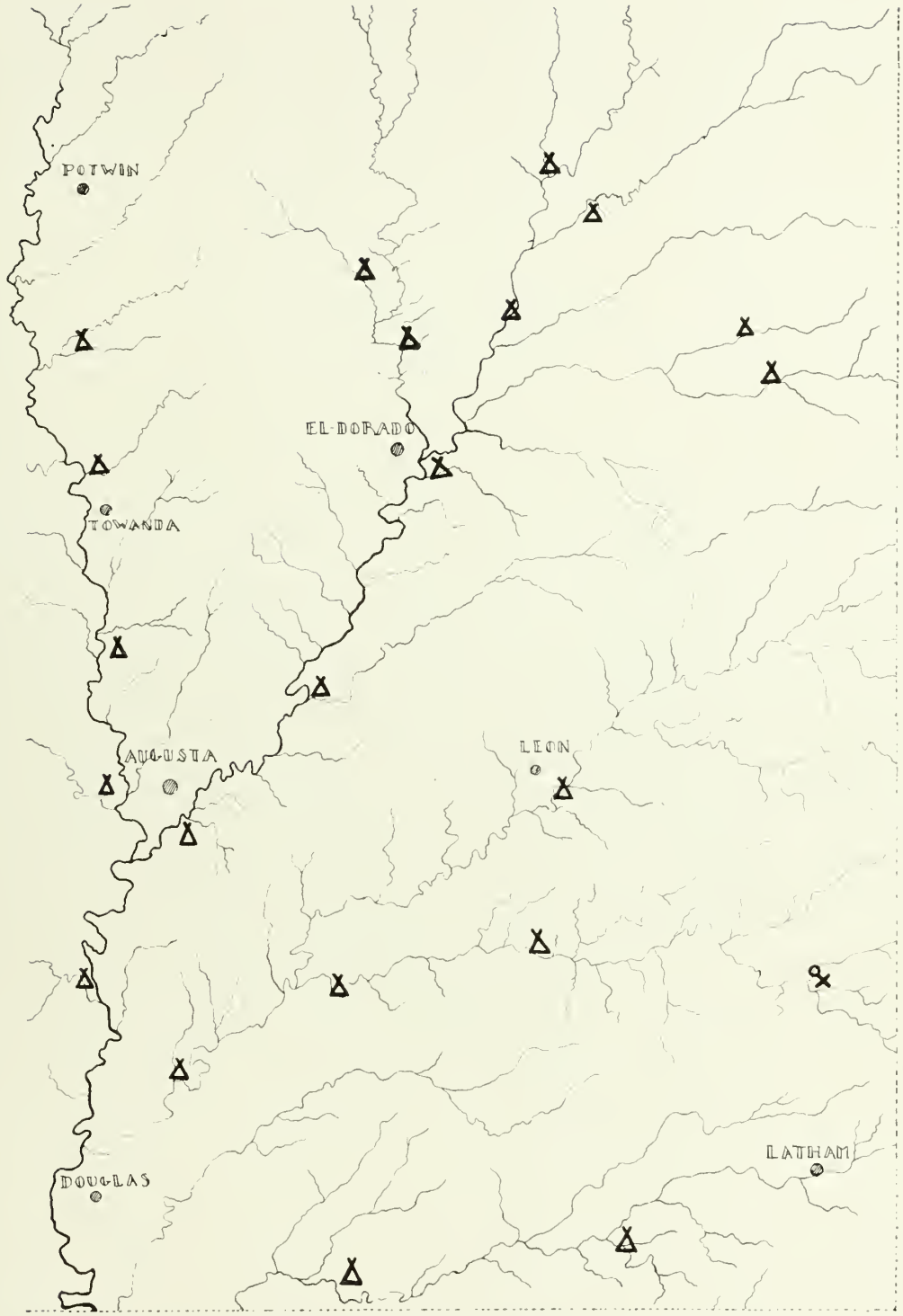


Fig. 28. Map of sites in Butler County, Kansas, furnished by Mr. W. L. Bass. Scale, about 6½ miles to 1 inch.

and speculation as to the origin or contributing cause for the formation of these small circular mounds, or tumuli. The laymen gave it up as an unsolvable problem long ago, but the world of science continued to puzzle over the matter and not merely to puzzle over it but to dispute over it as well. The geologists, who profess to be more informed concerning the Earth's surface and its peculiar formations than the learned men of any other profession, were almost unanimous in scouting every suggestion of human agency, and in agreeing to call these small circular tumuli "natural mounds." Among the theories advanced for the purpose of accounting for such formations by the operation of purely natural causes, were the following: erosion, glaciation, wind action, wave action, spring and gas vents, earthquakes, animal burrows, ant hills, and uprooted trees, with a number of others even more fantastic than any of these. The archaeologists, on the other hand, were quite keen to claim these low, circular mounds to be the result of the work of human hands, but most of them were utterly at a loss to offer any sort of a valid explanation to account for such a line of construction. About the best theory advanced by any of the archaeologists was that each of these small mounds was a platform, or elevated building site, to furnish good drainage for a lodge or hut. To this, the geologists rejoined with the question, "but why so many of them, and, why were they built on hillsides, where natural drainage was good?"

The writer first became familiar with these small, circular mounds in eastern Oklahoma, in 1889, and his curiosity concerning their origin led him to ask questions of many people, always with negative results, though occasionally someone would answer, "I believe some prehistoric race was responsible for them, but I do not know why they were built." Personally, the writer never formed any theory as to their origin. It was nearly 23 years later that, while riding through a section of eastern Oklahoma, where the whole face of the country was dotted and pimpled with these low, circular mounds, at a rate varying from 3 to 5 or 6 per acre, there suddenly dawned upon his imagination the idea that, if the Pawnee or Arikara Indians had built their timber-framed, dome-shaped, earth-covered huts, or lodges, without excavating the interior circle to a depth of 15 or 18 inches, as they did, and without building a vestibuled entrance, also sodded over, as they did, the fall of such a structure, due to the decay of its supporting posts and poles, would make just such a pile of earth or low circular mound, when the last vestiges of its posts had disappeared. It was not until some days later that the writer met Dr. Charles N. Gould, the well known geologist (now director of the Oklahoma Geological Survey), and discussed the matter with him. His concluding remarks, at the close of the interview was that the writer had advanced the only human agency theory as to the possible origin of these mounds that could be regarded as being at all tenable, and that he would like to see a thorough investigation made. Within a year and a half, the writer was privileged to begin such an investigation under the auspices of the University of Oklahoma. In the course of this investigation he carefully dissected not one, but a number of these small, circular mounds. In each instance so undertaken, he found abundant proof of human origin. This investigation was undertaken primarily for the purpose of determining whether or not these tumuli were due to human activities. At the time there was little thought, and less

intention, of attempting to determine the identity of the culture of the people who were responsible for the formation of these peculiar landscape features. The work thus begun has been carried on at intervals with some cooperation at the hands of

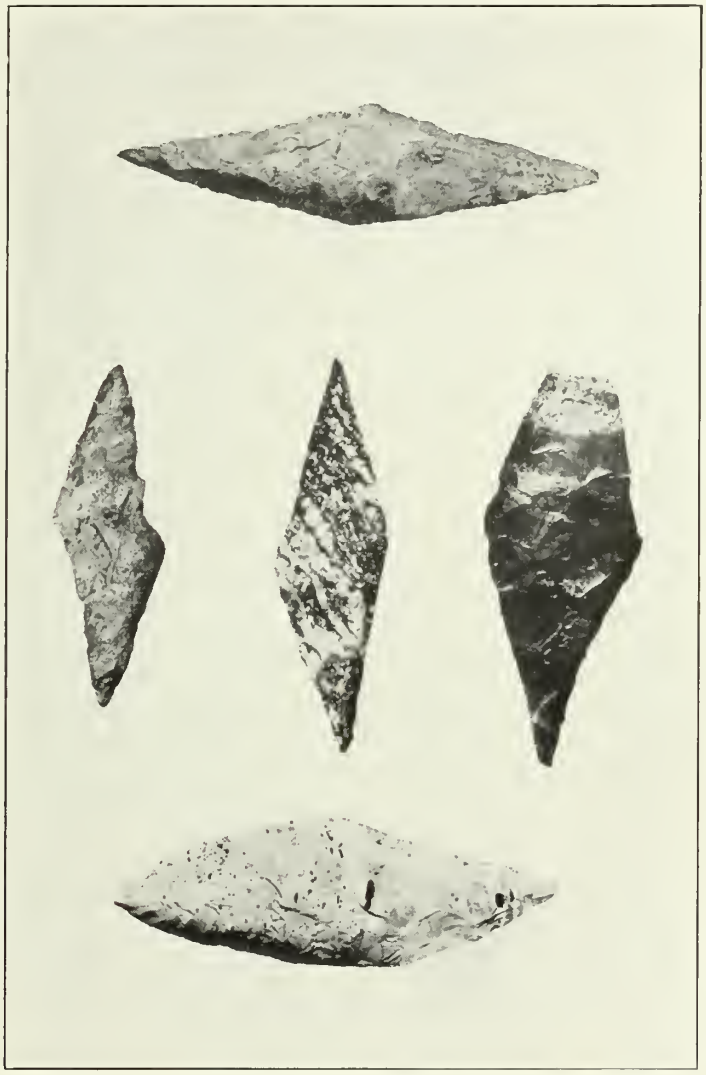


Fig. 29. Five specialized knives. Two with 4 cutting faces, or bevels. Butler County, Kansas. Collection of Mr. W. L. Bass. S. 1-2.

the University of Oklahoma and later of the Oklahoma Historical Society, but more largely by reason of the generous cooperation of private individuals, who furnished means to defray the expense of such a line of investigations, which the public institutions were not in a position to do.

In the dissection of one of these earth-lodge mounds, it was found that the

structure had been destroyed as the result of an internal fire, there being from two to three and a half inches of wood ashes over the entire floor, as if wood had been piled into the hut or lodge and deliberately set afire, either by an enemy or by the owner or his neighbors, possibly for the purpose of destroying some contagion or infection. Moreover, excavation beneath the floor of the hut revealed the fact that each of the supporting posts had been charred from 10 to 13 inches below the floor level, and that these charred sections were still standing in place. In addition to this, there were found scattered throughout the ashes on the floor, burned brick-hard, fragments of the clay plastering of a partitioned wall, with the parallel imprints of the woven cane or wattle lath very perfectly preserved. Another mute evidence of the life of that time, that was very interesting, was found in the form of several of the clay nests of the mud-dauber wasps, also burned brick-hard.

Another of these mounds that was excavated was much larger than the average, being 75 feet in diameter and 42 inches in height in the center. In walking over this mound, from which the timber had been cleared for cultivation only a few years before, the writer was surprised to find chipped chert and potsherds. Remarking upon these to Mr. Leonard M. Logan, a student of the University of Oklahoma, who was with him, latter replied: "Yes, and see what I have found," and he handed over a fragment of what had once been a pulley-shaped stone disk. Instantly there flashed through the writer's mind, the thought that here there had been a possible collapse of such a timber-framed, dome-shaped, earth-covered human habitation, while it was still occupied, and that this mound should furnish the proof of human origin. Several days later, he slipped back and excavated a small pit at one side of the mound, which resulted in confirming the conjecture this formed. He then hunted up the owner of the property and asked permission to excavate, with the result that he was directed to get off the place and stay off. Several years of negotiation followed, and it was not until three years later—in the winter of 1916-17—that he finally secured permission and, with the full approbation of the owner, systematically dissected the whole mound, with the exception of a small part which lay across the property line on the land of another owner, who refused to give consent. This mound was found on what is known as the Fort Coffee Bottoms, about 8 miles northeast of Spiro, in the northeastern part of Leflore County and is located on the flood plain of the Arkansas River.

Description of a Caddoan Earth Lodge

The ground plan of the timber-frame for a prehistoric Caddoan earth-lodge was practically identical with that which was in common use by the people of the Pawnee and Arikara tribes, since the beginning of the Historic Period, until within the past third of a century, with the difference that the prehistoric Caddoan lodge contained no vestibule or frame for the same. Four large, forked posts were selected to support the center of the dome-shaped frame. In the case of this lodge, which had collapsed while occupied, these post holes were found to be from 14 to 15 inches in diameter. These 4 posts occupied the 4 cardinal points. (This orientation of these posts has been found true in all other ruins excavated or dissected by the writer.)

At a radius of 22½ feet from the center, a circle of smaller forked posts had also been erected. The size of the post holes for this circle of smaller posts was found to be from 10½ to 11 inches in diameter.

Heavy timbers were laid from fork to fork on the four sides of the square formed by the large poles surrounding the center. Poles or small headlogs were then laid, from fork to fork, around the circle of smaller posts. Heavy posts or slabs were then laid at an angle of 45 degrees or less, the tops resting on the head-logs of the outer circle, the lower ends probably being embedded in the ground so that they

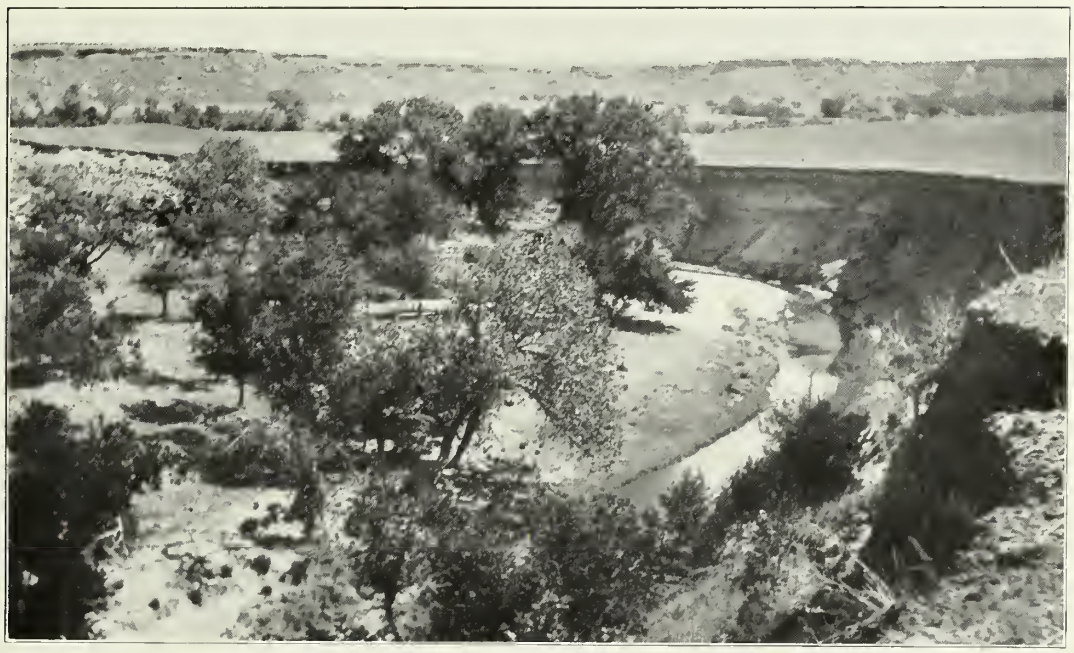


Figure 30. View of the plain on which are Handleys ruins. An elevation or mound will be observed in the left-hand corner.

would not slip or slide inward. Large poles or light logs, were than laid from the interior square to the head-logs of the outer circle, to serve as rafters. Short length poles, the size of a man's arm, were then laid transversely from rafter to rafter, being tied securely in place with willows or withes. The whole top thus completed was woven full of brush and this was covered with a layer of sedge or coarse grass. The rafters did not quite join at the center of the dome, a small aperture being left to admit of light, ventilation, and the escape of smoke, the domestic fire being built immediately under the same. Sod, or turf, was cut where there was a natural growth of grass, with an abundance of fibrous roots and this was carried to the frame of the new structure where it were used in building a wall that leaned against the posts or slabs, slanting outwardly from the head-logs of the post circle. This wall was carried up over the head-logs and the frame-work for the roof, and was built sufficiently thick to afford good surface drainage, regardless of the sagging of any

rafter or rafters which might not have been straight. The only openings to this structure were the aperture, at the center of the dome, and the door, which was located on the east side. The wall was possibly doubled and made very heavy, as the roof was also.

A structure thus erected was comparatively warm in winter and relatively cool in summer. It was secure against all but the most violent storms, and it afforded fair opportunity for defense, in case of attack. Platforms, which could be used for seats by day and as beds by night, could be constructed of sticks and poles, around the outer wall beneath the sloping slabs, posts, or poles which supported the same. The width of this portion outside of the post circle was proportioned to the size of the building, as was the height of the structure also. The location of these seats and beds, covered with mats, robes, etc., is surmised from the fact that the Pawnee and Arikara peoples who did not excavate their floors between the post circle, and the foot of the wall, used that space for seats in day-time and as beds at night. Moreover, the modern Wichita and Caddo Indians who dwelt in timber-framed dome-shaped, grass-thatched huts or lodges, used such beds and seats made of stakes and poles and covered with robes, skins or mats.

Beneath the floor of the structure, its occupants were wont to dig caches, or storage pits, into which they might place much of their property, temporarily. Later, these pits were emptied of their contents and refilled with a mixture of surface earth, sub-soil, wood ashes and debris from all parts of the camp. Incidentally, all the rubbish in the camp was collected—all its loose bones, clamshells, flaked and broken chert, potsherds, and other waste material—and was thrown in the bottom of such storage pits before refilling. This fact doubtless accounts for the utter absence of any sort of broken utensils or artifacts in the village site of any average prehistoric Caddoan settlement. That the head men of the village knew how to have the village "policed," as well as a modern military commander, is quite evident.

The careful dissection of this mound required several weeks of labor, even with an adequate force of assistants. During the course of this work, it was discovered that, subsequent to the collapse of the earth-covered lodge, from the decay and disappearance of its supporting posts, people of another stock had dwelt for a time in the vicinity and that they had used this mound-like lodge-ruin as a place of burial for their dead. These burials had been so shallow as to be just below the plow-level. As a result, the process of decay of the skeletal remains had been so complete that but little was left except the enamel of the teeth, with occasional traces of chalky-white material that was evidently formed by the decomposition of bone. There had been 22 of these intrusive interments on the surface of this mound. Because of the shallowness of these burials it was surmised that the same had been made by people of one of the tribes of the southern division of Siouan stock. This conjecture was subsequently verified by the finding of several ceremonial pipes of the modern Siouan type, which had been carved from a stone of a grayish-white color. One of these, 18 inches long, with a large bowl of perfectly cylindrical bore, is the largest Siouan ceremonial pipe that the writer has ever seen. The only other artifacts found which were certainly identified with this southern Siouan culture, were a number of exquisitely flaked blades of chert or flint. Four of these, averaging

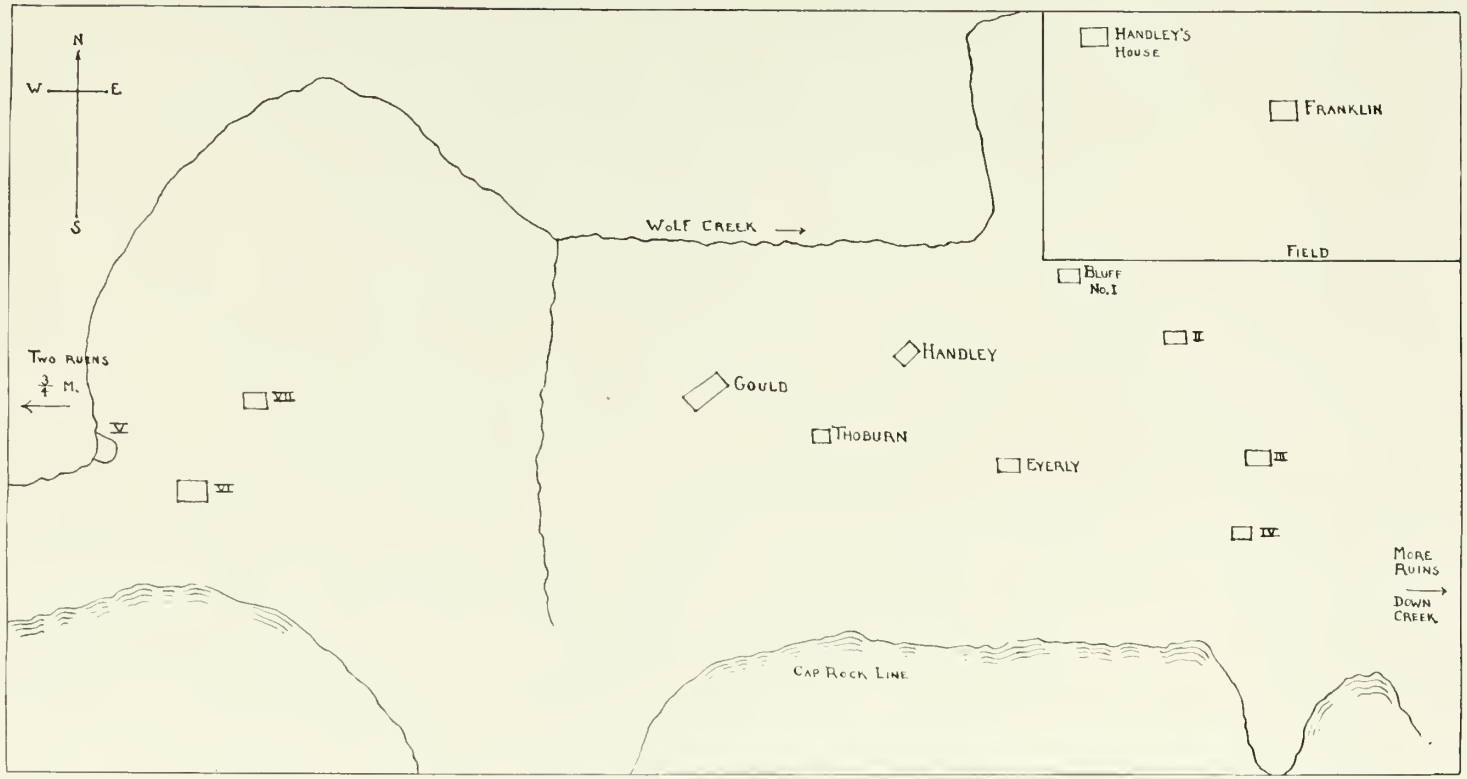


Fig. 31 Handleys Ruins Field Map

Fig. 31. Outline map indicating position of Handleys ruins. Distance covered 3500 feet E. and W.

about 5 inches in length, were found just as they had been placed at the time of interment, lying with overlapping edges, like shingles on a roof. The presence of such vestigia, so uniformly near the surface and so evidently Siouan in origin, was taken to be a certain indication of the intrusive mortuary activities of more recent occupants of the region immediately surrounding the site and, in point of time, probably not more than half as old as the mound itself.

No other traces of human remains were found until that part of the mound just inside the foot of the wall around the southwestern segment of the exterior circle was reached. Here, there were found the badly decomposed skeletons of 6 people who had perished when the wall collapsed. Indeed, 4 of the 6 had had their skulls crushed by the falling of the earth-covered timbers. The bones of these skeletons were in such palpable condition that none of them could be removed without falling into fragments. Inasmuch as the inside diameter of this earth-lodge must have been not less than 55 or 60 feet, it is assumed that there might have been several times as many people within the lodge at the time of its partial collapse but, since no traces were found of the remains of any others, it seems not unlikely that the rest had succeeded in making an escape. If so, however, their superstitious beliefs were probably such that they did not feel called upon to extricate the bodies of their deceased friends or relatives, in order to accord to them the customary funeral rites.

The collection of artifacts, utensils, tools, implements, and ornaments which were secured in the dissection of this mound was quite extensive and, from a scientific viewpoint, a very valuable one. Only one unbroken piece of ceramic ware was secured—a beautifully decorated shallow bowl of about 3 quarts capacity. Much broken earthenware pottery was found, however, and the sherds were preserved for ultimate restoration, if possible. More than 35 of the pulley-shaped stone disk ear ornaments were found, many of them with the larger, or outer flange encased in a thin sheet of copper. The diameter of these ear ornaments varied from $1\frac{3}{4}$ to nearly $2\frac{1}{2}$ inches, the outer flange sometimes having a considerably larger diameter than the inner flange. These occurred commonly in pairs, the two individual specimens being practically identical in pattern, size and decoration. Most of these were perforated in the center, the perforation being in the form of a smooth cylindrical bore. With these there were also found and secured, 3 larger ornaments of the same sort, neither of which was perforated, nor was there a duplicate to either, so it would seem not unlikely that these had been used as labrets rather than ear ornaments.

Beads of several different kinds were found, the larger beads being made of the black Webbers Falls argillite, running from $\frac{3}{8}$ to $\frac{5}{8}$ of an inch in diameter and very highly polished. Several pearl beads were found in a very palpable condition as also several unusually large shell beads. In some places, veins or layers of very small shell beads, about the size of the modern glass bead used in beading buckskin, were found. From the fact that these were thus found in veins or layers, it was inferred that they had been used for the purpose of beading belts, pipe pouches, quivers, etc.

A great deal of copper was found. Most of this was in thin plates and evidently had been used in the decoration of wearing apparel, head dresses or shields. Some of this copper was beautifully corrugated, with evenly-sized small ridges and channels. Evidence is not lacking that these people had the ability to either weld copper or,

at least, to solder or braze it. One of the most interesting finds made was that of a copper blow-pipe which had been made by hammering the native copper into a thin sheet and then rolling it into a tube which, when completed, was not as large as an ordinary lead pencil. Another very interesting specimen was a solid copper spindle, 12 inches long, tapering to almost a needle point at either end. There were also found the ores and salts of lead, zinc, and iron.

Implements and Tools

Several polished celts were found. These had been made of the black Webbers Falls argillite, which takes on a beautiful polish. Two of the most interesting items in this class were celts which had been fashioned from a finely carved calcareous sandstone, almost suitable for use in sharpening steel tools. This rock, which occurs locally in thin veins or strata, has lines of cleavage at right angles to the planes of stratification. One of these, 22 inches long, had been merely sharpened by grinding one end into a chisel-like celt edge. It was about 2 inches wide by $^3/_4$ of an inch thick. It is supposed to have been used in excavating post holes for the erection of the timber frame-work of the earth-covered lodge and caches, or storage pits, under the floor of the same. Another one of the same material, 13 inches long, did not have the lines of cleavage exactly parallel, being wider at the cutting end than at the top. Other celts, presumably intended for use as hatchets or tomahawks, were found. No perfect specimen of the grooved axe was found, though there was one fragmentary specimen of such an implement.

Very few arrow points were found. These were of both the hunting-point and the war-point types, the latter having a receding base with no barbs. Of bird-points (blow-gun points), nearly 200 were secured. Most of these averaged about $^1/_2$ inch in length, though some were even smaller. The material from which these miniature points had been flaked, included not only chert and flint, but also jasper, quartz, chalcedony and some materials that approached the agate, or carnelian in consistency and composition.

The people of the prehistoric Caddoan race were largely given to agriculture, as their descendants remain down to the present time. Their implements of tillage are to be found scattered over many fields that were supposed to be still in the virgin sod, when the white man first came, but which had really been broken up and reduced to cultivation some hundred years earlier, by the people of this stock. Their implements of tillage consisted chiefly of stone spades and hoes. Throughout the greater part of eastern Oklahoma, such implements were made of the black argillite, mostly secured from the ledge which causes the riffle or rapid in the channel of the Arkansas River, in Muskogee County, that has long been known as Webbers Falls. This material is as black as coal. In composition it is a combination of lime, clay, and silica. It flakes somewhat like chert or flint, only much more coarsely. While it is quite hard, it is not nearly so hard as chert or flint, and it is, therefore, worked also by pecking with a hammerstone and by grinding or polishing with an abrasive sandstone. Implements made of this material are better adapted to tilling soil than those made of chert, for the reason that it is tougher and not so brittle.

Most Caddoan spades were oblong or almost rectangular blades, from 2½ to 4 inches wide and from 7 to 12 inches long, and from ½ to ¾ of an inch thick, thinner at the edges and sharpened at each end. Whether these were mounted on handle or haft and, if so, how, is not known. Some of the spades were much narrower and

Fig. 32. The west wall of Gould Ruin at Handleys.

thicker than those just described. These are believed to have been used also in excavating post holes for building purposes and in digging caches, or storage pits, beneath the floors of the lodges.

The Caddoan stone hoe was double-bitted and, in that region, almost uniformly made of black argillite. It is quite thin on the cutting edges but averages about an inch thick in the narrow center, between the broader blades. Locally,

these hoes are commonly called "battle axes," for which purpose they would doubtless have served effectively. These people also used a very large and somewhat heavy turf cutter, approximately 5 by 12 inches in size and nearly, if not quite 1 inch thick, with carefully ground cutting edges at each end. These were doubtless used in cutting out turf for the covering of earth lodges, as well as for breaking up ground for cultivation.

It is believed that the Caddoan people must have cleared up extensive areas of fertile land on river and creek flood plains, removing all timber, brush, and canebrake growths therefrom; such lands, however, were always selected with a view to the fact that they were seldom or never, subject to overflow. They also reduced to cultivation certain areas on the upland prairie, where the surface was sufficiently level to resist erosion, or soil washing. It is comparatively easy to recognize and identify some of these ancient cultivated fields to this day, for the reason that, later, when the village site encroached upon the cornfield, there was not to be found, near at hand, any grassy turf, bound together with fibrous roots, which was not only suitable but necessary for the covering of the earth lodges. Consequently, the builders had to go either on higher ground, or along the edges of brakes and ravines, or even to the lowland swales where the soil was of a tough gumbo consistency, in order to find such needed turf for roofing purposes. Therefore, when mounds of light colored clay, or of heavy, black gumbo, are found superimposed on a field having a black or dark brown surface loam, it would seem reasonable to conclude that it had been under cultivation before these sods or turfs containing a different soil, had been transported thither, for building purposes.

The early Caddoan people buried practically all of their dead in the sandy subsoil of some of their valley land cornfields, usually from $3\frac{1}{2}$ to $4\frac{1}{2}$ feet below the surface. An average of one piece of burned earthenware pottery was buried with each interment. From the fact that bones of game animals and birds have been found in some of the pottery vessels thus buried with the dead, it may be inferred that some of these, at least, contained food and drink, which were evidently intended to sustain the departed on the journey to the spirit realm. Occasionally a skeleton may be found with no pottery near; on the other hand, instances have been noted wherein interments have been found in which 2 or more specimens of pottery have been buried, supposedly that of some member of the community of more than ordinary prominence. In rare instances as many as 8 or 10 specimens of ceramic ware may be found with such burials. The surplus pieces of pottery accompanying such burials are almost always not only better burned, but also artistic in design or decoration, or both. It is believed that burial in the valley lands, where a sandy sub-soil could be readily found beneath a cultivated surface, was generally resorted to for the reason that such an operation could be much more expeditiously carried out than if attempts were made to excavate graves in the heavy clay sub-soil of the uplands, with their crude stone excavating tools. The presence of large clam or mussel shells in some graves leads to the inference that most of these valley-land graves were excavated by such means and in a mere fraction of the time that would have been required to excavate a grave of like size and depth in the tenacious upland soils, by the use of heavier stone tools.

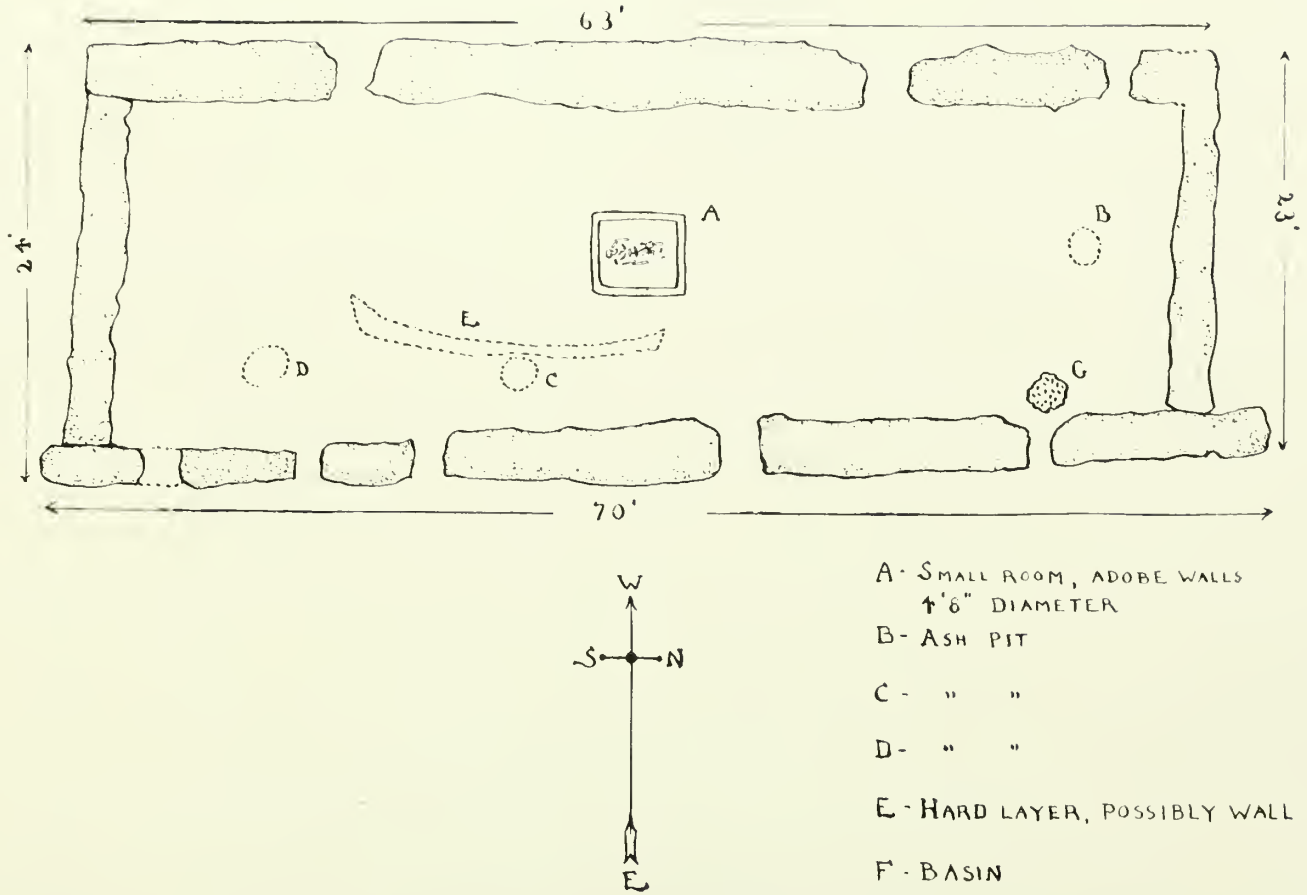


Fig. 33. Diagram of a large central room or enclosure, Gould Ruin, Handleys.

Work of Other Investigators

There has been much excavation in these ancient burial grounds of the Caddoan province, especially in the states of Arkansas and Missouri, for the purpose of securing the pottery. As a result, many hundreds of specimens of Caddoan ceramic ware are to be found in the more important anthropological museums of the country, much if not most of it credited to the "Mound-builders" (without distinction as to which Mound-builder culture), with no mention of Caddoan fabrication or origin. Mr. Clarence B. Moore, of the Philadelphia Academy of Natural Sciences, made especially fine collections of this ware in the valleys of the Arkansas, Ouachita and Red rivers. The results of his investigations and excavations were presented in considerable detail in three of his volumes, namely: "Certain Mounds of Arkansas and of Mississippi," 1908; "Antiquities of the Ouachita Valley," 1909, and "Some Aboriginal Sites on Red River," 1912.

In 1916-7, Mr. M. R. Harrington, of the Museum of the American Indian, Heye Foundation, spent 20 months at work in the archaeological fields in the valleys of the Red and Ouachita rivers, in Arkansas. The results of his explorations and investigations were published in a volume entitled "Certain Caddo Sites in Arkansas," by the Museum, in 1920. This report presents in more or less detail, accurate descriptions of the work done and of the discoveries made; it is copiously illustrated. In the Red River valley, the work done was in fields located in Hempstead and Howard counties, in the southwestern part of the state, while, in the valley of the Ouachita, the fields worked were located in the vicinity of Hot Springs, in the central part of the state.

Caddoan Earthenware Pottery

The pottery of the Caddoan peoples is distinguished for its great range in material, design, finish and decoration. A museum collection of this ware, to be thoroughly representative, should contain many hundreds of specimens. Practically all of that which was designed for domestic purposes was shell-tempered (i.e., the clay, from which the utensils were made, having been mixed with pulverized clam, or mussel shells, to give it a proper consistency). It is noticeable that, where burials were numerous, much pottery is found to have been tempered with pulverized vegetable matter, as if formed by grinding or macerating decayed wood. In the burning processes, this pulverized tempering material was merely charred. Such pottery is never found except with the burials and it is believed that it was made especially for such a ceremonial purpose. Indeed, the writer found traces of a pit in which the ancient potter had plied his craft adjoining a Caddoan burial ground (several miles north of Spiro, in Leflore County), much as a marble cutter, monument dealer or florist erects his place of business adjacent to the entrance of a modern cemetery. In the range of artistic skill and varied forms of design and decoration the ceramic products of the ancient Caddoan peoples were unsurpassed, if indeed, they could be equalled by the ceramic art of any other prehistoric people in the United States.

In form, the Caddoan pottery presents a great variety, including vases, urns, bowls, cups, water bottles and jars of many shapes, in addition to which there are numerous effigies of animals, birds, fish, reptiles and amphibians and even of human beings. Decorations include incised lines (made before burning), relief designs and superimposed figures, such as that of an animal or bird attached to the top of the handle of a bowl. Also, there are vessels shaped like certain birds and animals. Farther east, in Arkansas, the decorations include designs in color, as reported by Mr. Moore, but these are not in evidence as far west as Oklahoma. The incised folds, with etched filigree fillings, are so common as to be typical.

As before stated, the culture of the early Caddoan peoples was nearly, if not actually on a plane of equality with that of the Mound-builders, proper. Like the Mound-builders, their culture was subject to great deterioration after their once dense population became scattered. As already intimated, it has been the privilege of the writer to have directed considerable work in a Caddoan village site which existed at the beginning of the historical period, where the evidence of a primary contact with European culture was plain. That great changes had taken place in the course of 3 or 4 centuries, was evident. The pottery had lost much of its ancient refinement in design, finish and artistic decoration. The people were using the "turtle back" or "snub-nose" skin-dressing picks, with which their ancestors of a few centuries earlier had not been familiar. While they still used the double-bitted stone hoe, they were using more hoes, which had been fashioned and finished by grinding to a sharp edge the shoulder-blades of the buffalo and elk. They still used the "double-cone" clay pipe, and the broadly eliptical shallow corn mortar, or metate, but it was evident that their hands had lost much of the cunning that had been possessed by those of their ancestors.

The Caddoan people must have been a very numerous race at the time of their first settlement in the United States, to have covered such a wide area and to have left so many definite memorials and monuments of their presence, occupancy and activities. Whether the decrease in population was due to losses sustained as the result of wars with tribes of neighboring stocks or, whether a large part of them were swept away by some epidemic may never be known. They were still a numerous people when the first white man came, though even then but a mere fraction of what their ancestral stock had been, 3 or 4 centuries earlier. As a race, they have quite generally been peaceably disposed toward the white people, but even so, they disappeared much more rapidly than the peoples of some of the other stocks with whom the white people have been more or less frequently engaged in bitter warfare. Seemingly, they could not resist the white man's vices and diseases, with the result that the surviving Caddoan peoples of today are but a mere handful as compared with their numbers, even as late as two centuries ago.

The Origin of the Caddoan People

When the writer first dug a small pit near the edge of the large Caddoan domiciliary mound, in the northern part of Leflore County, in January, 1914, and found the pulley-shaped disk stone ear-ornaments, he immediately recognized in

them an indication of a possible kinship with the cultures of the tropical end of the continent. However, since one such instance could not prove a theory any more than "one swallow makes a summer," discretion suggested that he remain silent on the subject. This he did for $11\frac{1}{2}$ years, until in the summer of 1925, when he was

Fig. 34. East wall. Gould Ruin.

privileged to superintend the dissection of what was left of a mound of the true Mound-builder type, near the Delaware-Ottawa county boundary line, as previously described. There, with the finding of similar pulley-shaped disk stone ear-ornaments, though differing somewhat in details of construction, he realized that, at last, he might suggest, hypothetically, an apparent possibility that the eastern half of the United States and eastern Canada had been largely peopled as a result of a series of

successive waves of mass movement migration from racial swarming-grounds in the southern part of the North American continent. That such an hypothesis would have to assume that the Mound-builder cultures, and that of the Caddoan people as well, were of exotic origin, instead of local development, was equally plain. Down to that time, so far as the writer was aware, American archaeology had not given much attention to the element of racial swarming-grounds, in the origin and cultural development, of the indigenous stocks living east of the Great Plains though the native American race was surely as much entitled to have the same considered in the problem of population development as are any of the races of Europe or Asia. Plainly, the natural conditions of northwestern America did not make for racial swarming-grounds. On the other hand, there were areas in Yucatan, southern Mexico, and Central America which, though of comparatively limited extent, were possessed of happy combinations of fertile soil and humid climate, thus offering opportunities for the production of such vast quantities of human food, by agricultural means and at such low economic cost, as to lead, first, to the development of a dense population and that, in turn, to a high degree of culture in the arts and crafts. Then, when the capacity or saturation point was reached in population, either a real or prospective shortage of food, imperial colonization, or political discontent, would almost certainly lead to the removal of considerable portions of such overcrowded population. When such culture was brought into the midst of a new and sparsely settled region which was teeming with game and fish, and where the climate made possible an introduction of the cultivation of maize, pumpkins, squashes, melons and gourds, it would have been but natural that there should be a scattering of such an immigrant population and, with that dispersion, an almost certain and comparatively early deterioration in culture.*

That the Caddoan stock was subdivided into well defined tribe groups in prehistoric times, as it was during the early Historical Period, seems altogether probable. One of these, divided into a number of tribes, occupied the valley of the Arkansas, from the mouth of the Cimarron to a point below the Arkansas boundary. For some reason or reasons not known, those below the mouths of the Neosho, or Grand, and the Verdigris, seem to have migrated northward, nearly, if not quite, 600 years ago, possibly settling along what is now known as the Osage River, in western Missouri and eastern Kansas. Then came the westward advance of the southern Siouan (Osage-Kaw-Omaha) peoples, which forced these recently immigrant Caddoan tribes over into the upper Kansas, or Kaw, and the lower Smoky Hill valleys. They had been in contact and trading relations with one of the western Algonquin tribes, presumably the Ojibwa, before the westward advance of the main body of the northern Sioux forced the Ojibwa farther northward. From these Algonquian people, the northern Caddoan peoples of the upper Kaw and lower Smoky Hill valleys learned to use the small stone pipe and discontinued the use of the clay pipes of their ancestors.

*The theme of prehistoric migrations in the eastern half of the United States is being discussed in much greater detail in a paper which the writer has in the course of preparation, and which it is hoped may be published in the near future. The writer has also prepared a rather comprehensive paper on the Caddoan culture and the archaeological remains of the same, which it is hoped will be published shortly.

The Caddoan people of these two connected valleys in the north, subdivided into two closely allied groups or confederacies—the Harahey, who occupied the valley of the Kansas or Kaw, above Topeka, and the Quivira, who ranged the valley

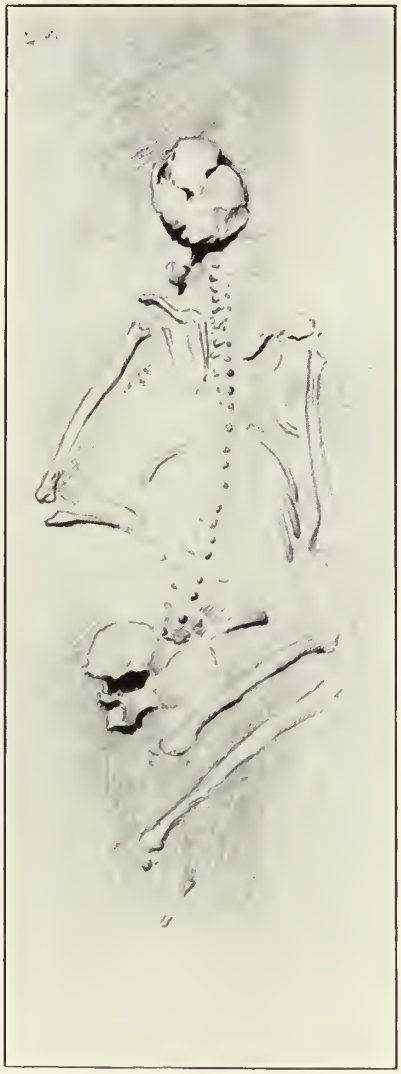


Fig. 35. Fragmentary skeleton, Handleys ruin.

of the Smoky Hill to a point out on the edge of the high plains and thence southward toward the great bend of the Arkansas. The hostile pressure of the Osage-Kaw people finally forced the Harahey to move up the valleys of the Blue and Republican rivers, whence, finally, most of them moved over to the valley of the Platte. Meanwhile, a kindred Caddoan division had ascended the Missouri Valley. At the mouth of the Platte, it subdivided, the Skidi settling in Nebraska, while the Arikara con-

tinued upstream into Dakota. Within a century after the visit of the Coronado expedition, the Shoshonean Comanche ceased to fish for salmon and to hunt for grizzly bear and Rocky Mountain sheep and, drifting out upon the Great Plains, they began to range behind the buffalo herds instead. Before their southward advance, the Caddoan Quivira retired, first across the Arkansas, then across the Cimarron and on southward, beyond the valleys of the two Canadians and the Washita, to that of Red River, where they settled in new villages and opened up new fields to be planted with maize, and where they became known to the Spanish American people as the Taovayas and to the early French explorers and traders as the Towiache, or Pani Pique (i.e., "Tattooed Pawnee"). Ever since the English-speaking Americans began to come westward across the Mississippi and learned the story of Coronado and his expedition, out across the Great Plains, to Quivira, they have been puzzled as to what had become of the Quiviran people. Dr. F. W. Hodge, 30 years ago, announced that their descendants are now known as the Wichita. Only recently, an investigation by the writer revealed the fact that the little stone pipe of the northern Algonquin type had been in common use by the Taovayas or Pani Pique—Red River Pawnee—just as it had been in the villages of the Quivira, so the little stone pipe, of the type that had been borrowed from the Ojibwa, by the northern Caddoan peoples, more than 400 years ago, added new evidence in helping to clear up the mystery of the disappearance of the Quiviran people.

Meanwhile the Caddoan tribes of the Arkansas River region in northeastern Oklahoma—including the Wichita, proper, and the Toucara (Towakony) were still there when the first French explorers and traders came among them, two centuries ago, and called them the Paniouassa (i.e., "Black" or "Southern Pawnee"), as distinguished from the Panimaha (i.e., "Upper" or "Northern Pawnee"), and they still smoked the "double-cone" clay pipes of their ancestors, two centuries after their Quivira-Towiache and Harahey-Pawnee kinsmen had ceased to use it. But the rum and smallpox and other vices and diseases which came in with the French traders, decimated the numbers of the Paniouassa, on the Arkansas, and those of their kinsmen, the Towiache, or Pani Pique, on Red River. So, sometime during the latter part of the 18th Century, the remnants of these two peoples merged and their descendants after having been variously known and designated as Pawnee Pict (Pique), Toyash (Towiache) and other appellations, finally fell heir to the name of one of their component Paniouassa elements and have been called the Wichita.

The Siouan Culture

As previously stated, traces of the Siouan culture are to be found in numerous places in the northeastern part of Oklahoma, some of them coming down to the beginning of the Historical Period. Practically all of these are believed to have been made by the present Osage and Quapaw people. They are easily distinquished from the cultural remains of other stocks by such type artifacts as the tobacco pipe, the stone hoe and the mortar, or metate, with which they ground grain. Their occupancy of Oklahoma probably was but temporary from time to time during the Prehistoric Period and, at that, it did not extend very far back into that era. They

were among the first tribes to come under French influence in the Mississippi Valley, two centuries ago. Their cultural remains are interesting for comparative reasons. If, as the writer has suggested, the Siouan peoples were in the procession of great migrations from the far South, that movement must have taken place at least a thousand years ago, as they are known to have lived in the region east of the Alleghenies and south of the Potomac for several centuries before their retrogressive migration to the West. If such be the case, the highly developed culture which was so abundantly and so well exemplified in the contents of the mound in northeastern Oklahoma has had a long time in which to deteriorate, and this deterioration is very manifest in the crude pottery and rather coarse work in their other arts,

Fig. 36. Small ruins, Archie King's ranch, Canadian Valley. Unexplored.

as found existing in the village sites and burials of the Siouan (Osage-Quapaw) stock which date from just before the beginning of the Historical Period.

The Athapascan Culture

Scattered over western Oklahoma and adjacent portions of the Texas Panhandle, western Kansas and southeastern Colorado, are to be found traces of the culture of a people whose occupancy antedated the later arrival of the Comanche, the Kiowa, the Cheyenne and the Arapahoe by several centuries, at least. From the early Spanish archives of New Mexico, it is evident that the region of the Great Plains, extending southward from the valley of the Republican River to that of Red

River, was included within the range of that great branch of the Athapascan stock, which is known collectively as the Apache people, and which includes quite a number of tribes. Hitherto, these have always been regarded, as have their distant kinsmen of the Navajo tribe also, as having migrated from the far Northwest, and as being a proof of the theory that all of the Indian tribes of the eastern United States had migrated from the same region. As yet, comparatively little has been done in the way of identifying the remains of any prehistoric culture of the region in question as belonging to the Athapascan-Apache people.

In the summer of 1920, the writer spent several weeks with Doctor Moorehead and while he was at work with a small field party, along the Canadian River, in the Texas Panhandle. Incidentally they visited an ancient irrigation canal in Meade and Clark counties, in southwestern Kansas. The writer has since revisited that section several times and has made considerable further investigation of these remarkable traces of an ancient culture. They also located traces of similar irrigation works in Oklahoma and the Texas Panhandle, and several mounds, besides one mound group, all of which are believed to be the ruins of pueblo-like structures with earthen walls and earthcovered roofs. That these people grew corn has been definitely determined; that they made and used pottery is likewise proven; that they might have learned the art of growing corn or that of making pottery in the far Northwest, or at any point between the far Northwest and the Great Plains south of the Republican River, is highly improbable; that they had once lived much farther east, where they had grown corn under naturally humid conditions, is not unlikely; that they had been driven out upon the high plains where they still sought to practice agriculture, but where their crops were blasted by the hot winds and destroyed by the big buffalo herds, seems altogether likely; that some of their hunters may have made their way to the Pueblo settlements on the Mora, the upper Pecos and the Rio Grande, in New Mexico, where they found corn and other field crops being grown by irrigation, is wholly within the bounds of possibility; that they attempted to avail themselves of Pueblo irrigation engineering talent, and that they attempted to adopt and to adapt to their purposes the irrigation husbandry and architecture of the Pueblo peoples seems evident.

The writer believes that by means of type artifacts, it may be possible to trace the Athapascan occupancy much farther east than it was at the time of the first exploration and settlements in New Mexico. He is planning to do some systematic work in this very interesting field which, down to this time, has been almost as a sealed book.

Unidentified Cultures

Scattered over various portions of Oklahoma are to be found numerous ancient village sites and shop sites which, while plainly distinguished, are as yet unidentified. This is especially true of the central part of the state, where the remains of most of the identified cultures are scarce or lacking altogether. Such vestigia include implements and projectile points of chert and flint, potsherds, mortars, mullers, hoes, spades, hatchets, celts and occasionally grooved axes. Careful study will probably be necessary to identify these and find the type artifacts of the same. This

is not of more importance locally than it will be in its relationships in the final study of prehistoric migrations and movements.

Quarries

Ancient quarries, from which Stone Age man secured chert, flint and other siliceous materials for the chipping or flaking of projectile points, knives, scrapers, skin-dressing picks and other implements, tools and weapons fabricated in like manner, are to be found in several portions of Oklahoma. One of the most interesting of these is the group adjoining the site of the village of Peoria, in Ottawa County.

Fig. 37. Pottery jars from ash pit in the Gould ruin. S. 1-4.

Many acres are covered with the debris which was thrown out from shallow, circular pits. Many rejects and unfinished stock blades are to be found. The material is a light grayish-white with occasional shades of blue and light pink. It was suitable for the flaking of blades of every type, from small arrowpoints to axes, spades and hoes. Careful investigation will doubtless reveal the fact it was the resort of a number of successive stocks of people, from that of the Cave-dwelling people, down to the most recent (Siouan-Osage) prehistoric era.

Another interesting group of quarries line the escarpments of certain "flint hills" in the northeastern part of Kay County, near the village of Hardy. The chert secured from the quarries (others of which may be found across the state boundary line in southern Kansas) occurs in the form of nodules embedded in a lower stratum

of limestone, thus necessitating considerable digging. As elsewhere stated, Otto Spring found that these quarries had been worked as late as the beginning of the historical period. The material from these quarries is greatly varied in color, some of it being beautifully banded, or striped.

In the extreme northwestern part of Oklahoma, in Cimarron County, there are several quarries. One of these, which the writer visited and inspected in 1913, is in the form of a ledge of flint nearly as white as porcelain. From it, during ages past, there had evidently been hundreds of tons of material removed. Other quarries, in the same vicinity, show varied colors, with iron stains and many specimens approaching the quality and composition of agate. In the same region, considerable quartzite was secured in the form of nodules found in ledges of metamorphosed Dakota sandstone, which had weathered away, leaving the quartzite nodules exposed and easily detachable.

In addition to workable material from regular quarries such as those enumerated, it is believed that pebbles, nodules and other forms of suitable siliceous rocks, were utilized wherever found—in stream beds, eroded from hillsides, in sand and gravel pits, etc.

In concluding this paper the writer wishes to acknowledge his obligation to Doctor Moorehead for the kind privilege of contributing to its contents. Under no condition would the writer unduly magnify the importance of the work which he has been trying to do. No one can realize better than he, that the fields which he has discussed in the foregoing paper should be worked out thoroughly, not under the auspices of but a single institution but rather under those of several—not by one man but by many.

Sites in Kansas

As Mr. Franklin traveled through Kansas he found three mounds on the farm of Mr. Henley, County Treasurer, at Eureka, on Fall Creek, tributary of the Verdigris.

From thence he went to Rosalia and met Mr. W. L. Bass, also visited Leon where he called on Mr. W. J. Martin. Both these gentlemen are located in what was originally part of Quivira, and we present a map, Figure 28, and typical Quivira-Harahey knives, Figure 29. The more thickly populated sites appear to be to the north, as indicated in Mr. Brower's Quivira.

West of Wichita the Arkansas passes through the heart of the old buffalo country. At Pawnee Rock, near Larned,—a famous site where occurred many battles between various bands of Indians,—there are a few objects in the hands of local collectors. Along the main Arkansas itself are scant evidences of prehistoric occupation. At Jetmore, Kansas, on a tributary of Pawnee Creek, Mr. Franklin visited a large ranch owned by Mr. Charles H. Jackson. His collection contains many chipped implements as well as weapons of the historic period. Among Jackson's relics is a Spanish bit. In one of the Kansas publications there is reference to a large Spanish sword which was found in the Great Bend country. There are no special details, but it is assumed that it belongs to an early period, possibly the time of Coronado. Pottery does not appear to be common along the river at this point, and although Mr. Jackson has searched industriously he found very few fragments.

In Mr. Franklin's diary are frequent references to graves of Indians of the historic period which have been looted by white men, which also applies to burials in bluffs along the upper Canadian and Cimarron. Our party found evidences of this practice. It is curious to note that although the Great Plains were inhabited by large numbers of Indians after the introduction of the horse, a majority of objects found throughout Kansas, Iowa or northern and western Oklahoma appear to be ancient rather than modern. In brief, the percentage of implements, weapons,

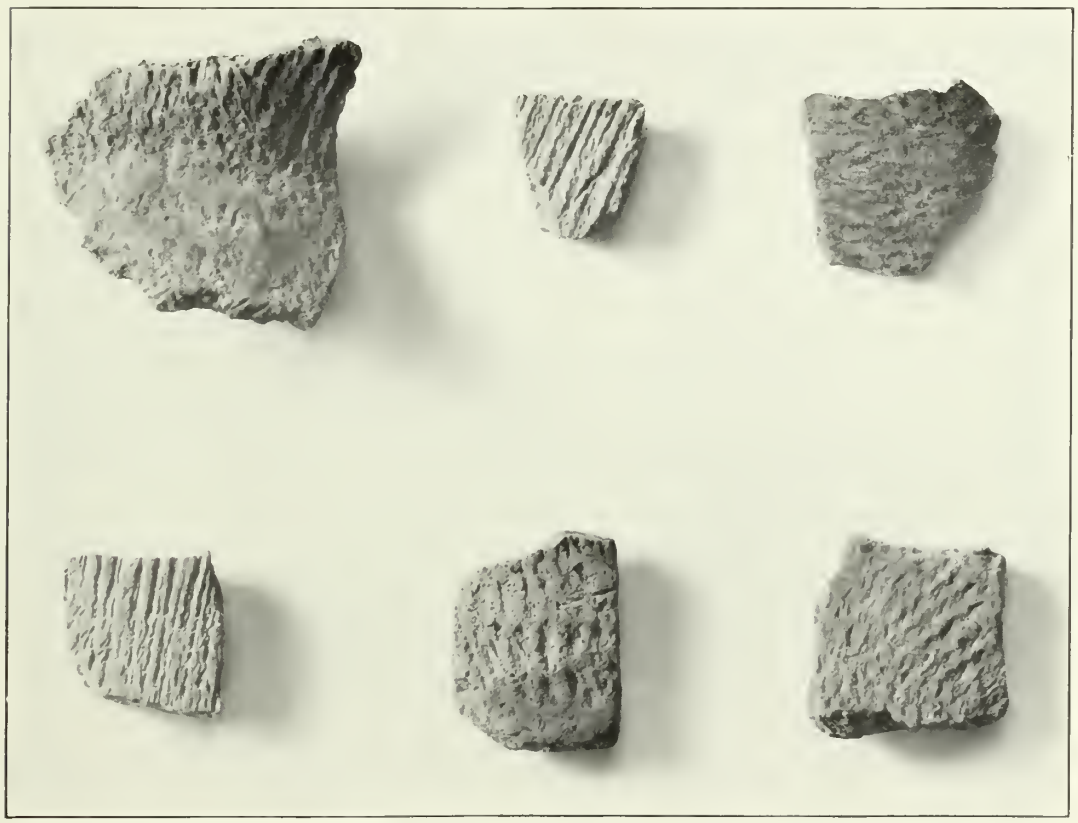


Fig. 38. Fragments of typical Handley ruin pottery from the surface and excavations. S. 2-3.

utensils or ornaments made use of by the "Horse Indians" during some three centuries compared with artifacts in stone, clay or bone is exceedingly low.

Mr. W. J. Martin in a letter to the author March 22, 1918 states that he had found few relics up and down the Arkansas although he presumes there are many. "Most of the specimens I find on the Big and Little Walnut are roughly chipped and the broken pottery is nearly all of simple design."

Mr. John J. Arthur, of Topeka, writing in June, 1919, states that he did considerable collecting in Morris County along a tributary of the Neosho. There is a large spring on the Randall farm locally known as Diamond Spring. At this spot have been found large numbers of interesting artifacts. At Liberal, Kansas, south-

west corner of the state, on a tributary of the Cimarron River, according to Miss Emma R. Jaquins, one of the editors on a local paper, a skeleton was found in the sand hills. The burial, almost intact, was wrapped in a Navaho blanket. Many objects, such as a sword, portion of saddle, beads, bracelets, knife and part of a gun were removed.

In 1913 the Minnesota Historical Society published in Volume 16, Part 1 an important paper by Professor N. H. Winchell entitled "The Weathering of Aboriginal Stone Artifacts." Much space is devoted to study of the unfinished as well as completed chipped objects from the Arkansas and Kansas Valleys. Of the so-called Quivira-Harahey district, Winchell approaches the subject from the point of view of a geologist. Some of his observations might not be accepted by certain of our modern archaeologists. Be that as it may, taken as a whole his lengthy paper exhibits much research and certainly merits careful study. He clearly differentiates between ordinary rejects and those palaeolithic types much weathered and heavily encrusted with patina.

So far as the writer has been able to ascertain, the largest number of ancient sites lie along tributaries of the Kansas River to the north of the Arkansas. The late J. V. Brower published in 1898 a volume entitled "Quivira", and in the next year "Harahey". Later he reviews the Kansas explorations in his "Memoirs of Explorations in the Basin of the Mississippi." He presented a revised map of Quivira and Harahey provinces in his 1902 publication. Omitting certain irrelevant subjects, and some of his theories, beyond question Brower did pioneer work of value when he called attention to Kansas as an archaeological field of consequence. The cultures to which he refers probably extended southward through the Arkansas Valley. He published a map of chert deposits in Kansas. He may have extended it a little too far but certainly the central portions of the territory indicated, contain numerous deposits of gray and white chert. It was distributed widely east, west, north and south and tens of thousands of specimens are in the hands of local collectors. In southern Kansas, not far from Oswego on the Neosho River there are numbers of village sites which have been reported by Mr. W. Stout who lives in the region.

Mr. W. L. Bass, of Rosalia, Kansas, sent the writer a map of Butler County on which he entered a cemetery and some 16 village locations. They are reproduced in Figure 28. Certainly there are more, but these Mr. Bass has personally identified.

Mr. Bass says, under date of January 12, 1930

> "You will notice that many streams head in our region, and nearly all drain into the Walnut river before it leaves the county. Now I believe that village sites and evidence of former occupancy occur on every one of these streams, even the very small ones. I can generally locate the villages by looking over the 'lay' of the ground from a distance.
>
> "At the place farthest S. E. marked ox—— on the map (Figure 28) a number of skeletons were plowed out, also some stone beads, and rude implements."

Details of this discovery do not appear obtainable. Many of us have been prone to regard Kansas as a field rather unproductive, archaeologically speaking, that all

Indian life centered in the buffalo—certainly our great mass of literature on Plains tribes seems to convey that impression. We have believed that most of the Indians were engaged in hunting that animal, antelope or other game, the tribes all very nomadic and little or no evidence of aboriginal art and extensive or continuous population. It is quite certain that when the archaeological map of Kansas stone age locations is completed we shall all of us be agreeably disappointed. In advance of tabulation of sites no one may accurately predict the number to be discovered but certainly there are several thousand.

Fig. 39. One of the walls of a ruin at Wolf Creek.

Brower mentions a total of approximately 10,000 chipped objects from the Quivira-Harahey district. These have not been tabulated but it is safe to assume that the percentage of large blades is high. Some one should study the collections and give us totals of all forms.

One or two Kansas authorities in recent times are of the opinion that some of Brower's work must be discarded, or take opposite views as to identification of Coronado sites. We must depend upon thorough and accurate survey and exploration for our facts. We may hope that the exact route of Coronado will be mapped. Yet, as in De Soto's case, it is extremely unlikely. Many factors must be taken into consideration by our enthusiasts. Lewis and Clarke of 1804-6 have been carefully studied, yet we are unable to identify all their camp sites.

Mr. Paul A. Jones, published in 1929 an account of Quivira. In this interesting volume he illustrates a number of types. The pipes in particular are significant in

that they are practically the same form or concept,—all of catlinite. This does not necessarily indicate very recent origin, yet catlinite is not supposed to be of great antiquity. It illustrates a fact referred to several times—that certain tribes or areas have produced well established types.

Figure 29 illustrates 5 knives from the vicinity of Rosalia, Kansas. Mr. W. L. Bass has collected extensively in Butler County and these cutting tools are in his exhibit. Mr. Jones shows several in his volume cited above. Students will note that these "four edged" knives are more common in the Great Plains and Texas Panhandle than in the Pueblo Country.

Fig. 40. Bird's-eye view of the ruins at Cottonwood, with graves in the foreground.

Three or four were found by our survey which are identical with these forms. Mr. Studer sent us another from one of the Texas Panhandle Culture ruins and it is presented in Figure 60. These knives are very interesting and their distribution should be ascertained. Seldom do they occur south of central and southern Oklahoma and the type is not found to the south and east, but rather extends through the buffalo country. It does not occur on the Pacific coast.

The Kansas State Historical Society in Vol. 17, 1926-8, printed an account of field researches by amateurs in the Arkansas Valley. This article refers to a number of village sites in Rice County, from the surface of which large numbers of artifacts have been removed. It is believed that a burial ground exists somewhere in the region, but according to Mr. Horace Jones, who wrote the narrative, the location of this has not been discovered. A word of caution might not be amiss in this connection. If a cemetery is found, above all it should be thoroughly explored under proper

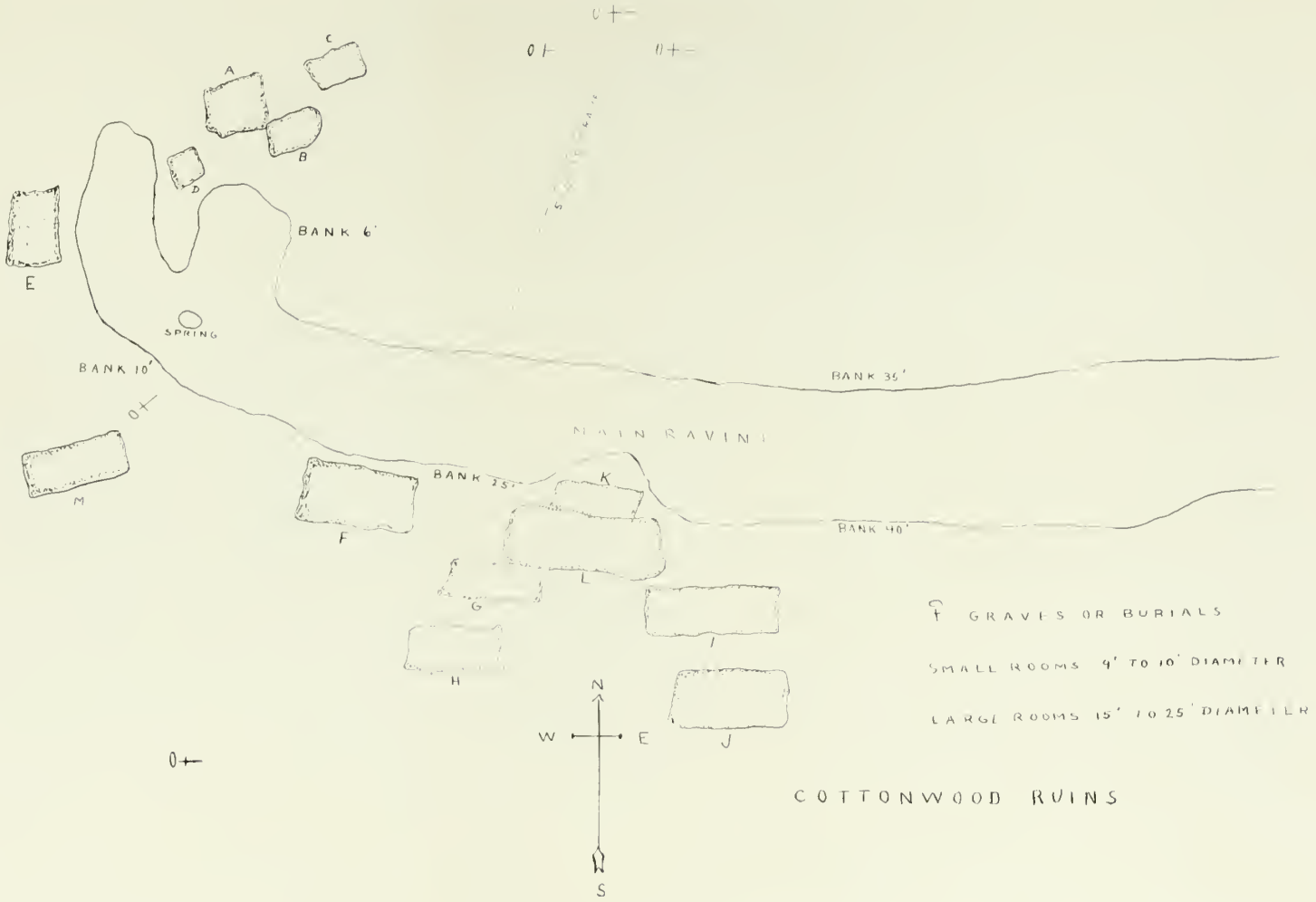


Fig. 40.1. Field map of Cottonwood ruins.

modern methods. There has been considerable activity on the part of collectors in central and southern Kansas, and while their efforts are to be commended, the methods outlined by the National Research Council and the Committee on State Archaeological Surveys should be carefully followed. There is not wanting a great bulk of material available for those who desire to study the artifacts, and particularly the chipped ones from the region, yet with no desire to be critical one might remark that there is not sufficient reliable or technical information concerning the conditions under which these have been found.

Mr. William E. Connelly, Secy., Kansas State Historical Society, Topeka, Kansas, writing the author on December 4, 1929 comments as follows:

> * * "The north side of the Arkansas River valley was Quivira. How far west up the river it extended we do not know. How far east beyond the Kansas line it extended we do not know. West of Wichita, probably from a point 25 or 30 miles east of Wichita, both sides of the valley were embraced in Quivira. The Wichita Indians were the Quivira Indians. The chief town of the Wichitas was at the mouth of the Little Arkansas River on the present site of Wichita, Kansas. That is the point attained by Coronado. He was never in the Kansas River valley nor anywhere north of the present site of Wichita.
>
> "We have made explorations of the Quivira village sites on the Arkansas River in the last year and we are certain of our position. I am sending you under another cover a little pamphlet showing a part of what has been done along the Little Arkansas River."

In the collections of the Kansas State Historical Society, Volume 14, 1915-18, Mr. Connelly presents a paper upon early Indian occupancy of the Great Plains. His article evinces painstaking research and study. He assigns Quivira a large territory, extending along the Arkansas into Oklahoma, and including portions of the Kansas valley. It would appear that his Caddoan area is far flung. For instance, he assigns portions of western Illinois and some 90 or 100 miles of southern Illinois and northwestern Kentucky. This may be true, but the intensive explorations at Cahokia would indicate a different culture from that of the Caddoan.

Pueblo Ruins in Scott County, Kansas

The Arkansas expedition did not visit this site although we looked over similar remains in Clark County. In the Kansas Historical Collections, Volume 6, 1897-1900, Messrs. S. W. Williston and H. T. Martin, of the University of Kansas, published an interesting paper which dealt with Pueblo remains in Scott County; also in the Kansas University of Science bulletin, Volume 5, No. 2, Mr. Martin presented a paper accompanied by a plan of one of the ruins. It would appear from these narratives that the exploration was intelligently carried out, and a perusal of both articles is suggested to readers of this volume. The chief ruin is located upon a low knoll and

Fig. 41. Fourteen objects, all from Handleys ruin, except the double pointed knife, 4 inches long, which was found on a site near Buenavista, Colorado. 4 Plains type scrapers are shown, varying from 1½ to 2 inches in length. The drill is 2 inches long, and the arrowheads from half an inch to one inch. The bone knife is from Gould ruin—length, 5 inches.

is some 100 feet in diameter. Rocks composing the walls were sandstone slabs brought from the neighboring hills. They found during the course of exploration some fragments of Pueblo coiled ware and one or two decorated sherds which were submitted to Professor Edgar L. Hewett. His opinion was to the effect that the pottery had been introduced from New Mexico and was not made in the vicinity.

Irrigation ditches about the ruins were rather extensive and the earliest white settlers made use of these.

Messrs. Williston and Martin came to the conclusion that Scott County pueblo was the site of Quartelejo. They quote from Hubert Bancroft, Volume 17, on Arizona and New Mexico, to the effect that certain families from Taos pueblo went into the plains and built their town called Quartelejo and remained until the Governor, Juan de Archuleta, ordered them back.

Careful reading of the text and inspection of the ground plan indicate that the ruin in Scott County was of undoubted Pueblo origin and due to the migration of a small portion of the tribe. It bears little or no relationship to the more primitive stone foundations or structures which were found by our survey in the Panhandle of Texas.

Ruins in Clark County, Kansas

May 24, 1920, we met Professor Thoburn in Beaver City, in the county of the same name, Oklahoma. Draining this region is Beaver Creek, longer and larger than Wolf Creek. Local reports are to the effect that some stone foundations occur, but we did not find them. Village sites seem fairly numerous. We examined sand hills north of that town, found a few fragments of Plains-pottery, not Pueblo. A few days were spent in the region of Englewood, Clark County, Kansas. Here we were told that ruins and irrigation ditches existed a short distance farther west. Our party did not attempt excavation. One ventures the opinion that these ruins are larger than those in Scott County, and it might be that this is the true site of Quartelejo instead of the group to the northward. Dr. F. W. Hodge, writing under date of January 3, 1930, advocated a careful archaeological examination of the entire area.

Professor Thoburn visited Meade and Clark Counties subsequent to our brief examination in 1920. He has contributed the following paragraphs:

> In the extreme southeastern part of Meade County, Kansas, near the boundary between it and Clark County, and about 5 miles north of the channel of the Cimarron River (which at that point is just across the state line in Oklahoma) there is the head of an ancient irrigation canal. Its age is unknown but it certainly antedates the beginning of the historical period. At its head, on Four Mile Creek, its channel is wide and shallow and is perfectly straight throughout the first 1700 feet of its course. Thence it follows the natural contours, becoming generally deeper and narrower. There is one natural storage reservoir, two fills and several cuts. At several places in its course, advantage was evidently taken of small upland watercourses. In traversing a sloping terrain, at right angles to the direction of the slope, the excavated earth was always thrown on the lower side of the

canal. In one instance, where there was a sudden increase in the gradient, with the bottom and sides of the channel composed of light, sandy loam, which would be easily subject to erosion, the grade was reduced by a series of several meanders, there being neither timber nor stone near at hand for the construction of a weir or dam dropping the water to a lower level. At one point in its lower course, it received the water of a small upland watercourse, through the medium of a small tributary canal or ditch, about 3 miles long.

This canal ends just south of the village of Englewood, in Clark County. The lower end (where it seems to have reached a level with the adjacent lands on either side) is distant from the head about 7½ miles, but the length of the canal, following all of its meanders, is estimated to be from 10 to 11 miles. Four Mile Creek, whence it drew its water supply, heads in low, prairie hills, where it has a fairly deep valley, several small ponds or water-holes, possibly spring fed but, if so, its waters disappear as it emerges from the hills, near the head of the canal, being absorbed by the desposit of sand, gravel and silt with which its former channel is completely filled below that point. It is not believed that this small creek ever had sufficient discharge of water to supply a canal of such proportions. It is therefore inferred that it was constructed for the purpose of catching the runoff from heavy, torrential local showers in the immediate vicinity of this small creek, with the design of flooding the cultivated lands contiguous to its lower end, thus supplementing the natural rainfall by the surplus torrential runoff from the drainage area of the small creek in the hills. It would seem not improbable that the construction of such an irrigation system for the purpose of supplementing the natural rainfall on the semi-arid Plains must have been undertaken after witnessing the results of irrigation by the Pueblo peoples of the Rio Grande, Pecos, Mora and other rivers of New Mexico. If so, it speaks eloquently of the determination of a people who had formerly grown corn under humid conditions, farther east, where there was more abundant rainfall and less danger of crop destruction by the "hot winds" of the Plains. The probabilities are that the identity of the people who constructed this really remarkable piece of engineering work will be established, in the not distant future, and that it will be found that the approximate date of their settlement and the excavation of this artificial water channel was between four and five centuries ago. Traces of similar irrigation works are to be found in several localities in the neighboring portions of the Oklahoma and Texas "panhandles."

If it be true that the builders of such irrigation canals endeavored to imitate the agriculture of the Pueblo peoples, it seems likely that they also attempted to adopt and adapt to their purposes the earth-walled and earth-roofed architecture of the Pueblos. In the course of our investigation of the ancient canal in Clark County, we found two low earthen mounds, at points on its course, which were certainly the ruins of such structures.

The smaller of the two was approximately 125 feet long, 75 feet wide and from 2½ to 3 feet in elevation above the surrounding surface. On the surface of this low elevation were found chipped chert, a broken metate, fragments of clam or mussel shells. The other elevation, distant less than half a mile, disclosed the presence of similar vestigia when carefully inspected. Near the edge of a land-locked lake, 2 miles from the village of Gate, in the eastern edge of Beaver County, Oklahoma, only about 20 miles distant from these 2 mounds, there is a group of 6 mounds, with like evidence of artificial origin. There are several other elevations along the course of the canal in Clark County.

Fig. 42. Large stones forming part of the walls of a building on Tarbox Creek.

Professor Thoburn made an inspection trip through the Beaver Valley, Oklahoma, about a year ago. In Texas County, Oklahoma Panhandle, and some 70 or 80 miles northwest of Handley ruins, and not far from the town of Guymon, he discovered small ruins. Although he attempted no excavations, from a careful surface study he concluded that these Beaver Creek ruins were practically the same as those of the Canadian valley itself.

Preliminary Investigation of the Texas Panhandle

In our preface we referred to the fact that specimens had been sent years ago from the upper Arkansas and Canadian for study. Geologists, botanists and other

scientists who have had many years experience in their special fields have little difficulty in separating horizons, species or forms of life. Hence the archaeologist, if he has examined series of objects from most sections of the United States, is also able to distinguish cultural differences. He is expecially apt to note something new, that which is a departure from forms or types with which he is familiar. The unfamiliar in any division of science has its own peculiar charm. Not merely explorers, but research men as well, enter with both zest and zeal into consideration of unknown fields or subjects, hence when these simple artifacts were received from the Texas Panhandle, the thought occurred that here was offered us an unexplored field. Some years passed and then a reconnoissance and one or two expeditions were projected into portions of the upper Canadian and Cimarron.

Figure 43. Small ruin, Cottonwood Creek.

Upon completion of our task, and after consideration of the notes and material obtained, we agreed that the outstanding feature of upper Canadian archaeology was its complexity. Furthermore, we realized that the region in which these little ruins occur is quite extensive and cannot be accurately or satisfactorily studied in one or two seasons. Dr. Mason and Dr. Holden in their recent reports, from which we shall presently quote, refer to the intense heat and other disadvantages. It is recommended that future surveys confine their operations to the winter season—a satisfactory solution of that problem.

The first mention by modern writers of ruins in the upper Canadian is found in the Journal of the Archaeological Institute of America, Vol. IV, Part 2, 1892, written by the late A. F. Bandelier. He describes 2 pottery jars found in Mora

County, upper river. He says that buffalo hunters told him of ruins farther down river, but it does not appear that he visited them. Professor T. L. Eyerly was for some years head of the Academy at Canadian, Texas. He published two brief papers in the Academy Bulletin, 1907, concerning ruins on Wolf Creek, then known as Buried City. We changed the name to Handleys Ruins in honor of the owners, Messrs. Sam and Oscar Handley. At present writing the property belongs to Mr. Sam Handley. Dr. J. Walter Fewkes heard of Mr. Eyerly's visit to the Wolf Creek site and went there himself in 1914 or 1915, but published no report. Mr. Handley says that Fewkes looked over the ground for a day but did not seem impressed with the importance of Handleys ruins, although he dug in one of the elevations and found a skeleton.

Early in 1929, Dr. Horace H. F. Jayne and Dr. J. Alden Mason, University of Pennsylvania Museum officials, called upon the writer and set forth their proposed study of northwest Texas. He gladly furnished them information as to sites in the upper Canadian Valley. Their expedition spent the summer of 1929 in the field about to be described. Dr. Mason's report is published in the Museum Journal for September-December, 1929. In so far as they explored, it is an excellent presentation of the problem of our Texas Panhandle Culture. Mr. Floyd V. Studer, of Amarillo, is very much interested in the subject and has made a study of the entire region for 23 years. We are much indebted to him for valuable information.

In the bulletin of the Texas Archaeological and Paleontological Society, 1929, there is a paper by Dr. W. C. Holden covering the examination of certain of the ruins in April 1929. Portions of his descriptions, with two diagrams, are presented on several subsequent pages of this volume.

Since then Texas Technological College sent an expedition, composed of 7 members of the faculty and several students, to examine certain ruins on Antelope and other creeks. Volume 2 of the Texas Archaeological and Paleontological Society, September 1930, presents an interesting account of detailed exploration of one of the ruins, from which we shall presently quote. We should encourage researches in this region on the part of such institutions or individuals as are able to conduct accurate, thorough and systematic explorations.

Early in 1919 the writer made a preliminary trip to the Texas Panhandle and from Canadian he drove over to the ranch of Mr. Archie King, inspected small ruins lying along the river and proceeded to Wolf Creek where he was entertained by the Handley brothers for a week. Upon return East it was decided to undertake a preliminary survey of the region.

Outfitting in Canadian, Texas, early in 1920, our party proceeded to Handley brothers ranch on Wolf Creek, Ochiltree County, and spent some 3 weeks in study and examination. Previously there had been some excavation in the largest ruin, which we named Gould in honor of Professor Charles N. Gould of Oklahoma, who had given us assistance on earlier surveys in Arkansas and Missouri.

Handley Ruins

A view of the entire plain on which are located the ruins and village is presented in Figure 30. Cottonwood trees in the foreground grow upon the banks of Wolf Creek.

Our illustration is taken from up stream and looks toward the south. A low mound, No. 1, is observed to the extreme left.

We were told that Mr. Goodnight first came into Canadian valley some 55 years ago, and located, in Paloduro canon. We called at his ranch and were given locations of several ruins, groups of petroglyphs, etc. Of the Wolf Creek site itself the original owner seems to have been a Mr. James Fryer. Not far distant was the site of Adobe Walls where a party of buffalo hunters, in 1872, withstood a two days attack of Kiowa led by Quanah Parker. One or two "oldtimers" told us that at the

Fig. 44. Antelope Creek ruin, No. 10, Studer.

time of the fight there remained traces of small adobe buildings, hence the name. Local tradition is to the effect that these were erected by Spaniards.

At an October, 1930, meeting of the Board of Indian Commissioners, Washington, General Hugh L. Scott, familiar with Kiowa and Comanche history, told the writer that in his opinion Adobe Walls marked an early post erected by Bent, the famous Indian trader.

The borders of the Canadian itself are, for the most part, void of trees and unattractive, yet of such tributaries as Wolf Creek the reverse is true. In his pamphlet Professor Eyerly said:

> "The ruins stand on a level stretch of land covered by native grass, and at the base of a high escarpment caused by a limestone caprock in the Tertiary formation. The immediate surroundings are very picturesque and pleasing to the eye. Situated in a bend of Wolf Creek with its abundant

supply of crystal waters, and covered at this place with plenty of timber, the site was well fitted to attract with its beauty the hearts of whatever people may have constructed these walls which now lay in ruins. This creek forms the north and partially the eastern boundary. The western boundary is a deep ravine fringed with cedars and the southern high walls and buttes of the cliff before mentioned."

The settlement was a large one, running as the outline map indicates, some 3,500 feet along the creek. Most unfortunately, our field map made at the time is mislaid or lost, together with several photographs. We did not attempt a regular survey—which can be made by some subsequent expedition. From Eyerly's, Studer's, and Mr. Sam Handley's maps we have compiled Figure 31 which indicates approximate positions of the foundations and mounds. It should be recorded for the benefit of some future explorer that during our examination all excavations were filled by our party. We endeavored to replace the long flat slabs set by Indians on either side of the walls. At present there is manifest an unsatisfactory condition which is due to indiscriminate digging on the part of visitors from the oil fields. Some archaeologist should devote 3 or 4 months to a very careful study of the entire group. Mr. Sam Handley informs the writer he had great difficulty in preventing persons from removing every vestige of primitive occupation.

Eyerly, who visited this site several times, presented a brief but excellent account of the general appearance of all these ruins.

Ten of the more important structures lie within a space of about 70 acres. The appearance of these at the time of our visit was that of mounds not very high and with gentle slopes. In several it was easy to distinguish the outlines of an enclosure, the base walls of which were made of stone. Others are completely covered.

Most, if not all, of these are rectangular. Eyerly and our party both observed that the stones are not laid as in the case of regular pueblos, but on the contrary are set on edge and they vary in size from 8 or 10 inches to as much as 2 or 3 feet in length. Careful examination failed to produce any stones that had been artificially worked. For the most part they are rough, thin slabs, chiefly of limestone, brought down from the bluffs. These stones extend into the ground from 18 inches to 3 feet, and sometimes $3\frac{1}{2}$ feet, the deeper ones being out of sight. Between the outer and inner walls the space is filled in with earth and small stones, this space varying from 2, 3, 4 or even 5 feet in width.

However, although unable to secure sufficient labor, we excavated to some extent and especially in Eyerly's "Temple", or No. 10, which we called Gould ruin. We assumed on completion of our work that Indians had built up rather irregular walls to a height of 4 or 5 feet, that to obtain additional elevation 2 or 3 feet of earth was added and that roofs were composed of poles and thatch. Possibly another row of stones, perhaps smaller, were added. The covering, or roof, may have been composed of buffalo hides supported by small poles.

In our expedition notes we stated—

"There is no positive trace of heavy timber such as occurs in houses of the Pueblo country. One explanation is offered, that later Indians and buffalo hunters

utilized all the available wood for their camp fires. As against this proposition, it has been suggested that heavy growth of cottonwood along the stream furnished them with sufficient firewood and the absence of timbers and roofs is due to antiquity of the remains."

Since then, Mason's complete excavation of two rooms in an elevation on Alibates Creek, some distance north of Amarillo, clears our archaeological atmosphere. We quote from his report (University of Pennsylvania Museum Journal, September-December 1929, pp. 329-333):

"On one side of the hillock a room had been partially excavated, the walls of which were marked in places by long vertical stones of natural

Fig. 45. Bivins site. Studer.

shape embedded in the walls, visible for a few inches above the soil and extending as far as two feet below the surface. This room was not further excavated. On the other slope of the mound another room which had been partly excavated was continued until the important features were determined.

"The room measured about fifteen feet in diameter and was mainly rectangular, though one corner was rounded and one side may have been curved. Built in the side of a mound, the upper floor was at the ground level on the lower side of the mound, but about four feet below the surface at the crest. The underground walls were of adobe or mud, but were solid and not built of adobe bricks as in the modern Mexican style. Most of them were blackened by smoke. Although the walls were not very much

harder than the material which had filled the abandoned room, the fill broke away from the walls with a clear cleavage. In this room no stones were set into the tops of the walls as was the usual practice. A number of different floor levels were noted, the lowest being 2 or 3 feet beneath the uppermost. These floors were apparently made of hard packed clay or mud over which was laid a thin film of plaster. In the centre of the house on the uppermost floor level was a rather deep conical depression with a few large stones and a large quantity of packed ash in it, undoubtedly the fireplace. Similar fireplaces would doubtless be found in the lower and earlier floors, but for the greater part the upper floor was left intact and was broken through to the bottom in only one place. The area of the fireplace was marked by a depression of probably six inches in the floor which dropped in a rather abrupt curb with rounded edges. At four points at equal distances from the fireplace were holes in the floor, which details showed plainly represented the posts which upheld the roof. Above most of the floors were found charred beams turned to charcoal, clay burned to brick bearing the imprint of small poles or reeds, and carbonized grass.

"The deductions from these data are evident. The house consisted of a room partially underground, the walls and floors made of clay faced with plaster. The roof, which rose to an unknown height above the surface, was supported on four posts placed in the interior of the room and consisted of cross poles with a straw thatch above this and possibly a covering of mud. The walls above ground may have been of the same construction as the roof or of solid adobe. The inflammable nature of the building led to frequent conflagrations during which the roof was destroyed and fell to the floor, partially filling the room. Instead of cleaning the debris out to the level of the original floor, it was packed down, leveled off, and a new and higher floor made upon it.

"Very few objects of any value were encountered in these excavations."

After we had completed the third revision of our text, we received from Dr. Holden the bulletin referred to on page 94. Earlier this year the Texas Archaeological Society carefully excavated a large ruin on Antelope Creek, which he calls A-C. Sitting around their camp fire during evenings the expedition members discussed roof construction and character offering several theories. This entire subject is so important that we quote at length from Dr. Holden's recent report cited above:

"One of the most important discoveries in the A-C ruin was made in room 1. It has long been a matter of considerable speculation as to what kind of roofs these slab stone ruins had. Beneath the floor level we found evidence which is not conclusive but fairly indicative of the nature of the roof. The floor level in room 1 is easy to trace. It consisted of about four inches of yellow clay which was carried in when the house was built and tamped on the surface of the original ground level. The old ground soil was a grey river sand. The top of the clay floor is covered by a thin layer

of ashes and charcoal. In many places it has a rich greasy color. In room 1 we dug below the floor level, thinking we might find burials. We found no skeletons, but we did find four holes in the sand. The holes were in a line north and south four feet from the west wall. The holes were two, five, eleven and fifteen feet, respectively, from the south wall. Each was two inches in diameter and from eighteen to twenty-four inches deep. When we uncovered the first hole we attached no particular significance to it. When the others were discovered to be in line with the first their importance became evident. It is most probable that they supported the roof timbers.

Fig. 46. Typical Panhandle ruin. Locality not given. Probably Bivins.

If this were the case, the room evidently consisted of a light framework of wood covered with some kind of light material. Speculation as to what that 'light material' might have been was a matter on which the discussion turned around the camp fire in the evening. Every possibility was introduced. By a process of elimination all the possibilities were discarded until two remained. The party became unanimous in the belief that the covering was either a thatch made of bear grass (yucca) which is abundant in that region, or it was made of buffalo hides put on in shingle style. To the first alternative someone objected that the grass may not have grown in the vicinity when the ruin was built. Dr. Stainbrook pointed out that geologists were of the opinion that conditions in that region had changed

very little during the last 5000 years and that it was highly probable that the tall bear grass was more abundant one thousand or two thousand years ago than now. On the other hand the region was the very heart of the buffalo range. The living water in the creek caused the buffalo to come to it during dry seasons in countless numbers. The deep canyon walls together with the irregular meanderings of the creek made it comparatively easy for the builders of our ruin to have killed the buffalo, even with their crude spears. The buffalo hide theory seems as highly probable as the grass thatch theory.

"To return to the holes beneath the floor level in room 1, the fact that the holes were below the floor with no evidence that they extended above the floor level constituted a mystery needing explanation. Someone soon framed a theory which seems perfectly plausible. The roof and wood work of the building could have burned down at the time of its abandonment or later. In that case the slender upright posts would have burned to the floor. Subsequent centuries of wind action filled in soil above the old floor. In time the parts of the posts below the floor level rotted away, leaving their impressions in the packed sand.

"It may be well to mention a third roof type possibility with a reason for its elimination. Someone suggested a flat roof of adobe. Such a type seemed highly improbable. A roof of that kind would have required heavy logs as cross timbers. The cross timbers would have had to have been long enough to have reached across the widest room, a distance of twenty-six feet, or they would have had to have been supported at the joints by heavy upright timbers. In regard to the first alternative, there are no timbers in that region long enough and straight enough to span twenty-six feet, and in regard to the second, the posts that fitted into the holes we found could not have supported heavy timbers, to say nothing of the additional weight of the adobe.

"Granting that the roof was of grass thatch or of buffalo hide shingles, it must necessarily have had considerable slope. The width of the rooms in the central and south sections of the house was too great to have permitted of all the slope being in one direction, in lean-to fashion; so it is most probable that the roof sloped from the center. It is to be remembered that the whole theory of the roof restoration has been based on the assumption that the holes beneath the floor level once contained the roof supports. It is possible that these premises are wrong."

Throughout the central area in our map, Figure 31, extended a village site. Years ago considerable material was secured by several large parties of Canadian Academy students. Today surface searching does not indicate extensive population in Indian times.

We believed Gould ruin the most important. Its major axis along the east wall is 70 feet, and the southern end is 23 feet diameter, whereas the northern measured 34 feet 6 inches wide. Within and without the soil is dark and heavy. This structure,

which Eyerly called No. 10, or "The Temple," has been much disturbed by various parties who have excavated in past years. It is peculiar in character, and the rooms, if there were any, are difficult of identification and measurement. Pits left by previous workers were partially filled, stone and earth intermingled in confusion. In Figure 33 a rough ground plan gives in general the walls, space enclosed and hearths, or ash pits.

The west wall, Figure 32, 62 feet in length, was more prominent than the east, and the stones were larger. There were 4 openings or doorways. In some places the diameter of this wall is almost 5 feet.

The east wall, shown in Figure 34, is lower and not quite so massive, and there are 5 openings or doorways. In the foreground the 2 blocks of wall between the

Fig. 47. Bird's-eye view of Dixon Creek ruins.

openings are chiefly of adobe and not so much stone, although slabs were used to hold the adobe in place. A marked contrast is observed in the rest of the wall, which like the western wall, is almost entirely composed of stone. Our party extended a trench outside the west wall, full length of the building, finding near the center a large ash pit or fireplace, 5 or 6 feet in extent.

It was long in use, being hard burned, and its base was some 5 feet below the present surface, and extended under the wall. With this discovery, we were led to the conclusion that a lodge site existed before the walls of Gould ruin were erected. Indeed, 2 or 3 ruins presented similar conditions. At the east wall, and in front of an opening in the north end, was a pile of rocks laid up irregularly. Quantities of buffalo bones occurred at many points and were scattered throughout the soil.

A trench nearly 60 feet in length was extended through the center of Gould ruin from north to south. About 18 inches down the ground was found very hard, probably an upper floor, if there were two floors. No great quantity of ashes, charcoal or burnt wood occurred. Near the south end of this trench we found a fragmentary bunched burial, down 20 inches,—no skull and no large bones. In the small room marked A on the diagram, Figure 33, were portions of another skeleton, a broken skull, femur, tibia, and fragmentary arm bones. This room, A, was the only one we could positively identify. It was very small, 4 feet 8 inches in diameter, and adobe walls extended to a height of about 2 feet. What we considered to be the base or first floor varied from 3 to 4 feet below the surface of space enclosed by the walls.

In the position marked E on the map was a hard adobe layer, slightly elevated, somewhat curved, and 13 feet in length. Possibly this was a wall or adobe partition.

The artifacts discovered were not numerous, and consisted of small arrow points, a few knives, and fragments of several bone hide dressing tools. Some of these are shown in Figure 41.

At the extreme southern end of our trench, on the base line or lower floor, was a deposit of ashes 2 to 5 inches in thickness containing 10 or 12 small arrowpoints and fragments of bone scrapers.

Twenty-four feet south of Gould ruin, discovered during test pit work, there was a well-defined basin, hard burned. The top of it was 2 feet from the surface, and extended down 1 foot 4 inches. Half way down it was slightly over 1 foot in diameter. A well-defined rim, 3 inches wide, extended around the top. This basin, almost pot-like, was filled with pure white ashes.

Figure 37 presents 2 jars found in a large ash pit occurring near the corner of the west and south walls. These were taken out sometime prior to our arrival, and there are no field notes. Dr. A. V. Kidder states that these jars are not of Pueblo type.

Careful search over ground near and extending beyond the ruins failed to produce more than 45 fragments of pottery which Dr. Kidder, after examination, pronounces different from Pueblo forms.

Thoburn ruin, named for Professor J. B. Thoburn, is 330 feet east of Gould ruin. The dimensions are 28 feet north and south, 37 feet east and west. A hard-packed floor was found at a depth of 2 feet, but detailed exploration was not attempted.

Handley ruin, named for the owners, is rather large, the north wall being 43 feet in length, south wall 45 feet, west wall 33 feet and east wall 32 feet, and was well preserved when we saw it. This structure is about 320 feet northeast of Thoburn ruin, and is within some 200 feet of the edge of a high bank overlooking Wolf Creek. Our party did some excavating. We found a small quantity of charcoal or ashes, half of a bone gouge and several artifacts.

The walls of this structure were not so wide as those of Gould ruin, and there appeared to be more adobe construction. Where stones protruded from the ground the width between the rows was about 1 foot, and at the base 2 feet. At the south end the walls appear to be some 2 feet in height. Outside the west wall we ran a trench, finding one well-defined doorway 20 inches in height. A pit was dug within the ruin,

and we found a broken mortar a foot from the surface. Near the center of the building a skeleton was discovered 2 feet 6 inches below the surface. It was a bunched burial, but well preserved, was taken out and shipped to Dr. Farabee, University of Pennsylvania. No objects accompanied the burial. Around this skeleton appeared to be an adobe wall enclosing a space a few feet in extent, almost too small to have been a room, although the adobe construction was some 15 inches in thickness. Exploration of this ruin is recommended.

Ruin No. 1 on the bluff. This is 50 feet or more above the creek, and appears to be 33 feet at its greatest diameter. One might consider it the westernmost outpost

Fig. 48. Landergin's mesa, upon the summit of which are 22 stone circles.

of the group. An erosion of the bluff has destroyed much of it. No south wall protrudes through the sod.

Franklin ruin, 600 feet northeast of Ruin No. 1, is situated on a high part of the plain. It is 37½ feet east and west and 28 feet north and south, and presents the appearance of a large house site and somewhat different from the others. At each corner we found a pile of rocks heaped about large corner stones. Between these heaps it was scarcely possible to observe a rock wall, yet there were scattered stones more or less in line. It seemed to us that these were insufficient to form a wall. It is possible, however, that stones may have been removed, although Everly was told by old settlers that they had not hauled away rock for foundations, fireplaces or other stone construction. Be this as it may, yet the debris on Handley's fields was much more convenient for those whites who first came into the valley than the talus flanking the bluffs.

Eyerly ruin. This lies 442 feet southeast of Handley ruin, and its dimensions are; north wall, 42 feet 9 inches, south wall 43 feet, east wall 33 feet, and west 30 feet. A few small test trenches were extended down to hard pan or floor. We believe that the walls were about 20 inches high, and as usual, large flat stones placed on either side, the intervening space varying from a foot to 20 inches. As in the case of Gould ruin, this space was filled with earth and small stones.

Thirty inches from an outer wall near the center of the room and upon base line were found 10 objects lying in a compact mass. They consisted of an unio shell, a

Fig. 49. Pottery from Antelope Creek. Mr. Studer's Collection. S. 1-1.

stone hammer, 2 fragments of jasper, 2 large flaked knives, one leafshaped implement, and 3 specialized knives, such as are shown in Figure 29. Subsequently 2 or 3 of these double-edged knives, typical of the region, were discovered elsewhere. A short distance north of the deposit was a very fragmentary skeleton.

Other structures included in this important group were not examined by our party. A word of explanation is necessary. At the time of our arrival the Panhandle country, archaeologically speaking, was practically unknown. We felt it our duty to ascertain the extent of these remains rather than to attempt thorough exploration of any one of them, and that policy was followed through a territory some 300 miles in extent. Wolf Creek itself merits rather careful study. There are more than 50 miles of it in the Texas Panhandle and an equal distance in Oklahoma. This little valley lay in the center of a semi-arid belt, and afforded the Indians wood, good

water, rich soil and an abundance of game. It is in direct line between the Pueblo settlements of New Mexico and the heart of the buffalo country. We are of the opinion that it was inhabited prior to the erection of the stone ruins because, as

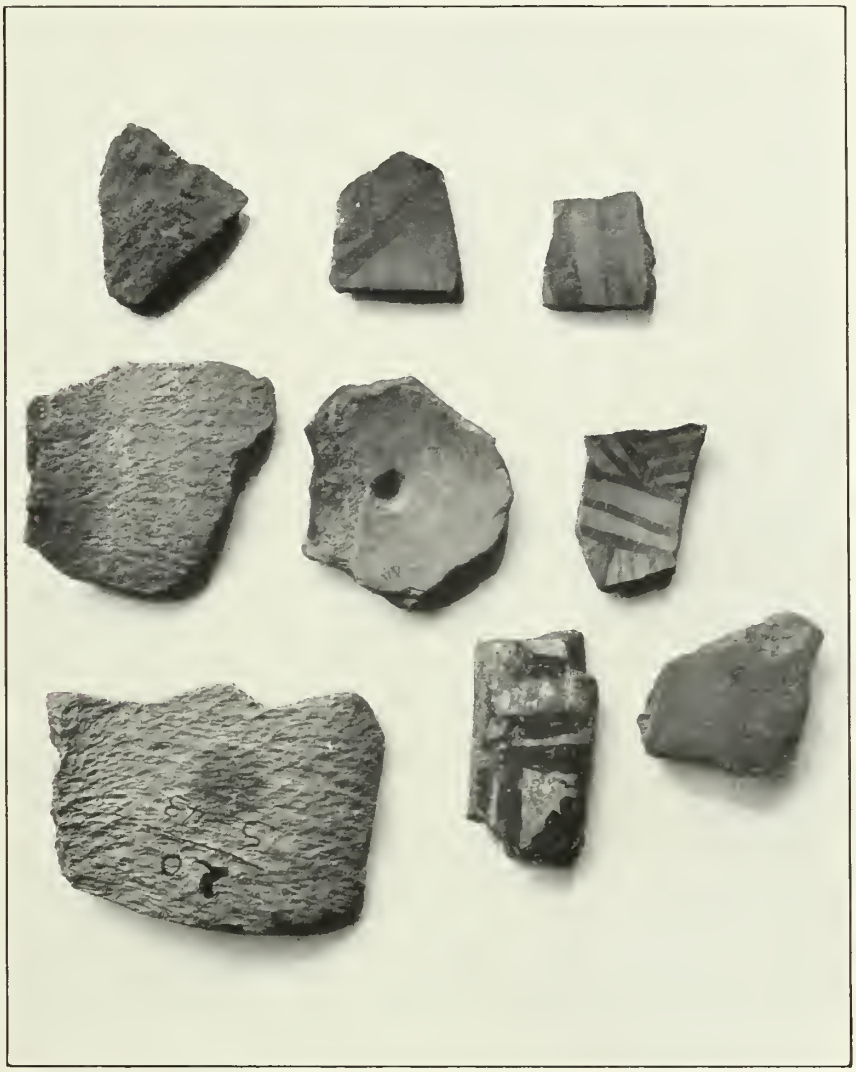


Fig. 50. Fragments of pottery found by Mr. Studer. The three to the left from Landergin mesa, or Site No. 20. Those to the right from Pecos. S. 2-3.

previously stated, we found fire pits, chips, and buffalo bones in the banks of Wolf Creek, at various points on the plain, and occasionally under the walls themselves. In most of these no pottery was in evidence, all of which is important, and we suggest that an entire winter be spent at this spot and numerous test pits sunk at various points.

A 3 weeks visit is insufficient to a correct understanding of the Wolf Creek settlement. It appears to the writer, if to no one else, that because of the peculiarities here in evidence that this small and picturesque plain may be justly considered one of the strategic centers in American archaeology. Apparently all agree that the remains are not Pueblo. Admitting this, yet it is a distinct departure from the ordinary Plains or buffalo culture, as we understand the term.

We further believe there exists a close parallel between the remains on Handley's property and those upon the ranch of Mr. Archie King, 25 miles southwest. Assuming that oil operators have not disturbed the King ranch, there is opportunity for careful study of an undisturbed site.

It is suggested that future archaeologists excavate completely several of these houses or foundations, that they may find some of them superimposed over ashpits or camp sites, that the relationship of one to the other be very carefully worked out. It is further suggested that they extend several long trenches at various points throughout village site area.

Ruins on Antelope, Tarbox, Cottonwood, and Other Creeks

It was our custom to consult with the older citizens, especially cattlemen. Their business, particularly in the early days, necessitated overland travel and continual camping throughout the upper Cimarron and Canadian. They told us of numerous small ruins scattered throughout the entire area. Invariably we found their statements correct. Because of such information we moved our outfit to Antelope Creek, established camp there, and found the ruins extensive and extremely interesting.

There are numbers of small ruins on either side of the creek. One in the valley on the west side has been washed out, and it was here that we found a fragment of corrugated pottery. Readers should note that this was in the valley.

The largest ruin appears to be 148 feet north and south, outside measurement. It lies some 100 feet above the creek. The south end is 27 feet diameter, but the walls have fallen down and accurate measurements, unless there is excavation, are difficult. The place is within arrow range of a high hill to the west. This large ruin is divided into rooms by cross walls. A few pits were dug by us, and we found the floor varied from 2 to 3½ feet below the present surface. Not a few chips of flint, carnelian, etc., occurred, but little pottery. There is a large gateway, or opening, on the east side, some 7 feet in width. The walls were rather low, but on either side of the gateway are large stones. The distance from water in the valley is some 600 feet.

On a high bench toward the east, flanking Antelope Creek, are 16 or more small ruins distributed through an area of 1000 or more feet. They vary from 100 to 200 feet distant from each other, and their dimensions range from 12 to 20 feet in diameter. Many stones are on edge, indicating walls. What appears to be the most important ruin lies some 75 feet south of a group of 4, and this particular one is surrounded by an earth-pebble embankment, which is east and west, 55 feet in diameter and 44 feet north and south. Height from the central depression to the top of the wall is about 3 feet or 5 feet from what we consider the base, or Indian floor. Several small test pits were sunk, and one trench 15 feet in length. The embankment has the

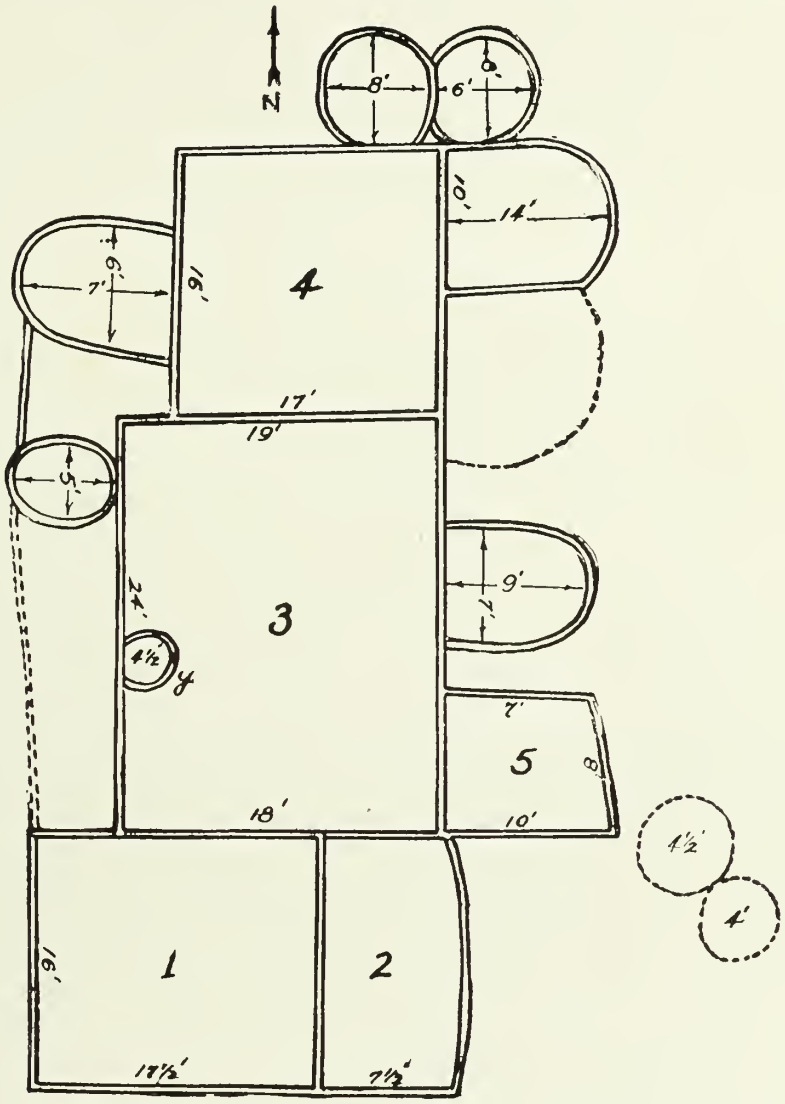


Fig. 51. Ground plan of ruin on Tarbox Creek. Drawn by Dr. Holden and reproduced from his report.

appearance of a small Ohio earthwork, composed of ordinary soil and many pebbles. It is not especially hard and could scarcely be considered adobe construction. Nothing to compare with it was found in all our reconnoissance throughout the Canadian-Cimarron country.

Our workmen opened a trench which was extended from inside the enclosure through to the embankment's center. Before we reached the embankment, we observed to the left a layer of ashes on the base line. In this was some charcoal. Working northward into the embankment we observed that pebbles extended downward

from the top about one foot. In the embankment itself there was neither ashes nor burnt earth—that is, none in our trench.

Within the area surrounded by this enclosure there were several shallow, irregular depressions burned, a few flint chips now and then, or arrowpoints, but not much evidence of occupation. The purpose of this structure is unknown, and since our examination was superficial and did no injury to it, we suggest thorough exploration and determination of relationship of this curious embankment to the rest of the site. To the suggestion that it is a mescal pit one might reply that its size precludes such use.

In March and April, 1930 the Texas society already mentioned made careful study of Antelope ruins and structure "A-C" in particular. A ground plan and cross section are presented in Volume 2 of their bulletin series (September 1930). We reproduce this in Figure 52. They found the ruin to be 163 feet long, 52 feet wide—or 15 feet longer than our measurements, as we had not included the slopes. Dr. Holden presents a cross section of an interesting wall. Here at the base we have stone set as at Wolf Creek and other ruins, and above there are supplementary stones with less space between, carrying the total wall construction to a height of nearly 5 feet.

He found well defined rooms, 20 in number. No Pueblo pottery was discovered. This ruin is well constructed, and there appears a more or less definite plan in the minds of its builders. Architecturally it is an advance beyond King and Handley structures.

In the description cited he mentions the discovery of a considerable amount of good horizontal masonry superimposed upon bases of stone slab construction. Particularly was this noticed in the heavy transverse walls between rooms 3 and 4 and 5 and 7. Yet most construction was such as obtained in other Canadian Valley ruins. We note with particular interest that the lower, or base, walls of these rooms are of Texas Panhandle Culture type. Slabs have been laid horizontally on top, all of which clearly indicates that at this large site on Antelope Creek the natives had progressed beyond the architecture of Wolf Creek. Here we have rudiments of Pueblo house construction.

Upon Cottonwood and Tarbox Creeks are many small ruins 11 to 12 miles west of Plemmons, Texas. Plemmons itself is on the bank of the main Canadian. In 1920 this was a small community, savoring of the old West. Tascosa, farther up the river, was in ruins. Many stories are told concerning pioneer days in Tascosa, and it is unfortunate that O.Henry, Charlie Siringo, or some other writer did not set down for preservation its interesting frontier history.

Cottonwood and Tarbox ruins may have been inhabited at the same time. Certainly they appear identical. Since our visit an oil settlement has virtually destroyed Cottonwood, yet at the time of Dr. Holden's inspection in April, 1929, the Tarbox ruins were in a fair state of preservation. Our inspection was merely perfunctory, yet since the remains have disappeared, it is well to present our rather crude field map and such notes and observations as were taken.

The country is rough and broken, intersected by deep ravines. There are several springs near both groups of ruins. Flanking Cottonwood is a long, high ridge on

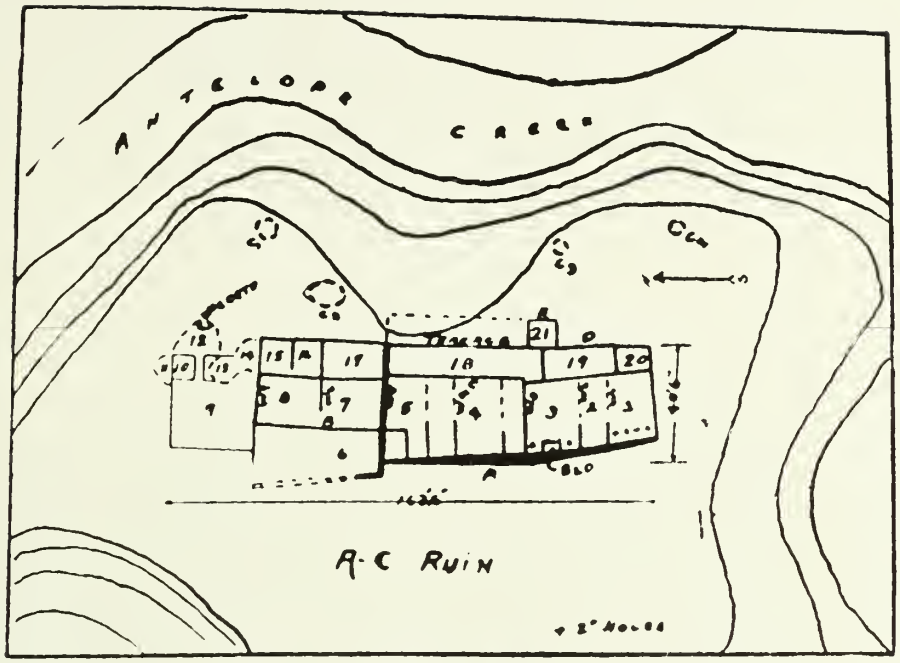


Figure 1

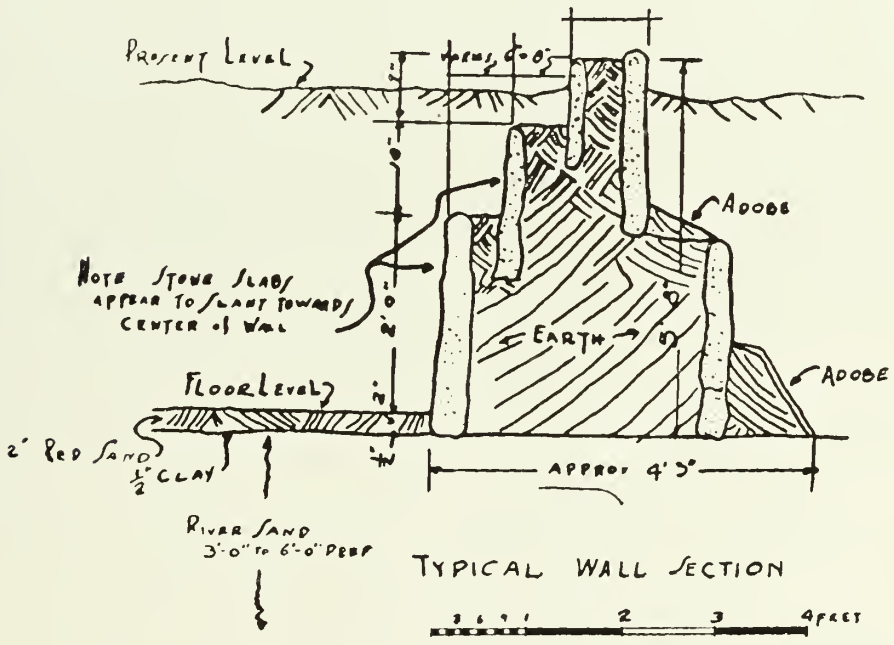


FIGURE 2

Fig. 52. Ground plan and cross section of wall of ruin A C, Antelope Creek. Drawn by Dr. Holden and reproduced from his report.

which were numerous graves some 500 feet north of the main ravine (see map). From below the elevation appears in sharp profile, and on this were located most of these ruins. Indeed, the entire setting is somewhat different from other ruin groups. When one descends a very steep bank into the gulch below and looks up the stones appear like small monoliths clearly defined against the sky and surrounded by very little earth. Aside from archaeological interest, it was a wild and weird spot, appealing to one's sentiment and conjuring up in one's mind pictures of that ancient past.

Fig. 53. Stone circles on high butte on Congdon's ranch. 8 circles in all were found.

Several pits excavated produced little or no pottery, and while there was a profusion of jasper, quartzite, chert, carnelian, chalcedony chips, there were not many metates or mano stones.

In contrast to other ruins, there were no mound-like structures from which stones protruded. We were informed that there were frequent and heavy winds in this section of Texas, and it is quite possible that earth originally surrounding these stones has disappeared due to wind action.

Most of these Cottonwood ruins were about 70 feet above the creek, and 700 to 800 feet back from the stream flanking the ravine shown on the outline map. While these buildings were not as large as those on Wolf Creek, yet one was 22 x 19 feet, another 25 x 16½ feet, and many of the stones, placed on edge, were 25 to 30

inches long. A feature observed both at Tarbox and Cottonwood, and not occurring to any extent elsewhere, was the large number of graves, roughly outlined, with flat stones set on edge. Thoburn counted 29 scattered through an area of 200 to 300 feet. Examination of these was limited to 3 or 4 in which we found decayed skeletons but no objects.

A comparison between the method of burial at Cottonwood and Tarbox and Indians of the far south indicates this difference; there, large limestone slabs were employed, and carefully fitted together. Frequently, little earth has infiltrated. In Tarbox and Cottonwood graves, however, small stones are utilized and the space surrounding the body is entirely filled with earth. Therefore, while the method is in principle the same, in the one instance great care has been exercised in forming the sarcophagus, whereas in the other stones are used merely to line the edges or sides. This form of burial, according to Dr. Kidder, does not occur in the Pueblo country, and it is certainly absent throughout the Arkansas Valley, in Kansas, and northern Oklahoma.

Both Cottonwood and Tarbox locations, containing as they did scores of buildings, presented too large and complicated a problem for our limited survey. Fortunately, Dr. W. C. Holden, representing the Texas Archaeological and Paleontological Society, visited this region with a party in April, 1929, and excavated to some extent on Tarbox Creek. (See Vol. I, September 1929 Bulletin of the Texas Society named above.) Oil employees told him that bones and fragments of pottery were found during the erection of an oil refinery and pumping station at Cottonwood. Holden presents a map and diagram of the main ruins on Tarbox, and we herewith insert a copy of his ground plan, together with portions of his text:—

> "Ruin A was the first to be excavated. It consisted of one room about 15 feet square. All the corners were slightly rounded, and the northeast corner was considerably so. The walls were between fourteen and sixteen inches thick and were of slab structure. The walls were easy to distinguish as many of the slabs were still projecting more than a foot above the ground. The old floor level was about fifteen inches below the surface. All the artifacts which we found were uncovered at floor level in the northeast corner and along the east end. About two and one-half feet from the north wall and one foot from the east wall were a number of fragments of pottery and charcoal. Near these was a large flat bone which showed no evidences of having served as an implement." He mentions a fine place surrounded by ten inch slabs on edge.
>
> In ruin B his party observed 12 or 15 rooms. "We found walls where none were expected from surface appearances. More thorough excavations and study may reveal a different floor plan than the one given in Figure 2. The outside dimensions are 68 feet by 33 feet. The old floor level is from 14 to 16 inches below the surface. Parts of the old slab walls were projecting above the surface as in the case of Ruin A. At other places the walls were completely covered with soil and debris. The various walls vary in thickness from 12 to 30 inches. The rooms are built on divers geometric

patterns. Some are rectangular; some are round; some are oblong; and some are rectangular on one side and circular on the other.

* * * * *

"The partition wall between Rooms 3 and 4 was of peculiar interest. There was no evidence on the surface of the presence of a wall. Judging from the general plan of the house, I suspected there should be one. Some digging uncovered a wall of horizontal masonry superimposed on slab structure. Some 16 inches was of slabs and 10 inches of the horizontal type. The partition wall between Rooms 4 and 6 was entirely of crude horizontal masonry.

"Adjoining the west wall of Room 2 is a small circular enclosure of slab walls. The outside diameter is 6 feet and the inside diameter is $4\frac{1}{2}$ feet.

Fig. 54. Rock barricade on Rice Mountain, near Cañon City, Colorado.

Beneath two layers of slabs, lying flat, or sloping, and covered with soil, and scattered among three other layers of slabs were two skeletons." The skulls lay together, other bones missing or badly decomposed. One, a child of two, the other an older child.

"The most interesting discovery in this place was found below the level of the skeletons. At a depth of 24 inches was encountered a 2 inch layer of charcoal dust mixed with soil. Digging deeper, we found at the depth of 36 inches a 6 inch layer of substance which appeared to be decomposed ashes and charcoal. We dug a tunnel to the north and found that the substance extended beyond and below the wall of the cist. It then occurred to us that the ash layer might be older than the heavy, outside west wall of Room 2. We accordingly extended a tunnel to the west and found the stratum reaching below and beyond that wall.

"From the standpoint of artifacts in both variety and number, the north room of Ruin D proved to be the most interesting spot on the hill. The two rooms of the ruin are circular in form; the diameter of the south room is about 8 feet and that of the north room about 7 feet. Something like half of the north room was excavated. We secured about 40 artifacts consisting of small manos, flint knives, a bone spade, scrapers, reamers, a bone awl, a bone needle and several spearheads. One of the spearheads is a beautiful specimen of agate-like material.

* * * * *

"It is noteworthy that no fragments of pottery of any kind were to be found either on the surface or the sides of the hill. A careful search on the part of several members of the party failed to reveal so much as a single

Fig. 55. Stones protruding from ground, located not far from the enclosure shown in Figs. 54 and 56, but on lower ground.

piece. Numerous fragments can be had by digging on the hilltop, whether inside or outside the ruin, but none were found nearer than 12 inches from the surface."

An Inspection Trip

We moved to Alibates Creek, which was examined by us rather briefly. Our party observed some 50 or more graves marked by stones on edge, and several well defined slab structures. This site has since been studied by Mr. Studer and Dr. Mason's party made excavations, one of which is described in this report. We returned to Canadian, meeting Mr. Floyd V. Studer and one or two other citizens, who accompanied us on several scouting trips.

Upon the ranch of Mr. Archie King, about 25 miles southwest from Handley's ruins, and a short distance from the old channel of the Canadian, is a group of 15 or

20 buildings, mostly small and scattered through considerable space. We merely searched the surface and did not attempt excavation. However, we were impressed by the extent of this settlement. About the King ruins, broken mano stones, metates and much chipped material is in evidence, yet little pottery. Such as was observed did not appear to be of Pueblo origin. Mr King's ruins have the appearance of low mounds, sand or earth had been blown by the elements around the stones until they were almost buried. Whether there have been oil developments since our visit of 1920 we do not know, but at that time Mr. King would not permit oil prospectors upon his property. A cursory examination of the King ruins leads one to a belief that they closely parallel those on Wolf Creek in concept and are not developed as are the ruins farther up the Canadian. Moving across country we reached Canyon, Texas, some distance south where upon the land of Mr. W. E. Bates we observed a very small ruin 22 x 18 feet diameter. There were numerous chips but no pottery observed on the surface. Stones were on edge but the walls did not appear to be thick.

From Canyon we travelled to Paloduro gorge, a very picturesque spot, and famous in early history. At this place we met several "oldtimers" who mentioned possibility of ruins in Bull Canyon, south of Tucumcari, also Indian Creek, north of Amarillo, and the Matador Ranch. Another gentleman claimed to have observed Indian "pictures" and relics some 8 miles north of Glenrico, Texas. In Paloduro Canyon we were unable to find rock shelters although there were a few petroglyphs. The survey moved to Amarillo. We called at the residence of Mr. Pat Landergin, who owns one of the largest ranches in northwest Texas. At his home we met Miss Harriet Corbin, with whom we had had correspondence. Mr. Landergin gave us permission to camp and excavate on his property and we proceeded to the Landergin Ranch some 55 miles north of Amarillo. En route we stopped on the north bank of the Canadian and observed there an exceedingly large site located near several springs. Acres of ground were covered, by chips of flakable stone. There were many hand hammers, blocks of chert, etc. Search in the bluffs, and upon adjacent land indicated absence of stone buildings or rock shelters. We were informed that this was a favorite camping place of buffalo hunting Indians in early historic times. Amidst the surface debris a typical tubular pipe was discovered and it is illustrated in Figure 61. It is not unlike some Pueblo forms, yet similar cylindrical pipes are not wanting in California or elsewhere. Both Miss Corbin and Mr. Landergin wished us to photograph some of the petroglyphs painted upon a great overhanging rock flanking a stream. It was locally designated "paint rock." The writer remembers distinctly visiting this interesting place and that upon a large sheet of wrapping paper we copied the designs, a few being rather complicated, many of them of animals and men, and several of which were done in a spirited manner. Unfortunately, this paper has become lost, but it should not be difficult, upon inquiry in the region, to locate the spot. Some one should copy these Indian records to insure preservation.

Not far from headquarters ranch on the Landergin estate is a tall outstanding butte or small mesa. A picture is presented in Figure 53. On the summit of this were 22 small stone circles. There is very little soil and it was therefore impossible to place stones on edge. The mesa is some 300 or more feet in altitude and its crest

is reached by a steep climb up a narrow trail. Established upon the summit a body of Indians would be absolutely protected from their enemies. However, there being no water available, save some distance from the base, Indians remaining on the top must sooner or later be forced to surrender. We discovered some broken metates, a few arrow heads and scrapers and small bits of pottery. Not more than an acre of space was available upon the summit.

An aged Mexican named Isobel, living at headquarters ranch, states that Kiowa, Comanche and Apache at various times camped upon the mesa top for protection. He visited them 50 or 60 years ago. They found stones already there and

Fig. 56. Rather large defensive work of stone.

used these for low walls and fire places. None of these Indians, he stated, made foundations for lodges.

Mr. Studer made two excursions to the top of Landergin's mesa, carefully searched and found 16 fragments of pottery which were identified by Dr. Kidder as Plains and not Pueblo pottery. We therefore concluded that Landergin's mesa was occupied by the Texas Panhandle Culture people.

From Landergin ranch we proceeded to Tucumcari, making the usual inquiries, and from there journeyed to Logan, New Mexico. From this point on, for some unknown reason, according to maps, the Canadian becomes the Red River. We are now well up and not far from that large and most eastern of all pueblos, Pecos.

We investigated the region around Tucumcari and at Ritter Springs found a very large site extending along the river, and here observed numerous flint, chert, jasper, chalcedony chips and hammerstones. In La Cinta Canyon we spent two days. A Mexican citizen, Mr. Lee West, who was thoroughly acquainted with the region, showed us 2 or 3 small caverns or rock shelters in which we found ashes, charcoal and some arrowheads. After much difficulty we managed to get our outfit

down a narrow sheep trail to the base of the canyon. At the lower end of this canyon, some 60 miles away, is the famous Bell Ranch, the employees of which were much surprised at our appearance. Automobiles frequently entered the canyon but always from the lower end and up to the time of our arrival no one had been known to bring cars down that steep trail at the upper end. While we worked on some small unimportant rock shelters, Thoburn went up Burro Canyon, 8 miles finding several shelters that contained ashes.

We journeyed to Mr. Congdon's ranch, 12 miles south of Logan. Here was found a high detached mesa similar to that one on Landergin's ranch. Congdon's butte is precipitous on all sides except toward the south and even there the climb is quite steep. On the top are 8 stone circles or foundations and there is a stone wall protecting the entrance. There are evidences of hard packed earth floors down 10 to 20 inches and considerable charcoal and ashes. The crest of this rock is 63 paces east and west and 40 paces north and south. We picked up a small fragment of typical Pueblo pottery, several minute scrapers and mano stones.

We continued up the river past Sanchez and went to Watrous, from thence to Mora, which is as far westward as we penetrated. From Sanchez upstream, and particularly in the vicinity of Watrous, there is typical Pueblo culture in evidence although buildings are not extensive and there is not one large or dominant site, such as would compare with any of the outstanding buildings at Aztec, Chaco, Pecos, etc. Several days were spent in this section, but no excavations other than test pits were attempted. Upon a high ridge and not very far from the town of Mora one observes 21 circles of stone, the largest of which is 15 feet diameter and 2 feet in height. These are surrounded by the usual signs of occupation. Upstream a short distance from Mora, where the valley is narrow, shut in between ranges, were several buildings, one of which is rather large, perhaps 60 or 70 feet in extent. Towering above this ruin toward the west is a high mountain. Southwest lies the pass through which Pecos could be reached by trail, a distance of, approximately, 50 miles. We shall comment later upon this subject.

We secured quite a number of pottery fragments of both black on gray ware, and corrugated. Dr. Kidder examined these and assigns the black corrugated ware to a period between the years 1,000 and 1,200, known in his classification as Pueblo III. See Figure 62.

The Upper Arkansas

No work was done along the Arkansas itself beyond western Kansas.

We are indebted to Mrs. Paul Huntley of Cañon City, Colorado, for interesting information concerning Indian remains in the upper Arkansas.

Figures 54 to 56 are reproduced from photographs she kindly sent us. Mrs. Huntley is an enthusiastic student of local antiquities and has examined the country within a radius of 25 miles.

Mr. and Mrs. Huntley lived near Rice Mountain, in North Webster Park, on Wilson Creek, about 15 miles northwest from Cañon City. Not far from their home she observed on the spur high up above the creek several irregular stone barricades. Figure 56 presents a considerable section of the largest "fort" and Figure 54 another

view of the same. Mrs. Huntley did not measure the walls but it is her opinion that the several sections range from 10 to 30 feet in extent.

In Figure 56 are a number of long stone slabs now standing and Mrs. Huntley thought that many of the stones originally were upright. This, however, would imply some kind of support or that the Indians had set them in the ground. The place merits a careful examination. On a flat below the ridge are found stones in either circles or quadrangles shown in Figure 55. Mrs. Huntley is of the opinion that they do not compare with the Panhandle ruins. She found upon the surface many fragments of flint, a few perfect arrowheads, as well as broken projectile points, and mano stones. The stones shown in Figure 55 appear to surround spaces the size of small rooms. No excavation was attempted save in the creek bank 100 yards beyond where Mrs. Huntley dug out some fragments of pottery and the unusual and highly specialized chipped object shown in Figure 57.

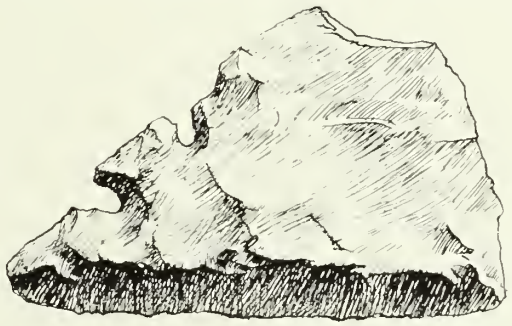


Fig. 57. Highly specialized chipped tool, numbers of which have been found in the Panhandle of Texas. Locality, near Cañon City, Colorado. S. 1-1.

Twenty-five miles east of this spot a boy found two whole pottery vessels resting upon a shelf in a bluff—possibly a rock shelter. He was very young and not realizing their importance they became broken before Mrs. Huntley secured the fragments. One had the capacity of a gallon and the other about half as much. The lady very kindly sent us the pottery and it was examined by Dr. Kidder who pronounces it not Pueblo, but like Texas Panhandle types. He also identified as Pueblo corrugated, period about 1100 A.D. the fragment she found about 5 miles from Cañon City.

Mrs. Huntley's researches indicate there is considerable archaeological material of importance in the upper Arkansas and it is to be hoped that the region will be carefully studied by the officials of the Colorado State Museum.

Cimarron Country

Our survey travelled for a number of days along the upper Cimarron, Cimarron County, Oklahoma. We heard of a few ruins farther up toward the mountains but were unable to visit them.

There are many overhanging bluffs and evidences of inhabited rock shelters as

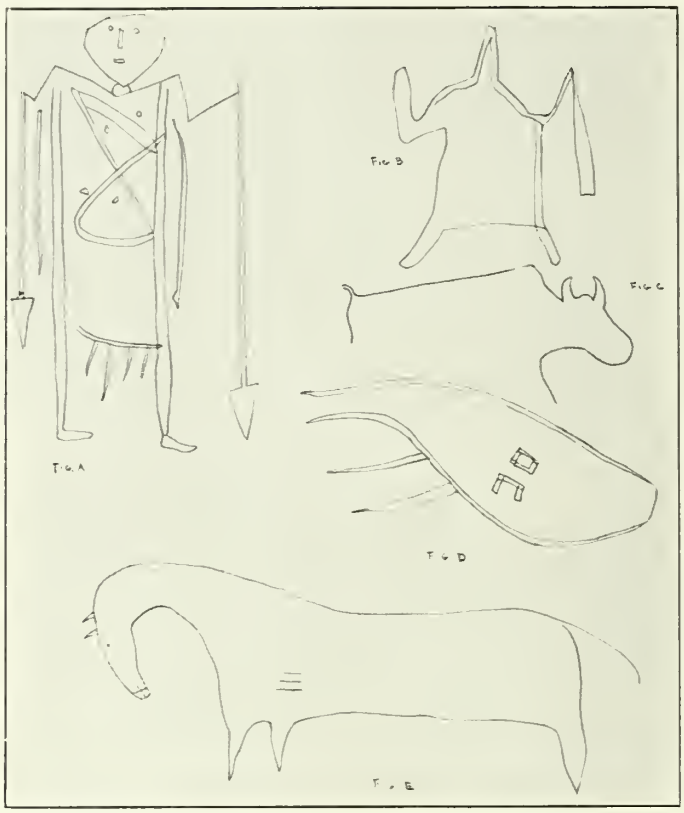


Fig. 58. Petroglyphs from Sam Hallock's ranch, Cimarron Valley.

Professor Thoburn has indicated on page 54. One of the most interesting features of primitive life in the Cimarron is the large number of petroglyphs. Mr. Easley and Mr. Sam Hallock of Cimarron County own considerable land flanking the river. At one point on Hallock's ranch there are scores of designs, some carved into the rock and a few painted.

These sandstone bluffs are continuous for miles, fairly regular in outline and occasionally intersected by ravines or gulleys. The floor or bench varies from 6 or 7 to 15 feet above the valley. There has been a great deal of weathering or erosion, and in some places the overhang is considerable. All petroglyphs are placed on smooth sections of the wall and vary from a few feet to as much as 10 feet above the bench or floor. Sheltered by the overhang they were protected from the weather and are therefore well preserved.

The cuttings are $\frac{1}{10}$th to $\frac{1}{4}$th of an inch deep and all appear more or less weathered. We reproduce these designs in Figs. 58 and 59.

A Height, 20 inches.
B Painted in black, height 10 inches.
C Black paint.

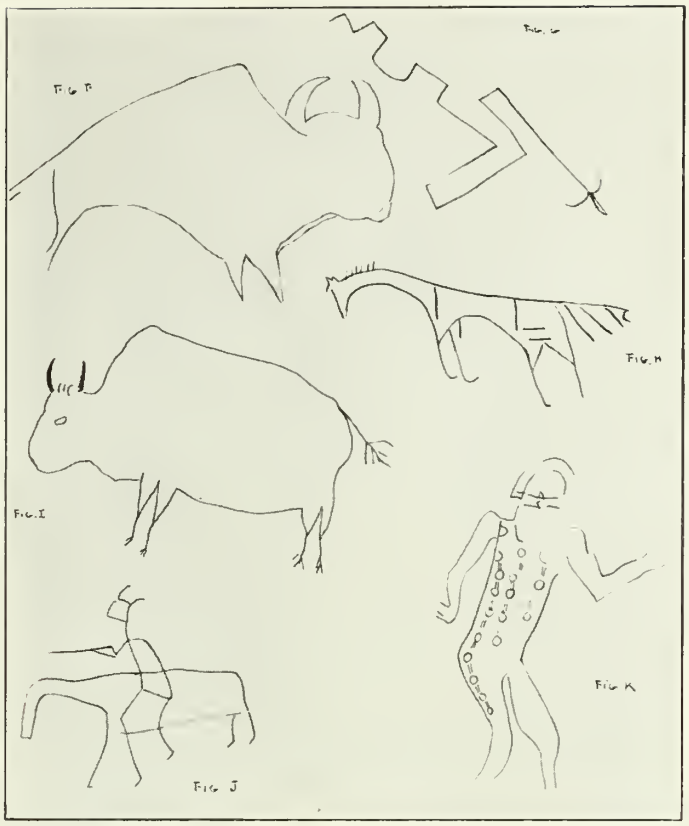


Fig. 59. Petroglyphs from Sam Hallock's ranch, Cimarron Valley.

D 20 ft. above the valley, design about 20 inches long, head missing due to work of vandal.
E 28 inches long.
F Life size.
G 26 inches.
H 10 inches. Black paint in the cuttings.
I 18 inches.
J Rather small.
K About 18 inches.

Whether the Cimarron petroglyphs are the most extensive in this country seems doubtful, yet we must record that they are scattered through 8 miles of bluffs and our party noted some 300. Cattle men informed us that they are rather frequent all through the valley.

As to the human outline lettered K, Thoburn thought it represented a Spaniard in armor. Another person is of the opinion that it indicates smallpox, which, as we all know, was a great scourge in early times. One or two observers consider this portrait and the life-sized buffalo (F) quite well executed.

Numbers of these petroglyphs in both Texas and Oklahoma Panhandles, western New Mexico and elsewhere are damaged because white people have carved their initials in proximity to or upon the Indian art. At several places we painted in large letters high up and 100 feet or more from the groups of petroglyphs, a request that this practice be discontinued.

Mr. Floyd V. Studer has actively continued his reconnoissance work through 1929 and 1930. He reports ruins 15 miles due north of Vega, Texas, near the Canadian River on Mr. Landergin's ranch. This, apparently, is a different site from the one we discovered. He says: "They may have been visited by you, yet somehow I doubt it. The ruins are located on an unusually high mesa, or the flat top of an isolated peak, and show evidence of long habitation. I have done no excavating, but have picked up many artifacts, perhaps more than at any other place I have visited."

May 16, 1930, Mr. Studer wrote:—

> "Last evening Mrs. Studer and I drove to Tascosa, Texas, which is 40 miles west of Amarillo, and on the Canadian River. On Saddle Back mountain, which is one-half mile south of the Fort Worth and Denver Station at Tascosa, we found much evidence of the Post Basket-maker. (I will call it Post Basket-maker until someone corrects me.) There are perhaps four to eight rooms on top of one small peak. We observe the same simple architecture found in nearly all of the stone ruins on the Canadian River. These, however, are not at all well preserved, and appear to be very old. The top and side of this peak is literally covered with flint, hearthstones, metates, manos, and buffalo and deer bones. I found many pieces of Post Basket-maker pottery, and one fragment of pottery, which is enclosed, and appears to be, perhaps, Pecos.
>
> "This may be of interest to you, because thus far this is the first piece of colored pottery I have ever found at one of our so-called Post Basket-maker sites. I am hopeful of discovering more. I have never heard of anyone else finding colored or decorated pottery at one of these Canadian River sites.
>
> "I also found several very fine bird points, one worked obsidian object, and a number of fragments, a few hide scrapers of the usual type.
>
> "Another very interesting observation is that on the north side of this peak, the refuse heap is about four feet in depth, which leads me to believe this particular site had a long occupation."

Dr. Kidder examined these sherds and states that the decorated one is Pecos of early type, but all others are of Plains or Texas Panhandle Culture.

Mr. Studer was asked to prepare some field notes upon his observations. These appear on page 131.

Recapitulation and General Conclusions

Again we begin at the mouth of our river and work upstream. Brushing aside minor differences exhibited in local mound groups, or their accompanying habitation sites, we find the life of our mound people to be homogeneous with Indians of

the "pottery belt" or mid-Mississippi valley mound culture. That they present characteristics in common, all of which have been established by Holmes, Moore, Harrington and other writers and explorers.

Our first marked change, which we have studied rather intensively, occurs in Yell County, Arkansas. Extending westward and well into Oklahoma, we observe

Fig. 60. Chipped objects, upper Canadian River. Collection of Mr. Floyd V. Studer. Note the beveled knife in upper row. It is of the four blade type. S. 1-2.

diminution of tumuli and a lowering of what might be termed Mound-builder art or custom.

Down river we were in a heavily timbered country, great expanses of lowlands, large sluggish rivers, and swamp areas of considerable extent. Such conditions seemed to appeal to mound-building tribes throughout the entire South. Indeed, in central and southern United States there are few mounds in rough and hilly sections of the country and even fewer in mountainous regions. As we proceed, this lower river terrain changes and forests gradually become smaller until they practically disappear in northern Oklahoma, where we enter the Great Plains or buffalo country. It should be observed that while this transition is gradual, nevertheless it is evident.

To the north, a scant 3 to 5 days journey on foot from the Arkansas itself, located in broken terrain, are the Ozark Bluff Dwellers. One may safely claim their culture to be absolutely separate and distinct from all others in this great basin of nearly 1500 miles in extent.

In central Kansas are evidences of extensive cultures, rather primitive, such as were observed by Coronado and to which he gave the names Provinces of Quivira and Haraliey. These constitute our fourth culture. Archaeological investigations have produced a large amount of stone material from certain sites where population in early times was quite dense.

These collections would indicate that the villages of prehistoric periods before Indians obtained horses, were more or less permanent.

With the introduction of the horse Plains tribes became vastly more mobile and nomadic. All available records of archaeological explorations in the Great Plains lead one to the conclusion that there are not many large village sites of the historic period.

In western Kansas, in both Scott and Clark counties, we find inclusion of undoubted Pueblo culture due to migration from Pecos, or Taos, or elsewhere, into the Great Plains. This is set forth in our historical records. Remains in these counties are to be neither confused nor confounded with Texas Panhandle Culture located in the Canadian Valley. They are strikingly different.

Eight or ten miles east of Wolf Creek, Ochiltree County, Texas, we discover our first small foundations, or rectangles of stone, which are indicative of Texas Panhandle Culture. There is more or less steady progression in size and numbers of buildings and improvement in stone age art until we reach the Mora, a tributary of the Canadian. At the head of this little valley there is unquestionable evidence of well defined Pueblo architecture and ceramic art, if not identical with that of Pecos, at least similar to it.

Admitting the necessity of further research, nevertheless it would appear that upon data obtained by Mr. Studer, Dr. Holden, Dr. Mason and our own survey, we are justified in presenting certain conclusions. Somewhat minute examination of these seems in order.

A total of six or seven different cultures in the entire Arkansas drainage is apparent, four of which are outstanding and clearly defined.

We need not comment further upon the lower river or the Ozark Bluff Dwellers. From central Oklahoma northward and westward, we know that the buffalo entered very largely into the life and living of Plains tribes. There was not that development in agriculture so evident in the mound areas. Actually, we do not know as yet very much concerning prehistoric life in the Great Plains. Our literature covering the historic period is extensive. According to this it would appear that the Plains or "horse" Indians presented a culture more or less uniform although there were linguistic differences.

In western Kansas, Oklahoma and Texas Panhandles we find many of the so-called stone rings; that is, large flat stones placed in circles upon the surface. They were more common 15 years ago than at present. Doubtless many have been removed in recent times. Some observers have thought these were sun symbols and

made use of in ceremonies. It would appear to the writer that a different explanation should be offered. We are now in a country swept by severe storms and high winds. What would be more natural than for man to place large stones upon the edges of buffalo hides covering his tepee frame in order to secure his habitation? Skin

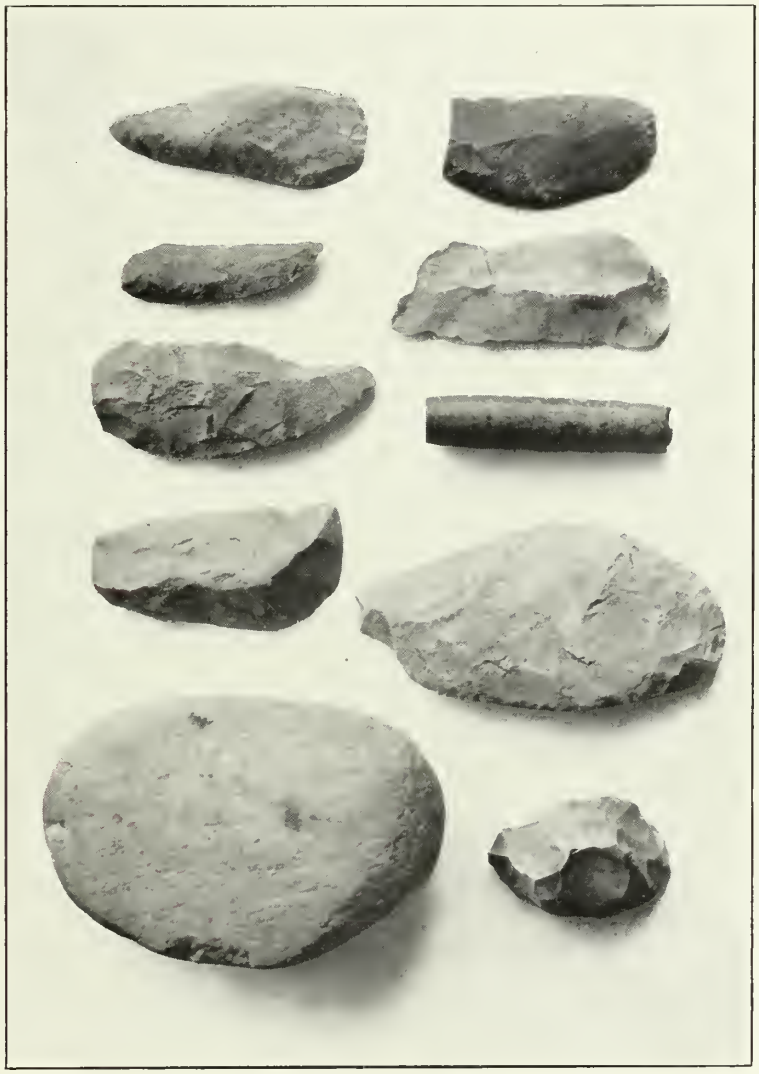


Fig. 61. Objects from Ritter Springs, New Mexico. The tubular pipe may be of Pueblo origin. S. 1-2.

coverings were pegged to the ground. The strain, due to winds, would tend to loosen the base. Hence the use of stone slabs. This custom obtaining for an unknown length of time might suggest partial stone construction. Let us examine the field evidence. Along Wolf Creek, Cottonwood, Antelope and other streams, where these small buildings occur, there is a superabundance of stone of desired form.

In times of considerable antiquity the first red men entering the valley probably lived in skin lodges. By turning to page 112 the reader will observe that Dr. Holden found evidences of previous occupation under the walls as did our party at Handley ruins. One refers to antiquity advisedly for no observer considers these ruins recent. It is quite probable that some Indian, a little brighter than his fellows, conceived the idea of utilizing stones as foundations for his hut. From this simple discovery improvement architecturally was rapid, or at least progressive, hence the larger, more complete buildings and settlements as we approach the Mora Valley just over the divide from famous Pecos.

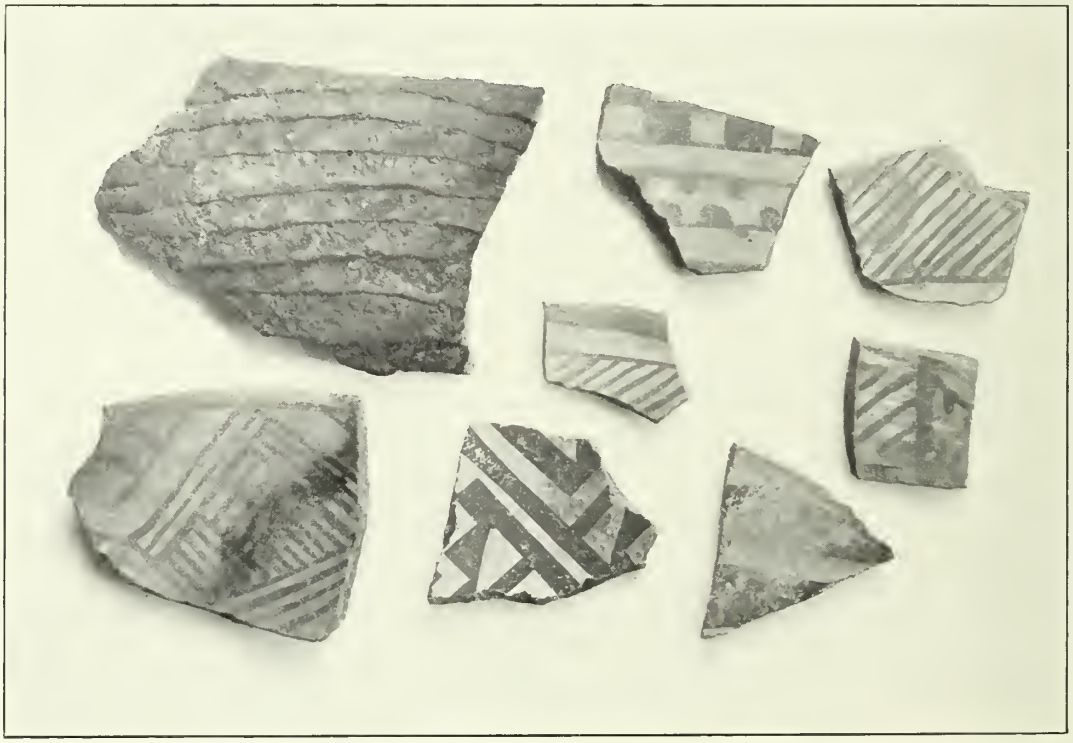


Fig. 62. Characteristic upper Mora Valley Pueblo Pottery. Found by our survey in the ruins. S. 2-3.

We are quite aware that several distinguished archaeologists, who have perfected very important and accurate researches in the Pueblo country itself, incline to the opinion that all these Canadian ruins are the result of migration eastward of the Pueblos themselves. This may be true. However our savants do not seem to take into account one very important factor which is the chief or dominant characteristic of entire Pueblo life—their ceramic art. That is more pronounced than the architecture. It is fixed, and has been accurately divided into 18 or 19 sub-divisions all based on decoration, or form, and time epochs assigned to most of these.

In the entire area east of the Pueblo country we have a profusion of pottery forms and fragments. Notwithstanding several attempts no satisfactory classifica-

tion has ever been devised. That such is possible no one may deny, but the subject is extremely complicated and difficult for the very good reason that there are in our museums and general collections a world of different designs, motifs and concepts. Actually, the ceramic art while everywhere apparent, did not follow fixed or established forms in decorative concepts.

The parallel we wish to draw between pottery of our entire country and the Southwest apears to us to be very important. Our Pueblo ceramic art is clearly defined and persistent and it is generally accepted as characteristic of the people and the area in which they lived. No one disputes this.

Leaving the Mora Valley, where Pueblo ceramic art obtains, and working eastward, by the time Tascosa is reached, this art has totally disappeared. We believe that the Pueblo people, if they erected the remains at Wolf, Antelope, Dixon, Tarbox Creeks and King's ranch, would have left concrete evidence of their pottery art. Of course, it might have become modified but it certainly would not in that short distance have changed to types comparable with those of the Great Plains.

True Pueblo pottery and irrigation ditches are in evidence in Scott and Clark Counties, Kansas. These two settlements are very different from the slab house construction evinced at the sites we have described.

In several places have been found a few fragments of corrugated or painted Pueblo ware. These occur on the surface and there seem to be more of them southwest, west or south of Amarillo than from the Canadian Valley itself.

The Pueblos frequently organized buffalo hunting expeditions. Women probably accompanied these and carried along some small earthenware jars. Other scouting or hunting parties undoubtedly visited many sections of the Canadian Valley and left evidences of their presence, for aught we know to the contrary, in post Texas Panhandle Culture times.

Save in one instance, there are no records as to painted or coiled ware pottery fragments found in floors or ash pits of the Texas Panhandle Culture. The exception occurs not far from Hereford in Deaf Smith County on Tierra Blanca Creek. Here Dr. Holden and his party discovered several small buildings, one of which they excavated in August 1930. He secured quite a number of fragments representing Glaze II, IV and V of Pueblo culture, which Dr. Kidder assigns the period 1300 to 1500. Holden's report read before the annual meeting of the Texas Archaeological and Paleontological Society, came by air mail as page proofs were being prepared. In this important and rather lengthy paper, not yet published, Dr. Holden mentions the necessity of a study of the region south or east of Pecos, therefore his expedition located at Tecolote, which is of Pecos and not of Arkansas drainage. We can not present his findings in advance of publication. It is sufficient to say, however, that careful work done at Tecolote indicates direct Pueblo influence and culture rather than that of the Texas Panhandle. Since he found fragments of Pueblo pottery of the 1300-1500 period at Tierra Blanca near Hereford, Texas, we heartily agree with the conclusion expressed in his final paragraph to the effect that Pueblo Indians when on hunting expeditions occupied some of the ruins. At the time of such visitations these ruins were in better state of preservation and their use as temporary homes by the Pueblo people is natural.

It was the Department of Archaeology at Phillips Academy that financed Dr. Kidder's important work, continuing many years at Pecos pueblo. Otherwise, it would not be proper for us to refer to a discovery made some two years ago. This is unpublished and therefore details are not available until Dr. Kidder issues his report. Near the pueblo itself, just across the arroyo, he found a rudimentary, or first, pueblo of simple construction and apparently much older than the stone structure on the mesa above. Just how far the artifacts found compare with those from the Canadian valley remains to be seen.

This discovery is of very great importance, in our opinion. Two theories suggest themselves. First, assuming that a band of Indians came into the Pecos Valley

Fig. 63. Site No. 13. Photograph by Mr. Studer. See page 135.

from the Southwest and about the time that Pueblo architecture in Chaco or Mesa Verde was well established, it is to be presumed that they would at once select Pecos rock and erect a typical stone pueblo. Again, if the migration was from the Southwest, in pre-Chaco or pre-Mesa Verde times, it is conceivable that they would not immediately construct stone habitations. Second, that the first Indians came into the valley from the East, lived for some time in the more primitive pueblo and gradually began the erection of Pecos itself.

There are two or three routes from the Canadian to Pecos Valley. We have already mentioned that one from near the town of Mora over the mountains to Pecos pueblo. This is shorter but necessitates passing over high ranges. A longer, but much easier trail, from the sites near Tascosa and Hereford, Texas, reaching

Pecos Valley somewhere near Santa Rosa in Guadaloupe County, New Mexico might have been followed. It is significant to observe that all through this Canadian region and the upper Red River, the Texas Panhandle Culture persists. True Pueblo pottery does not occur in quantity. The reverse is true in the Pecos Valley. Dr. Holden found a preponderance of Pueblo art at Tecolote, as mentioned on page 125, but here there is no particular indication of Texas Panhandle Culture—it has practically disappeared.

Chronology of Pueblo Cliff-dweller culture in the Southwest is not entirely established. One may safely assume that the region was occupied at least two or three thousand years, and perhaps longer. During this time epoch there may have

Fig. 64. Wall of slabs, upper Mora Valley. Observe that these stones are placed horizontally, not on edge, as in buildings farther down river.

been migrations to and fro. We must remember that the great game country lay east of the Rockies rather than in the Colorado or Rio Grande drainage. This being true, why did not Pueblo establish themselves on the Arkansas, Canadian, or Red Rivers? We know that raids by non-Pueblo tribes caused the final abandonment of Pecos. Were the Texas Panhandle Culture folk friendly to the Pueblo, or of that stock, unquestionably many inhabitants of Pecos, or other similar settlements west of the Rockies, would have journeyed east and joined with their friends. The very fact that the Kansas pueblos were abandoned, and that there was no such general migration into the Texas and Oklahoma panhandles, would indicate hostility on the part of Plains tribes to the Pueblo or, that the slab houses were pre-Pueblo.

We do not know the lingnistic stock of the Texas Panhandle Culture.

As to the stone artifacts themselves, these are not wanting. It is rather curious that throughout a region of such extent, and where there are some hundreds of remains, there is not a superabundance of stone objects. Those obtained by the several surveys and private individuals furnish us with a basis of comparison. Certain forms are common throughout the entire region between Little Rock and Santa Fe, yet this observation would apply to all sections of eastern and southern United States where primitive man lived. Among all these artifacts we observed types more or less confined to the region under discussion and interpretative of the culture.

Concerning pottery of Panhandle Culture people, reference to Figures 37, 38 and 49 will acquaint readers with prevailing decorative concepts. All are simple and have slight variations.

We have already commented upon the importance of Pueblo ceramic art. There is another factor to be taken into account. The writer has referred to the great abundance of flat slabs available all through the upper Canadian. If these ruins were erected by Pueblo coming in from the West, is it not curious that they should have abandoned their effective method of house construction? Why did they build walls of stones laid flat throughout the entire Pueblo country and on reaching Canadian reduce to simple form this very effective architecture? Is it not more natural to assume that the reverse is true, and that our Canadian valley folk began with primary simple house construction?

Returning to Wolf Creek, for a final and brief pause, we again inspect Gould ruin. Its walls are massive and there are almost no evidences of partitions dividing the large central space into rooms. Structures of heavy timbers covered with earth are not unknown among the Mandans. Catlin describes medicine, or assembly, lodges 40 or 50 feet inside diameter. We conclude, therefore, that Gould ruin was a large assembly place and that from the nature of its construction it marked a distinct advance over the earth-timber lodges of Plains tribes.

It is significant to note that at true pueblos in western Kansas there are irrigation ditches of considerable extent. We do not find them in our Canadian Valley. The Indians of our Texas Panhandle Culture may have raised corn and beans, but they appear to have depended chiefly upon buffalo, antelope and other game.

Whether one considers the trail across the mountains from the head of the Mora to Pecos, or the longer and more comfortable route lying southward and finally reaching Pecos Valley, is immaterial. Certainly there is steady improvement in architecture and art upstream from Handley and King ruins until we reach well defined Pueblo settlements at the head of the Mora. It is, therefore, not difficult for us to visualize a gradual progression towards perfection in both architecture and ceramic art which finds it culmination in the very great structure established upon the rock of Pecos.

Finally, the proposition that all these ruins and settlements in the Canadian Valley are due to a migration of Pueblo peoples eastward may be true. If we assume that hypothesis we must explain the disappearance of two characteristic and dominant arts within a distance of less than 250 miles.

Our conclusions were sent to Dr. W. C. Holden with the request that he suggest and criticise freely. In a letter from Lubbock, Texas, dated November 4, he gives his views as follows:—

"It appears to me that you make out a very good case for the western migration of the Panhandle Slab-house dwellers. I confess the more I investigate and study the Canadian Culture the more at sea I am for an explanation as to how it originated and what became of it. It seems to me, however, that it may be reduced to three alternatives. One of these is the theory which you advance. A second is the Pueblo expansion theory. If

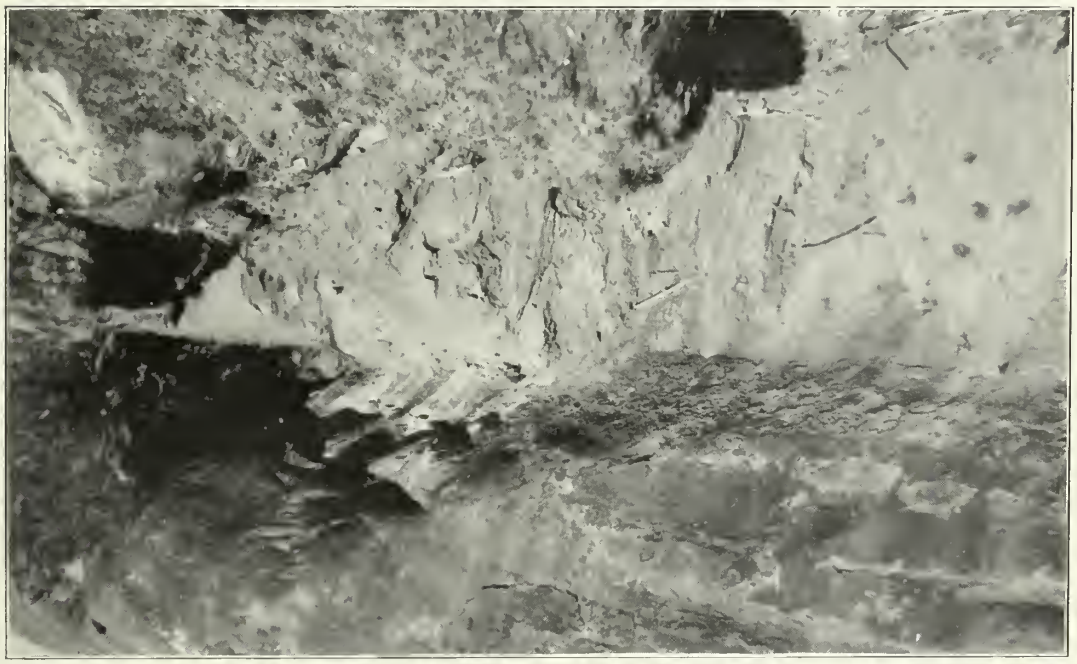


Fig. 65. Rock shelter, site No. 15. Adobe wall and refuse at the base. Photographed by Mr. Studer.

Dr. Kidder's chronological classification for the Southwest is correct it may be that the distribution of the late post-basketmaker period was far more extensive than the distribution of the pre-Pueblo and Pueblo periods. I understand that the black-on-white pottery was a pre-Pueblo development. It could be that during the shrinking process that the invention of the black-on-white pottery was made about the time the Canadian Indians had withdrawn as far westward as the Mora vicinity. A third alternative would be that the Panhandle culture had no relationship to the Southwestern Pueblo culture, and that it was a glorified Plains development which existed during early Pueblo time or before. If this be true, however, it will be necessary to show that the Mora dwellers were of Pueblo origin and were not related to the Panhandle-Canadian dwellers. I believe

that much more excavation and intensive study will be necessary to prove or disprove any of these theories."

The Question of Origin

In our preceding pages we have indicated the importance of the upper Canadian, Cimarron, Red and Arkansas valleys in prehistoric times. Students and lay readers will understand that just now it is impossible to offer anything definite concerning the origin of the Texas Panhandle Culture.

Just recently Dr. Edgar L. Hewett's important volume, "Ancient Life in the American Southwest," has come from the press. Although Dr. Hewett, who has labored long and successfully in the Southwestern field, mentions but briefly the region we have discussed, yet he does refer now and then to origins. He treats Southwestern archaeology in its broadest aspect. One or two of his comments, obviously presented in a conservative manner, suggest a new line of thought, which we desire to present. In all probability we shall, a decade hence, have our origin inquiries answered.

Several, if not most, of our very able students of the Southwest proceed upon the assumption that these cultures developed far to the southward and came into Arizona, New Mexico and Texas from Mexico, or more distant sections. Some archaeologists familiar with the Mexican and Central American fields seem to have taken for granted northern migration on the part of their tribes—hence the development of Pueblo Cliff-dweller culture of the Southwest. Is it not possible—we do not claim probability—that the migration was from the Pueblo Cliff-Dweller cultural areas into northern Mexico? Some of the earlier writers mention this hypothesis, yet it is discarded by modern archaeologists. There is somewhat to be said in favor of the proposition. It satisfactorily explains a gradual improvement of art and architecture until we have reached central Mexico. Assuming that the more popular theory is correct, we must explain the disappearance of truncated pyramids and large buildings long before we have reached the Texas or New Mexico frontier. On page 22 we have already commented on the absence of truncated pyramids throughout 1500 miles of territory. The northern migration theory is plausible if we assume it occurred prior to development of art and architecture. That is, that it began in early Neolithic times. If this northward movement took place after high development in either Aztec or Mayan countries, it is natural to conclude that examples of both arts should be found, not only in northern Mexico, but also the valleys of the Gila and Salado. Habitat and development of corn also enters into this question. When that is determined we shall know which of the two theories is correct. In the light of our present knowledge—and we admit its inadequacy—it would appear that we have quite as much in favor of the northern origin theory as the other.

Contending that man came down the Pacific coast—as most agree—it is reasonable to suppose that he tarried in the Southwest. Such field evidence as we possess seems to tend in that direction. That he moved from north to south appears to be more logical and less complicated than the other theory.

SOME FIELD NOTES AND OBSERVATIONS CONCERNING TEXAS PANHANDLE RUINS

By Floyd V. Studer

Northwest Texas is a virgin field for the historian and archaeologist. While we have no ruins and village sites comparable to the spectacular Maya buildings, or the extensive Inca structures, nevertheless our section is intensely alluring.

My interest in northwest Texas archaeology began 23 years ago when I accompanied Professor T. L. Eyerly, my history teacher, on an expedition to what was then known as "Buried City" on Wolf Creek, in Ochiltree County. This is the same site that my good friend, Dr. Moorehead, partly excavated several years later. While I did not meet him until some time after I became interested in the subject, I want to publicly thank him for valuable assistance he has rendered me throughout these years.

Although my work has been mostly reconnoissance, I have spent considerable time trying to locate, with accuracy, each site on individual county maps, as well as upon a large northwest Texas map.

During the past 23 years I have located, visited and mapped 110 major ruins, and have seen some of them many times. Many of these ruins had been previously reported by Dr. Moorehead, who in my opinion is the first scientist to make a survey and a report upon our region. Many of these are what I term Post Basket Maker, and I have in my files a rough sketch map record of each. Appreciating the fact that it takes much time to properly excavate even a single room of a ruin, or burial, I have left most of these sites undisturbed, except for a little surface work, or examined the previous digging of some cowboy.

Some of our Post Basket Maker sites are not visible on the surface, and only through the presence of flint and pottery, or because of gopher and prairie dog holes, are we able to locate such.

An outstanding characteristic of most of these ruins is found in their location, as in all ages protection was recognized as a primitive instinct. His home was built first apparently for protection, both from warring tribes and the elements. He often sacrificed convenience to water for a well protected home site.

We appear to have no burned rock mounds, no mound-building culture, and few rock shelters, but we do have many slab house sites, with now and then a gesture of horizontal masonry. This latter is in evidence at two ruins. We have Plains sites in abundance. We differentiate between Post Basket Maker and Plains, calling the Post Basket Maker culture agricultural, and the Plains nomadic. We likewise have evidence of what we might call a sand dune culture—at least their artifacts and pottery are different. We also have some evidence of a semi-cliff-dweller occupation. This site is No. 15, and may have been a regular Post Basket Maker site whose people utilized a large overhanging cliff as a part of their wall structure.

Northwest Texas presents a wide and interesting field in many respects. Geographically, we are in the extreme north portion of the state with extensive level plains, cut east and west by the Canadian River and its many tributaries. This territory in and around the Canadian is very wild and picturesque.

The limestone caprock, which outcrops on the edge of the Plains before breaking into the tribntaries of the Canadian and other valleys, is of white and gray colors.

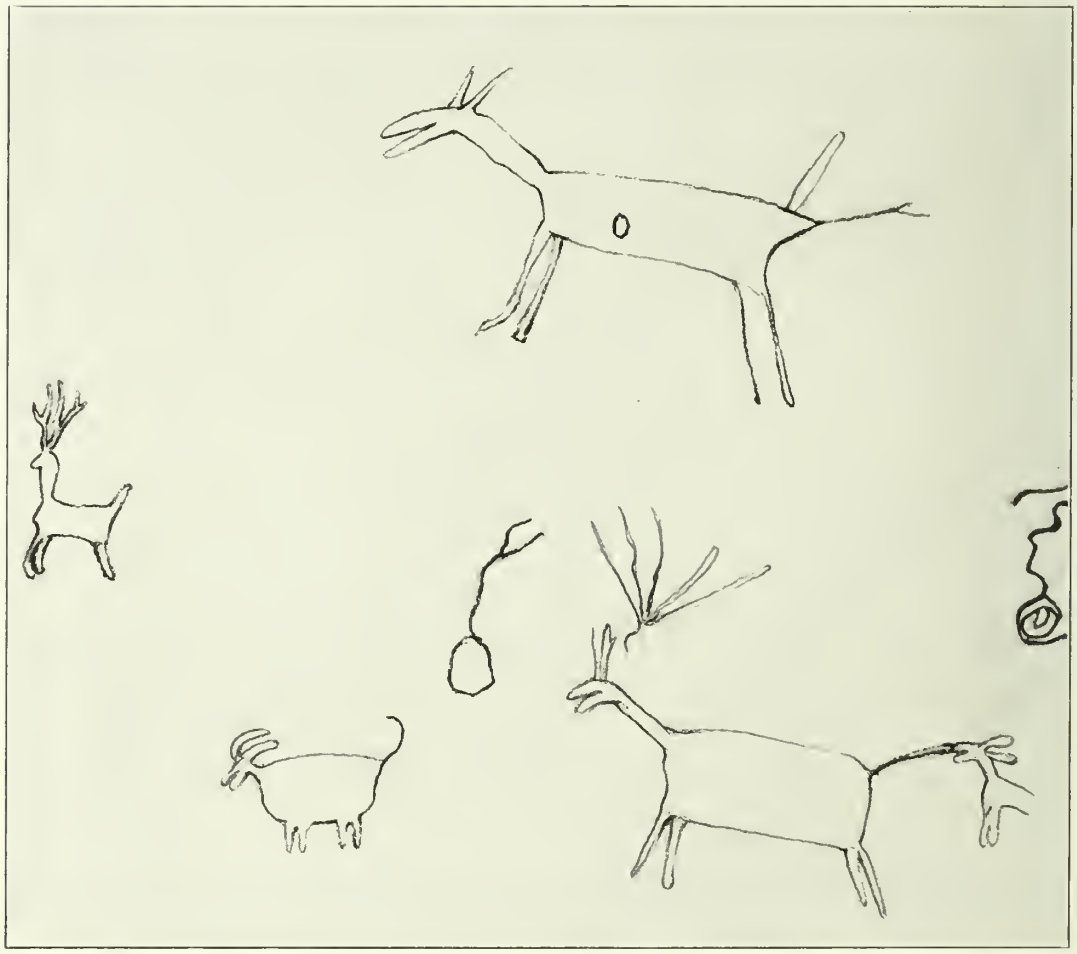


Fig. 66. Drawings on the rocks, 8 miles west of Bell Ranch, near Tucumcari, New Mexico.

The foundations, and perhaps the walls, of the various Post Basket Maker sites are made of this limestone material.

Generally speaking, our entire northwest section is more or less barren of trees of any kind, yet in the watered valleys one will find cottonwood, hackberry, a few walnut, chinaberry, several varieties of willow, and many small cone bearing trees such as juniper and cedar, and on the Plains proper, adjoining the various tribu-

taries, an abundance of mesquite. Among the smaller plants we find yucca or bear grass, sage, wild plums and wild grapes. There are few, or no, nut bearing trees.

Our territory originally abounded in wild animal life, and even today one finds deer, antelope, coyote, rabbits, raccoons, wildcats, many prairie dogs and small animals. There were, of course, great buffalo herds. Wild turkey, quail, both Mexican and Bob White, plover, ducks, geese, and almost every species of small bird life occurs here. The bones of these various animals and birds are found in practically every site.

During the rainy season there was always an abundance of water on the level or flat Plains where the buffalo and other game roamed. Even in the so-called dry

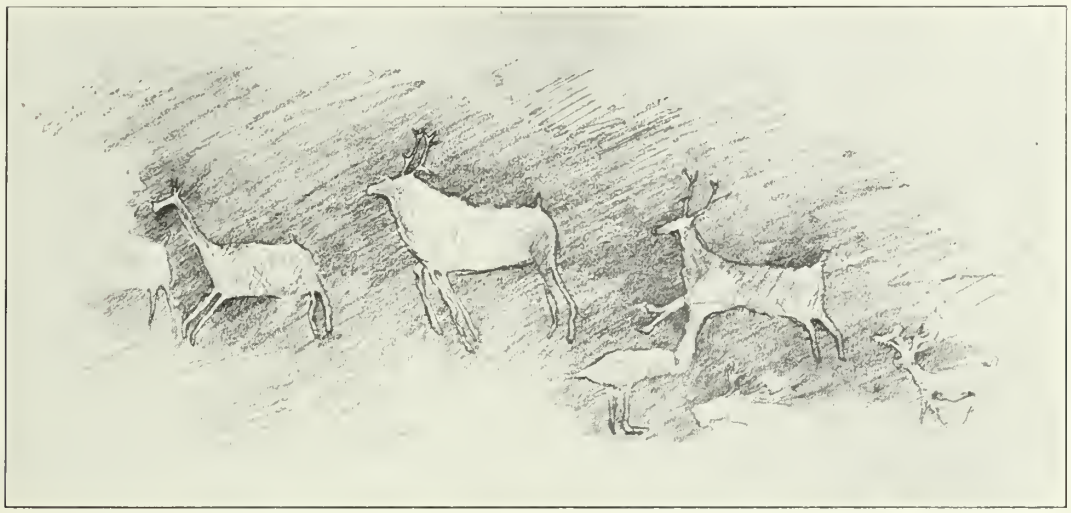


Fig. 67. Pictures on the wall of a rock shelter, Oak Canyon, Riley's Ranch, 8 miles northeast of Folsom, New Mexico. These, drawn by an Indian of long ago, equal in artistic conception some of the prehistoric French pictographs.

season many springs of crystal pure water are observed throughout our territory. Naturally, most of our sites are found near these springs, or along the partially dry stream beds, which will produce water by digging into the quicksand at various depths.

In regions where wood was not so plentiful, Indians unquestionably utilized buffalo "chips." This fuel, by the way, was used by the early white settlers.

A short description of several of our typical sites may be of more interest than thorough detail upon any one site, and I, therefore, shall present readers a bird's-eye view of the Panhandle section. Perhaps, without exception, every Post Basket Maker site shows an intrusive, or later occupation, by the Plains tribes. However, only two of my particular sites have yielded pure Pueblo pottery. These are sites No. 63, and No. 20, which will be described more fully in this paper. It has been reported to me from various sources that Pueblo pottery has been found in this particular area at one other location.

No. 80 is the largest Plains Indian site I have seen in this section. It is small,

however, compared to those south of us near Abilene. It is located on a rolling Plains divide, midway between two usually dry streams, which are about a mile apart. No springs are now within close proximity. The soil is rather loose, but not sandy. Field evidence indicates either fairly long occupation, or a heavy, short occupation, because of the many hearthstones found, and which were all carried to the site. Considerable flint fragments, broken flint artifacts, and fewer bones than usual occur, which latter characteristics I attribute to erosion. No pottery is in evidence. Excluding mesquite, there are very few trees except in the valleys, on either side. I found exceedingly large spear points, a beautiful lance point, long and slender, which was made from flint foreign to our section, and many hide scrapers—

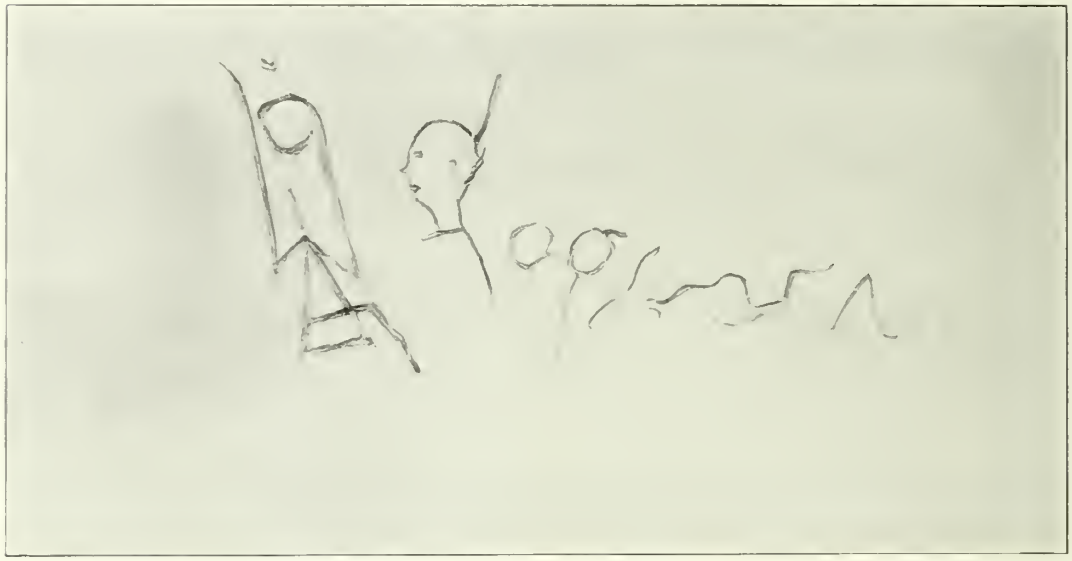


Fig. 68. Petroglyphs on the wall of a bluff not far from Hallock's Ranch, upper Cimarron.

three of which were somewhat unusual for this section in that they were triangular and worked on all three sides. This site is within two miles of Post Basket Maker No. 5 and one-half mile south of Post Basket Maker No. 81.

No. 63, 39 miles northwest of Amarillo, indicates a very old site, and it has not less than 12 rooms. It shows long occupancy by these people, followed by Plains occupation, which latter is a matter of historical record. It was here that intrusive Pueblo-Pecos pottery was found. It was sent to Dr. Moorehead and identified by Dr. A. V. Kidder, the authority on Pecos art. No water, nor trees, are within half a mile. An unusually large amount of whole and broken metates, considerable flint, and a great number of perfect points and other artifacts were found on the surface. There are many beveled types, one perfect specimen being a double beveled knife. There is an abundance of Post Basket Maker pottery, some obsidian, one piece of which was worked, and the only piece of worked obsidian I ever found at any of these sites although most of them show obsidian flakes. There was also one tubular

pipe, a combined hide scraper and drill—which is rare in this section—one metate worked on both sides and worn completely through. Following a heavy rain I found 20 small points, which is the largest number of such I have found at any one place, even after many trips. This site upon the mesa has been undisturbed, except for the screening of a portion of a refuse heap. However, in the last two weeks I have opened two rooms. The refuse heap is unusually large, covers an area of about twenty feet. Its greatest depth is exactly 4 feet, and it has an average depth of some 3 to 3½ feet (see sketches and photographs). Systematic screening is now being done on this site, and will be completed within the next two or three days. Artifacts and pottery from each eight inch level are being carefully recorded, and sent to Dr. Moorehead for further identification. Sketches of the site appear in Figures 69 and 70. Room A is now excavated to a depth of 5 feet 6 inches. The lower floor rests on a soft sandstone bed rock. The first floor, which is of well defined clay, is 1 foot 4 inches from the surface. Below this a second floor is 1 foot 11 inches deep; third floor, 4 feet 5 inches deep; fourth floor, 5 feet 6 inches deep. Between each floor level was found an unusual amount of buffalo, deer, antelope, turkey and other bird bones. Ashes of original color and soils burned to blue, and also reddish colors, were found. Many pieces of pottery, several bird points and scrapers were at a depth of 5 feet 6 inches. Some points show a heavy patina. Measurements of the largest structure, which is bordered by vertical masonry, indicates a large room 29x15 feet. The next outline to the immediate left is 11x14 feet. Each outline, however, showed evidence of several rooms. Room C appears to have been badly eroded, and aside from the left wall and two stones on the north wall, little remains. Some of the pottery is exactly one-half inch thick—perhaps cooking ware—but it is typical of all Post Basket Maker pottery. Many manos, several beautiful bone implements, one of which is 4 inches long, polished and ornamented with 18 incisions, were located. I plan to work this site completely during the winter. According to the ranch owner, Mr. W. E. Herring, there are two seeping springs within three-fourths of a mile. Further excavation will no doubt reveal as many as 12 to 15 rooms. This is a very conservative estimate considering the numerous rooms found under similar circumstances elsewhere. To say the least, there is evidence of rooms covering the entire portion of the eastern point of this mesa from north to south. I am especially indebted to Mr. Herring.

Site No. 13 is distinguished in construction by unusually large flat stones set vertically in double or parallel rows with rocks and adobe between. The outside stones are 6 to 8 inches thick, and several of them measure as much as 36 inches by 48 inches. We believe the width of these walls to be about 30 inches, which perhaps is a fair average of most of the walls of the various ruins. Some are 12 inches wide and others are 40 inches. This site has one large rectangular room about 25x30 feet, and only excavation will show the number of transverse walls. Most of these rooms are small. I have found only one piece of pottery at this ruin, several arrowheads of flint and quartzite, 2 metates, 2 manos and 2 unusual notched knives. Many potsherds are present at another site about one mile to the north on the flats. Much flint found on these various sites is known locally as agatized dolomite, and undoubtedly came from a quarry known in my records as No. 58.

Frequently a site is located upon the ledge or bench just below the caprock and flanking a dry stream bed. An unusually large Post Basket Maker location upon the Plains proper is within one mile of this site.

No. 34 is unusual to the Panhandle section because of the presence of different types of pottery and flint objects. It is in a large drifting sandbed, but quite close to water. There are no trees. Black on gray ware, coiled and finger decorated pottery prevail. No. 34 is 110 miles south and west of Amarillo, and is not in the Canadian River Valley. The smallest scraper, and likewise the largest scraper, I have was found at this site. Water is 2 or 3 feet from the surface. These dunes, I am told, are

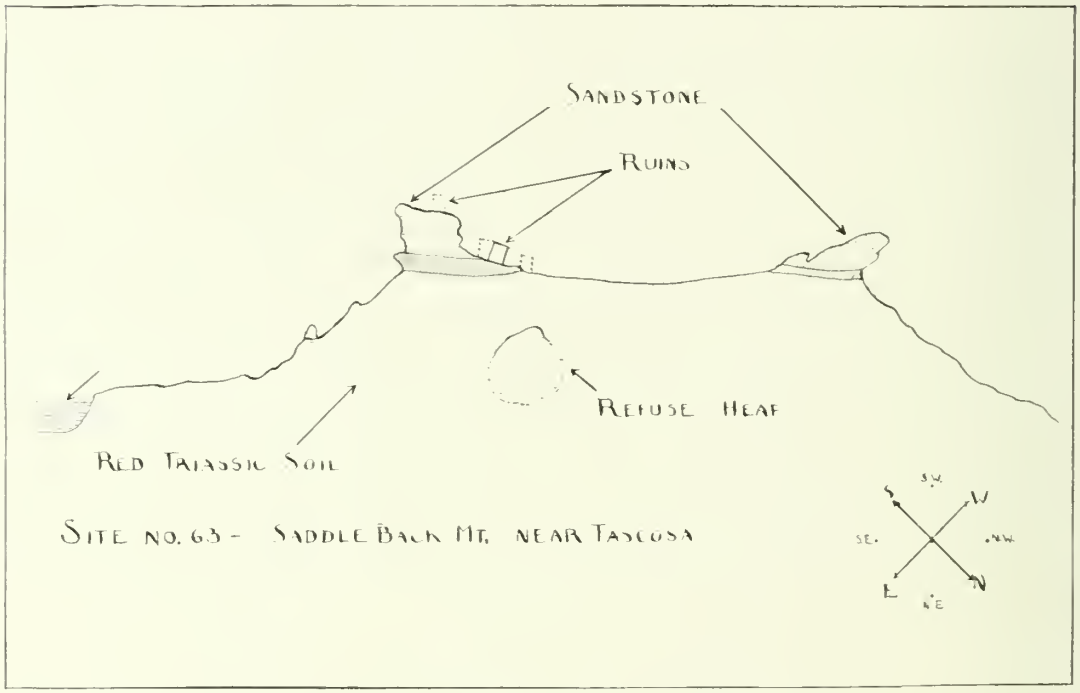


Fig. 69. Cross section of site No. 63. Mr. Studer.

scattered through a territory of some 150 miles and extend to the Pecos river. Some obsidian objects, one copper point, a copper ring, and a complete bison head were found. Antelope, prairie chicken and deer still abound. There are alkali and salt lakes close by. It was a favorite buffalo country, but there were sufficient fertile spots for Indian agriculture. I consider this a Pueblo camp site.

Flint mine, site No. 58. Since flint was as important to the Indian as steel is to us, a brief description of this site may be of interest. It is an unusually large agatized dolomite quarry, and as far as my knowledge is concerned, is thus far unreported. Indications are that tons and tons of this material have been taken out. A bird's-eye view from a distance shows the top of the mesa and sides are pock-marked with large excavations, and Indian work extends for six-tenths of a mile. There is evidence of

many workshops adjoining the quarry, and for a distance of one mile or more I have found many pieces which may be termed as blanks, which I understand were used for trade purposes. Without a doubt these mines are not common in northwest Texas, although there are several outcroppings of agatized dolomite on the north side of the Canadian River, but none of them worked so extensively as this one. It is located within 1½ miles of No. 28, which appears to be a large Post Basket Maker station. The exposure of the agatized dolomite on the banks of this tributary of the Canadian River has a thin stratum of tertiary gravel on top. It is in a wild and picturesque country. Many Plains camp sites adjoin the quarry. I

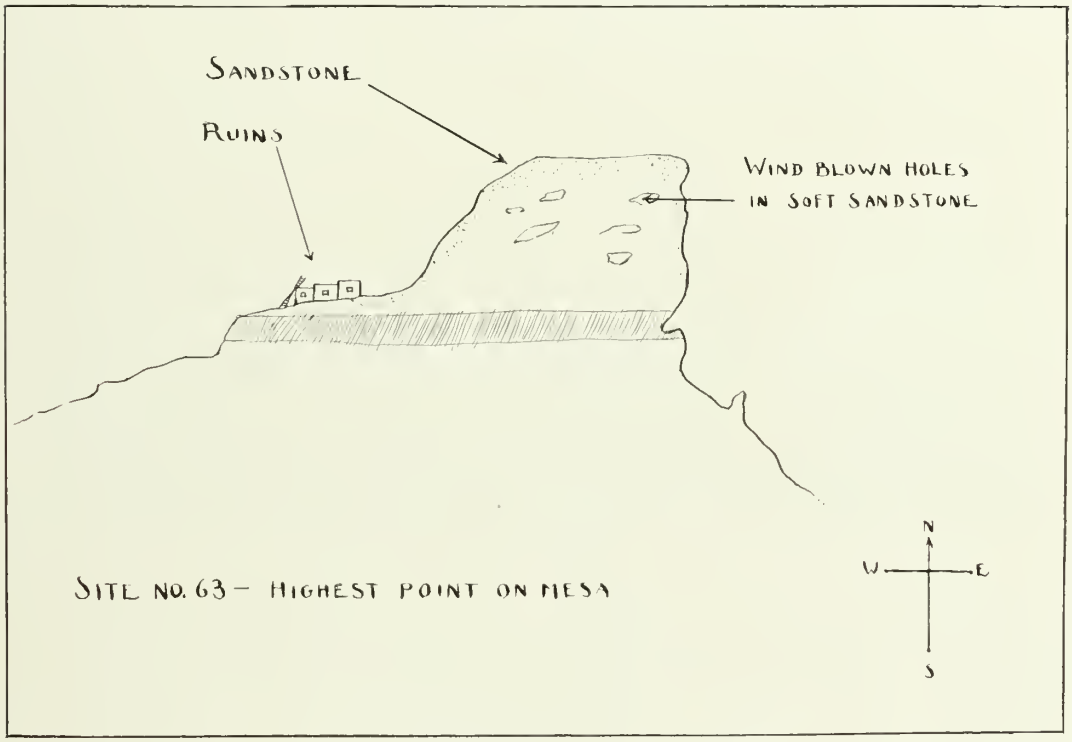


Fig. 70. A near view of site No. 63. Mr. Studer.

might hazard the guess that this mine meant wealth and power for the people who lived at site No. 28. Most of the flint is in brilliant colors. There is another primitive mine of some consequence between Silverton and Clarendon. Agatized dolomite appears to be easily worked, and of this material we find many projectiles from smallest bird points up to largest spearheads, also scrapers, knives, hammerstones, axes, drills, hoes and lances. We find artifacts made from this flint-like rock scattered throughout our entire section, but we also know that the Indian used available local material. This flint in no way resembles the nodules which are found near Abilene. The workers were real artisans as evidenced by some of the almost paper thin knives and projectiles. No serrated points occur.

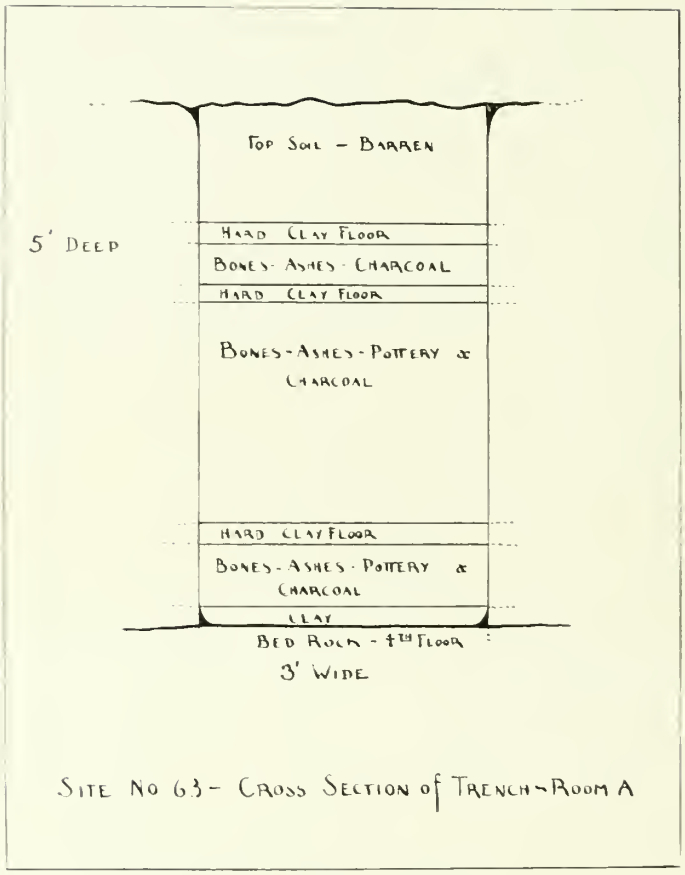


Fig. 71. Mr. Studer's diagram.

At a Plains site 4 miles above Post Basket Maker No. 5-G. C., I discovered at the head of a spring many artifacts and broken flint, hearths, charcoal, also ashes and flint, and buffalo bones deep in a high embankment adjoining a small stream.

Burials. We have three or four types of burials, some inside the abandoned rooms of the ruins, as were found at Handley's 23 years ago, and later by Dr. Moorehead. Other burials are within proximity to the various Post Basket Maker sites. We observe a few rock shelter burials, one of which was near site No. 15, and was completely sealed with horizontal masonry. Pack rat holes had caused water to run into this burial, causing the skeleton to disintegrate. We secured some fragments of typical Post Basket Maker pottery. Other burials were covered with large

Fig. 72. View of Congdon's butte. See page 116.

and small loose stones, and some were surrounded by small vertical slabs. I am not altogether sure that all these small circular stone affairs of vertical masonry represent burials, for I have thoroughly excavated two, and found no evidence of skeletal remains. The much debated question with reference to water, which is not always found near our Post Basket Maker ruins, can perhaps be explained without difficulty. While in the Zuni region of New Mexico this summer I noticed Zuni women carrying water from pits dug in the streams close by, even though there was some water running at the time. It was easier to dip water from holes than to obtain it from shallow channel flows. The Plains Indian probably did likewise.

Some of our ruins are surprisingly large. One I lately visited for the second time—No. 85—shows 29 very definite outlines in vertical masonry, some of which, no doubt, will reveal 2 or 4 rooms to each outline. The transverse walls are usually not visible. There are many rooms at this site, probably 60 to 80.

We do not lack pictographs or petroglyphs, both the incised and beautifully painted ones. I am now preparing a paper on this subject, but confined to pictorial art of northwest Texas.

A Few General Observations

We have no polished celts, no grooved axes of any kind, a few grooved hammers, and arrow-shaft polishers in this area, occasional pipes—one beautifully made, apparently catlinite, and one tubular. There is some obsidian, evidently from west of Santa Fe. Practically all, if not all, of the knives are beveled to the left. Many mussel shell fragments are found at every site, and one or two pieces were pierced. No wood artifacts appear, but there are numerous bone awls, and worked bone implements of unknown use. There are very few rock shelters. It is perhaps significant that the writer has never found a steel and but one copper arrowhead in this region,

Fig. 73. Close view of a ruin. Unusually large stones.

although some have been reported. The rooms of all these sites vary in size, and shape, therefore no approximate measurements can be given. Some are as small as 6 or 7 feet square, and others 20 to 30 feet in extent. Some of the square, or rectangular outlines, show many rooms upon excavation. The fire pits are very interesting and are of two types. One made of plaster, or adobe, was 12 inches deep and 20 inches across, with a raised edge of clay around each pit. The adobe, or burnt clay, was quite smooth and the fire pit symmetrical. Other types are made of small, flat stones, even as we would build a hearth today. A few mortar holes, in solid rocks, are found, but the metate or grinding stones predominate for they were portable. We do not observe many objects for personal adornment. I have observed no irrigation ditches, yet it is reasonable to assume they practised irrigation. One "cist" at site No. 77 was 7 feet in diameter at its widest point, and oval shaped rather than round. Flat, well laid stones extended to a depth of 7 feet. There was undisturbed soil beneath the flat stones. A few bones, charcoal and ashes were found, but there was no evidence of skeletal remains.

January 3, 1931 we received from Mr. Studer additional and valuable information. It is our opinion that we have scarcely made a beginning in the study of prehistoric sites and cultures in this interesting and important region.

At the meeting of the American Anthropological Association held in Cleveland December 29-31, 1930, Mr. J. L. Nusbaum, Director of the Laboratory of Anthropology, Santa Fe, New Mexico, informed the writer that he had visited agatized dolomite quarries along the Canadian in company with the geologist, Dr. Charles N. Gould, and others. Associated with fossil bison remains at Folsom, New Mexico, were found some projectile points. Accounts of the discovery have been written by Messrs. F. D. Figgins and J. H. Cook (see Bibliography). It is not yet determined whether the material of which these points are composed was obtained from quarries along the Canadian. The subject is conducive to more and thorough investigation.

In several places we have commented upon the supposed character of roof construction of Texas Panhandle slab houses. Mr. Studer, after careful inspection of his field diary and notes, requests that the writer present a brief statement. At a number of sites he found chunks or masses of adobe containing impressions of twigs and limbs. In the floor of several rooms he discovered rather large post holes, and now and then charred logs of considerable size. Buffalo hides may have been employed as coverings at Handley's ruin. Mr. Studer's researches inclined him to the belief that skins were not used. Roofs were light, in the case of most buildings, in others rather heavy. On upright supports were placed small poles and these were covered with twigs and branches, or possibly rushes. Over this was spread a light coating of adobe. This settled about the twigs and branches, thus leaving impressions in the chunks subsequently found.

Remarks Upon Figure 74

The map presented in this illustration includes the ruins or sites observed by our survey and a considerable portion of those discovered by Mr. Studer. It is not complete, there being at least 60 and probably 70 more locations known to Mr. Studer. These are omitted intentionally. An explanation is due our readers. We have already intimated much damage has resulted from indiscriminate digging. The ruins are small, the ash pits, burials and room floors all near the surface and easily reached by pot hunters. There remain throughout the region quite a number of extensive ranches. Thousands of cattle are pastured upon fenced ranges. Many persons who visit these ruins leave the gates open, thereby causing cattle owners considerable annoyance. With few exceptions, the land proprietors have permitted Mr. Studer to make observations, and might consent to a thorough exploration of their properties, yet they desire the general public excluded. Therefore, in view of these circumstances, we thought best to omit from our map many of the more important sites.

Mr. Studer is continually making additions to his large scale county maps, and in due course of time this information will be released.

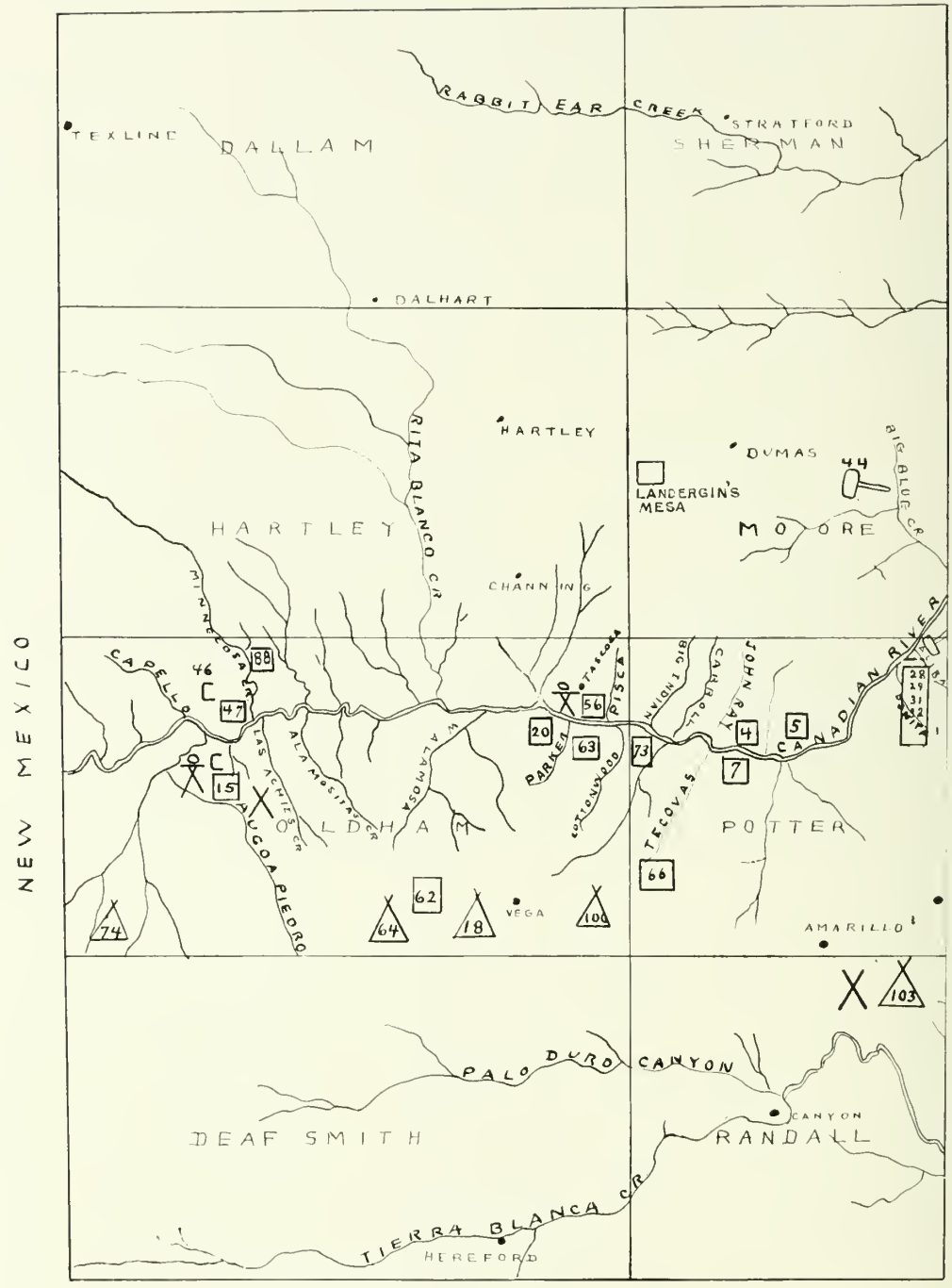
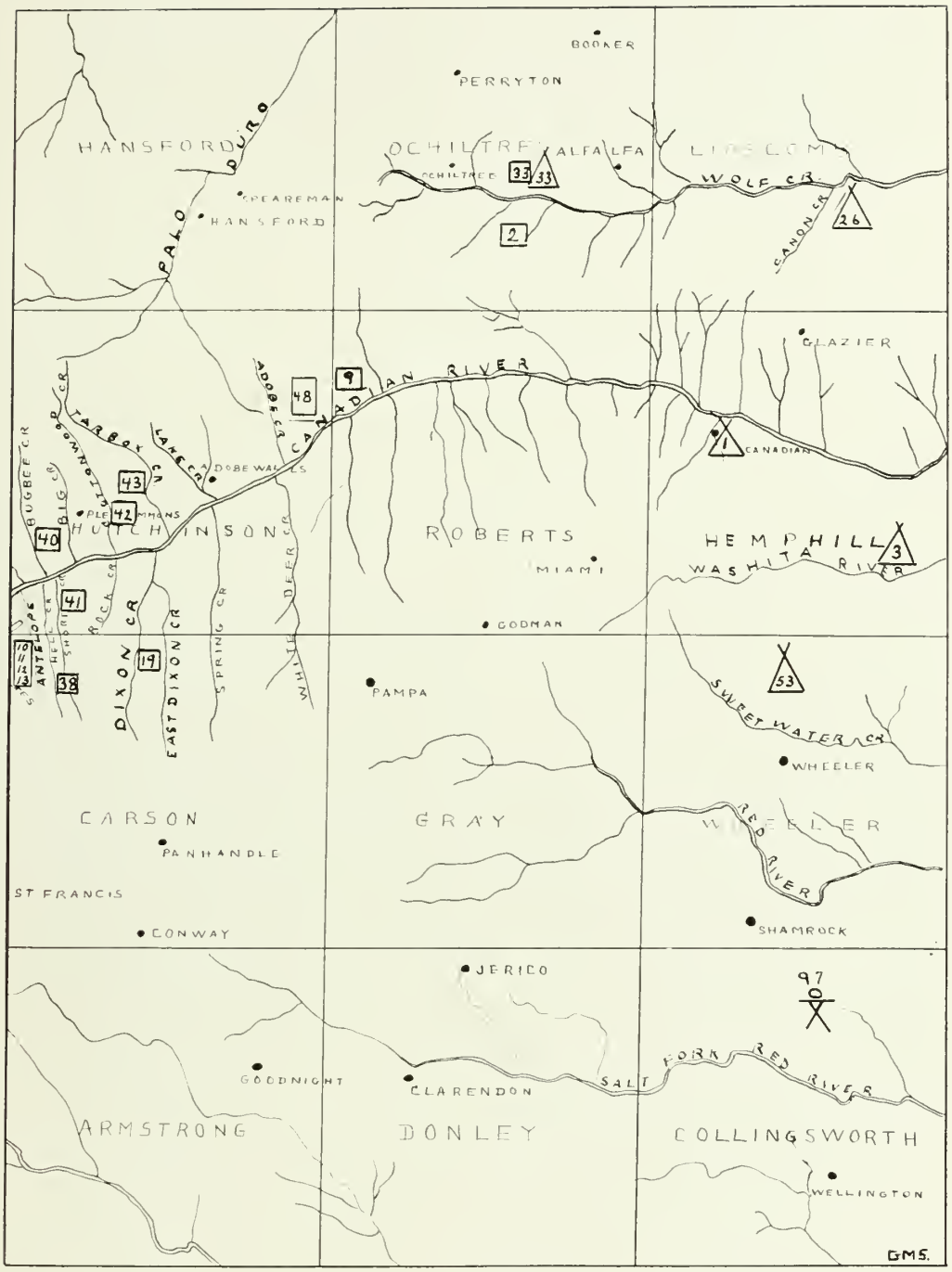


Fig. 74

FIELD MAP OF TEXAS PANHANDLE SITES

COMPILED BY FLOYD V. STUDER

SCALE 1 INCH = APPROXIMATELY 20 MILES



OKLAHOMA

LEGEND

- STONE FOUNDATIONS
- VILLAGE SITES
- ROCK SHELTERS
- PICTOGRAPHS
- GRAVES
- QUARRIES

Fig. 75. View of a group of rocks in the Verdigris Valley, near Liberty, Kansas. See Preface, page vi. Photograph by Mr. Thomas M. Galey.

Fig. 76. View of rock covered with petroglyphs, one and one-half miles from the group shown in Fig. 75. Photograph by Mr. Thomas M. Galey.

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APPENDIX

The Exploration of Jacobs Cavern

BY

CHARLES PEABODY AND W. K. MOOREHEAD

Reprinted from the original plates. This publication was Bulletin I of the Department of Archaeology, Phillips Academy, and was issued by the Norwood Press in 1904.

PHILLIPS ACADEMY

ANDOVER, MASSACHUSETTS

Department of Archaeology

BULLETIN I

THE EXPLORATION OF JACOBS CAVERN

McDONALD COUNTY, MISSOURI

CHARLES PEABODY AND W. K. MOOREHEAD

1904

NORWOOD, MASS.
PRINTED FOR THE ACADEMY BY
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PREFACE

THE Department of Archaeology of Phillips Academy, Andover, Massachusetts, through the courtesy of the newspapers[1] of the United States, published, in 1902, a circular letter.

The purpose was to direct the attention of those especially who reside in the remoter districts to the importance of finding, preserving, and studying specimens of archaeological value.

The letter was read by Mr. E. H. Jacobs, an archaeologist of Bentonville, Arkansas, whose kindness prompted him to impart to the Department his knowledge of the existence, near Bentonville, of caves, caverns, and rock-shelters affording traces of former human habitation.

He also at the time sent a gift of specimens to the Department from his own collection, and showed an eager interest and a desire to assist in furthering the plans of the Department for excavation. Accordingly, exploration was decided upon, and during April and May, 1903, cursory examinations of several caves and shelters and a more thorough examination of Jacobs Cavern were accomplished.

The Curator of the Department was in this field from April 19 to May 23; the Honorary Director from May 12 to May 23; after their departure the work was carried on under the direction of Mr. Jacobs. All operations ceased on June 1, 1903.

It is with great cordiality that the acknowledgments of the Director and the Curator are paid to Mr. Jacobs for his continued and cheerful assistance in every branch of the work;

[1] Among others of the *Sun* of Bentonville, Arkansas.

to Mr. Samuel Prater and his family for their hospitality; to Mr. J. H. Foster, the owner of the land, for his free permission to excavate; to Mr. J. L. B. Taylor for his unceasing vigilance at the cavern; to Mr. W. N. Smith for his accurate photographic work and valuable advice in difficult mechanical situations, and to all the men who worked with the explorers for their good nature and perseverance.

Particularly are thanks due to Professor Charles N. Gould of the University of Oklahoma for the gift of his valuable time in spending a week at the Cavern and in preparing a report on its geological features.

The preparation of the present Bulletin has been made easier by the information furnished by Professor W. J. McGee of the Smithsonian Institution of Washington and by the coöperation of Professor Frederick W. Putnam of Harvard University and of Dr. H. C. Hovey of Newburyport, Massachusetts.

It is also a pleasure to speak of the facilities offered by the Peabody Museum and by the Library of the Department of Geology of Harvard University, which have been freely made use of.

The metric system is used throughout the report on Jacobs Cavern.

ANDOVER, MASSACHUSETTS,
January 28, 1904.

I. THE ARCHAEOLOGICAL EXPLORATION OF CAVES, IN GENERAL

In order to determine the importance relative to archaeology of the exploration of Jacobs Cavern, notice should be taken of work done elsewhere of a similar nature.

In Great Britain true palaeolithic man is proved to have existed in many caves.

As an illustration, that one called Robin Hood's Cave[1] may be cited; its situation is near the common boundary of Derbyshire and Nottinghamshire.

A vertical section of the cave is here given, for purposes of demonstration and comparison:

ROBIN HOOD'S CAVE

Vertical Section from Roof to Floor

Stratum	Composition	Thickness	Age	Contents
X	Stalactite (*sic*) uniting roof to floor	?		
	Dark layer of earth	5″ to 6″	Recent	Pottery: Mediaeval, Roman
A	Stalagmitic breccia (very hard)	0″ to 36″	Pleistocene?	Bones and implements; Imported flint flakes, points, etc.; scrapers
B	Cave earth	21″ to 52″		Bones broken by man; Charcoal; Flint and quartzite implements
C	Red, clayey sand	24″ to 48″	Pleistocene	Bones of lion, wild boar, etc., marked by hyenas; Quartzite hammers and splinters
D	Light-colored sand, with limestone blocks	24″		No traces of man or wild animals
E	Rocky floor			

[1] Boyd-Dawkins, *Early Man in Britain*, p. 178.

Here traces of man's occupancy were found in strata 5′ to 9′ in aggregate depth. Remains of palaeolithic man have also been found in Kent's Hole, Devonshire,[1] Wookey Hole, Somersetshire,[1] in the cave of Pont Newydd, St. Asaph, North Wales,[2] and elsewhere.

In France an illustration is furnished by the Grotte de l'Eglise, Dordogne,[3] whose section follows:

GROTTE DE L'EGLISE

SECTION FROM TOP TO BOTTOM

STRATUM	COMPOSITION	CONTENTS; DESCRIPTION
X	Sheet of stalagmite . .	
A	Layer of black earth . .	"Solutrian"[4] Bones of reindeer, horse, and ox Bone awls and points Flint flakes, saws, and scrapers
B	Red earth	"Moustierian," and older Remains of reindeer, cave bear, and horse Chipped implements
C	Yellow sand	Remains of bear and bison "Choppers" and flakes of "jasper"

Remains of cave man have been found in Belgium in the valleys of the Meuse and the Lesse, in Switzerland on the Salève and near Schaffhausen, and on the northern continent as far south as Styria.[5]

Caves in Austria-Hungary are described by L. Karl Moser.[6] A vertical section of one from top to bottom follows:[7]

[1] Boyd-Dawkins. *Early Man in Britain*, p. 194.
[2] *Ibid.* p. 192.
[3] *Ibid.* p. 198.
[4] Mortillet, *Congrès. Int. d'Anthrop. et d'Archéol. Préhist.*, Brussels, 1872.
[5] Boyd-Dawkins. *Early Man in Britain*, p. 204.
[6] *Der Karst und seine Höhle*, Triest, 1899.
[7] *Doline und Höhle Vlašcajama.*

Stratum	Thickness	Description	Contents
A	15 cm.	Earth	Pottery
B	30 cm.	Ashes	Pottery
C	15 cm.	Stones	Charcoal; Implements: Bone, Stone
D	40 cm.	Red-brown gravel	Flint chips (Palaeolithic)
E	40 cm.	Red earth and limestone	Few implements (Palaeolithic)
F	?	Stalagmites, etc.	

So-called "bone-caves" are found in Moravia.[1]

Cliff-dwellings in France, unknown till recently, have been noted in the Departments of Aveyron and Ardèche and near the Jura Mountains, — all of the neolithic period; others of later date are also known.[2]

In Crete terra-cotta figurines have been taken from the stalagmitic formation in the Dictaean Cave; it does not appear, however, that they have been embedded in the material.[3]

In America reports are at hand from Honduras and Yucatan. G. B. Gordon[4] mentions in "Cave 3, Chamber 2" the remains of fire and burnt bones, under a layer of stalagmite about six inches in thickness. E. H. Thompson,[5] in his researches in Yucatan, found nothing of palaeolithic period, a conclusion also accepted for that country by H. C. Mercer.[6]

Caves in Peru containing human remains are reported,[7] and the "burial caverns" of Alaska have been visited by Dall.[7]

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[1] R. Trampler, *Mittheil. d. Prähist. Comm. der K. Akad. der Wissenschaften*, Vienna, B. 1. 3. 1893.

[2] E.-A. Martel, *La Spéléologie*, Paris, 1900, p. 115.

[3] R. B. Richardson, *The Nation*, June 18, 1903.

[4] *Caverns of Copan*, Mems. Peabody Museum, Vol. I, No. 5, Cambridge, 1898, pp. 7 (143) and 11 (147).

[5] *Cave of Loltun*, Mems. Peabody Museum, Vol. I, No. 2, 1897, p. 22.

[6] "Cave-hunting in Yucatan," *Mass. Inst. Tech. Quarterly*, December, 1897, Vol. X, No. 4, pp. 370 and 355.

[7] Boston *Herald*, January 24, 1904.

In the United States proper widespread efforts have been made, and are at present making, in cave exploration.

H. C. Mercer,[1] in his many investigations, has found nothing truly palaeolithic. O. C. Farrington[2] has examined caves in Indiana, and made observations on the rate of growth of stalagmites. He has visited Wyandotte Cave, Crawford County; Marengo Cave, Crawford County; Shiloh Cave, Lawrence County; Cran's Cave, Monroe County. J. R. Nissley[3] has described a cave in Hancock County, Ohio.

Stalagmitic deposits have been found in Luray Cave, Virginia, and F. W. Putnam[4] has reported on the Mammoth Cave, Kentucky. Stalagmitic deposits are also said to exist near Cavetown, Washington County, Maryland, and in southern California.

The article above mentioned, in the Boston *Herald*,[5] inspired by W. H. Holmes, contains a *résumé* of the previous season's work in American caves. Early human occupation is suggested as possible in the caves of Grand Gulch, Utah; mention is made as well of explorations under the auspices of the Smithsonian Institution, in Indiana, Kentucky, Tennessee, Alabama, Virginia, Maryland, and Pennsylvania.

In addition to the work mentioned, the University of California is at present conducting cave examinations in that state, a work of the utmost detail, under the direction of Professor Frederick W. Putnam.

Completing the list of published work, the following titles represent what has already been published on Jacobs Cavern:

C. N. Gould: *Science*, July 31, 1903, pp. 151 ff.
E. H. Jacobs: Archaeological Edition of Benton County *Sun*, June 11, 1903.
E. H. Jacobs: Quoted in *American Antiquarian*, September–October, 1903, Vol. XXV, No. 5, pp. 312 ff.

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[1] *Cave Explorations, Eastern United States*, Univ. of Penn. Dept. of Amer. and Prehist. Archaeology, 1894. *Indian House* and *Durham Cave*, Univ. of Penn., as above, Vol. VI, 1897, pp. 147 and 173.

[2] *Observations on Indian Caves*, Field Col. Mus. Public. No. 53, Geol. Series, Vol. I, No. 8, Chicago, February, 1901.

[3] *American Antiquarian*, 1888, Vol. I, p. 43.

[4] Peabody Museum Ann. Rep. No. 8.

[5] January 24, 1904.

C. Peabody: *American Anthropologist*, New Series, Vol. V, No. 3, July–September, 1903, pp. 579–580.

C. Peabody: Abstract of paper read at meeting of Archaeological Institute of America, Cleveland, Ohio, December, 1903; in *American Journal of Archaeology*, 2d Series, Vol. VIII, 1904, No. 1, p. 81.

It may be said here that work more detailed and complete has been accomplished in the caves of Europe than in those of America, with the result of proving for the former a very much earlier occupation by man than for the latter. In one respect the continents agree, — in the widespread and not unnatural use of cliff excavations, caves, caverns, and rock-shelters as habitations by primitive man.

II. GEOGRAPHY, ETHNOLOGY, AND HISTORY

Jacobs Cavern is situated on the north bank of Little Sugar Creek, two miles east of Pineville, the county-seat of McDonald County, Missouri.

The County is included in the so-called "Ozark Uplift," or elevated lands extending from near Carbondale, in southern Illinois, southwestward through Missouri and Arkansas to near South McAlester, in the Indian Territory. Some of the heights attain an altitude of seven or eight hundred metres, but in McDonald County much of the land forms a plateau of about three hundred metres altitude, intersected by valleys seventy or eighty metres deep.

The large number of the valleys, the steepness of the slopes, and the beautiful woods upon them, combine with numerous rushing, clear, cold streams to give a charm to the landscape that is a reminder of some parts of New England.

The climate is moderate, rather colder than would be inferred from the latitude, 36° 35′ north; the soil is stony, but somewhat fertile in the river bottoms. Fruit raising is, however, the characteristic agricultural pursuit.

Freshets of violent and widespread destructive power are not infrequent, the creeks and rivers doubling or trebling their

depth in a few hours. Such floods add an element of uncertainty to farm work and the chances of success.

Good water and the altitude render the region comparatively healthy.

Jacobs Cavern may be reached by carriage from Pineville, itself accessible by stage from Lanagan, a station 9 km. distant on the Kansas City Southern Railway; or the cavern may be approached by wagon road from Bentonville, Arkansas, 30 km. to the southeast. This city is the county seat of Benton County, Arkansas, on the Bentonville Branch of the St. Louis and San Francisco Railroad. The absence of bridges and the occurrence of the floods above mentioned make communication on occasion uncertain.

Who were the first inhabitants of the Ozark region is not known. The historical inhabitants may have been the Kiowas after their migration southward from the Black Hills.

The cavern is included in the district ceded by the Great and Little Osages to the United States on June 2, 1825.[1]

These Osages, of the Siouxan linguistic stock, are further said to have lived on the Osage River, a hundred miles to the north, and on a tributary of the Arkansas River, perhaps somewhat nearer.[2]

Of the early explorers, Coronado, on his expedition to Kansas in 1540, probably passed to the westward of the Ozark Mountains; and there is a tradition that De Soto's men, after his crossing the Mississippi, ascended the White River as far as what is now Benton County, Arkansas.

The first recorded white settlement near the district was that of the French near the mouth of the St. Francis River, in 1670.

A certain Adam Batie was, it is said, the first white man to enter a claim to government land in the neighborhood; this was shortly after 1819, when Arkansas Territory was organized. It lay near Maysville, northwestern Benton County.

In later times the region was in the track of military operations in the war of 1860–65, and the caves were probably of

[1] C. C. Royce, *Indian Land Cessions*, Bur. Eth. Rep. No. 18.

[2] Lewis and Clark, *Journals*, Vol. I, p. 43, Ed. New Amsterdam Book Co., New York, 1902.

use in the guerilla warfare characteristic of border sections. A Minié ball was found in the ashes at the rear of Jacobs Cavern. At present the immediate valley is somewhat sparsely inhabited by farmers, of whom a considerable proportion are of northern birth. Negroes are almost entirely absent.

III. MINOR CAVERNS AND SITES

The "Ozark Uplift" abounds in recesses and caverns varying from rock-shelters a few metres in depth to true caves with a length of several kilometres.

EDEN BLUFF

Under the guidance of Mr. Jacobs, Mr. Moorehead examined some of the caverns of the White River Valley, Arkansas.

One of them, known as Eden Bluff, is on the north bank of White River, in the western half of Section 34, Township 19 north and Range 29 west, Benton County, Arkansas.

In the bluff proper is a rock-shelter, with an opening about 100 m. in length in the side of the cliff and with a depth inward of perhaps 17 m.; the bluff has altogether a height of nearly 100 m.

The rock-shelter was used in early times for burials, and five or six skeletons have at different times been exhumed; a feature was the "wild hay," dried, found in connection with the burials. This long grass is said to have been abundant on the hills at a time when the country was less heavily wooded. Great damage has been done in the interior by modern searchers after "Spanish gold."

The same condition of affairs exists two kilometres up the White River from Eden Bluff.

A small cavern at this point has been tampered with at different times, and among the earth and stone excavated were many bones of animals, some of them showing the first stages of becoming fossils.

A more detailed examination was undertaken of McElhaney Cavern, situated $\frac{1}{5}$ km. east of Monte Né, Benton County,

Arkansas,[1] 8 km. southeast of Rogers. It is on the farm of J. H. McElhaney, in the southeastern quarter of Section 27, Township 19 north, Range 29 west. It faces southwest, and its dimensions are as follows:

Height from floor to roof, at the opening	3 m. 35 cm.
Height from deposits on floor to roof, 6 m. within the cavern .	2 m. 44 cm.
Height from deposits on floor to roof, 8 m. 30 cm. within the cavern	1 m. 52 cm.

Immediately adjoining McElhaney Cavern to the eastward is a small rock-shelter, the floor of which is 2 m. 13 cm. above the present valley level, but whose roof is a prolongation of the stratum of rock forming that of McElhaney Cavern proper.

A deposit of gravel 75 cm. in thickness has been laid down in a cave of which the present small rock-shelter is probably a remnant or successor; water dripping upon this has caused it to become a firmly cemented breccia.

Above the breccia, stalactitic and stalagmitic material filled up much of what was left of space in the cave. The average thickness of the two strata of breccia and of stalactitic material is not far from the same, 75 cm. or more.

Behind these and parallel to them, the small shelter extends for some distance in the form of a cave. The filling in of the small shelter in all likelihood took place before the floor of McElhaney Cavern was established, hence, possibly, the complete absence thus far of evidences in the breccia stratum of human presence.

The floor of the larger (McElhaney) Cavern was found covered with black earth 66 cm. to 1 m. in depth; ashes and débris, abundant near the walls, were intermingled.

There were no stalactites long enough to reach the floor, and no stalagmites.

Animal bones, flint implements, and fragments of pottery were found, not giving evidence of great age.

One fragmentary skeleton was found near the east wall, 40 cm. down.

[1] Abstract of Report by E. H. Jacobs.

It is probable that the occupation of this cavern was more recent than that of Jacobs Cavern.

The abundance of the village sites in the valleys, and in the terraces of the White River region, is shown by the frequent finding of projectile points, knives, hammer- and rubbing-stones, etc., and points to a long and full inhabiting by man; game and fish are not far to seek, and the soil is of a moderate richness.

Pictographs are found in the neighborhood of Eden Bluff; cosmic symbols, tribal and totemic signs, etc., are in evidence.

IV. GEOLOGY[1]

The hills along Sugar Creek have been caused by the erosion by water of the massive limestone rock.

This limestone contains a large amount of flint or chert, usually in the form of nodular concretions, although sometimes occurring in definite layers. This is the Boone chert of geologists and belongs to the Subcarboniferous Age. The limestone is otherwise known as the Mississippian limestone; it is the rock that covers the greater part of southwestern Missouri, northeastern Indian Territory, and northern Arkansas. The lead and zinc mines of Kansas, Missouri, and Arkansas are in this formation.

In the lower part of the limestone, flint is often absent, and the massive gray rocks are arranged in definite layers, usually from 10 cm. to 50 cm. in thickness.

This part of the formation, known as the St. Joe limestone, is sometimes 20 m. thick, and often is wrought by weathering into characteristic precipitous or overhanging bluffs, extending, it may be, for miles along a stream. The St. Joe limestone is cut at irregular intervals by two series of vertical joints or fissures that divide the rock into rectangular blocks.

The principal series of these joints, which may be termed the master-joints, trend approximately north 35° west, and the other series north 20° east.

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[1] From the complete report of Professor C. N. Gould. Cf. also his article in *Science*, July 31, 1903, p. 151.

The joints may often be distinguished along the face of the cliffs, where they form the division planes between the rock that is still in place and the blocks that have fallen off.

Immediately beneath the limestone is a mass of shales known as the Eureka shales, attaining at times a thickness of 15 m.

The shales, usually black and papyraceous and worn by weather into thin flakes and tablets, are impervious to water, while the limestone and chert just above are more or less porous; thus there arise thousands of springs which issue between the St. Joe limestone and the Eureka shales; at this horizon are the famous Eureka Springs of Arkansas. Also between the limestone and the shale are numerous caves, formed usually by the wearing away of the soft shales beneath the harder medium.

Jacobs Cavern is entirely within the St. Joe limestone, thus differing from the other caves. Immediately above the mouth of the cave the bluff overhangs for about 3 m., and then gradually slopes for 100 m., more or less, to the top of the hill.

The cave is truly a rock-shelter, with floor, roof, and walls of limestone, irregularly V-shaped; it is throughout natural, no marks of human workmanship being visible in the walls or roof.

The flat top is composed of a single stratum of limestone, while along the sides of the cave stratification lines are well exhibited.

The rock floor is covered to a depth of 1 m. with clay, usually a homogeneous mass, yellowish brown, containing fragments of limestone.

Above this was a deposit of ashes. There seems no reason to doubt that the clay is a residual result of the disintegration of the limestone, for, so far as noticed, it has never been disturbed, and the line of separation between it and the ashes above is generally sharply marked. Pits dug in different places showed essentially the same clay structure. Near the bottom of the clay the small limestone fragments are more numerous than above, while at the top they are practically wanting.

At the back of the cave is a fissure, extending upward from the roof to a height of 3 m., separating the roof of the cave from the rear wall. The fissure, probably a master-joint of the series described above, is from $\frac{1}{2}$ m. to less than 1 m. wide, and continues along the back of the cave beyond the main part, forming a narrow recess, which in turn extends for about 5 m.[1]

Along this fissure, and also along the back of the cave where the fissure does not extend, are stalactites, stalagmites, and pilasters, formed by the action of water dropping from the roof. In places the entire fissure above the level of the roof is choked with stalactitic material. The continued dropping of the water carrying $CaCO_3$ in solution upon the ashes covering the floor has formed a sort of stalagmitic ash-breccia, often enclosing fragments of flint or sandstone, flint implements, bones, charcoal, and other material similar to that found buried elsewhere in the ashes.

To the mind of the writer, there is no doubt that the ash-breccia was formed very slowly during and after the deposition of the ashes.

The peculiar toadstool-like shape of some of the pillars, the like of which he has never observed in any other cave, appears to point indisputably to this conclusion. After a careful examination the writer assumes that the following process has taken place: Ashes mingled with bones, flint, and charcoal were deposited upon the floor; then the water dropping from the roof formed the stalagmitic breccia, which spread out in a mass in the shape of a toadstool. Around or upon this stalagmite other ashes and charcoal were deposited, and a second toadstool was formed by the water; in some cases even a third may be seen.

Finally, when the deposition of the ashes ceased, the stalagmite continued to grow until it joined the stalactite from above, forming a pilaster.

Near the back of the cave, particularly underneath the fis-

[1] "Bone-recess" on the map.

sure, the greater part of the ashes and some of the clay covering the limestone floor have been cemented by the action of $CaCO_3$, forming ash-, clay-, and limestone-breccia, often very firm and solid. In other parts of the cave both ashes and clay are soft and easily moved.

A number of blocks and slabs of limestone were found on the surface of the ashes, or embedded in them or in the clay beneath. They have evidently fallen from the roof, some before man's occupancy, others during it, and still others quite recently.

Of the sandstone fragments and flint flakes in the ash stratum, there seems no doubt that all were carried into the cave from outside. (The possibility of their having entered from above through the fissure at the back is rendered small, first, by their great number, second, by their even distribution throughout the cavern.[1])

The nearest sandstone outcrop on the surface is, so far as could be determined, 6 km. distant, near White Rock, although small sandstone boulders and pebbles are occasionally found on the gravel bars of Sugar Creek.

Whatever the source of supply, man has necessarily brought the sandstone specimens into the cavern.

As to the thousands of flint flakes, varying from small "spalls" to pieces the size of the hand, it was at first thought that they might have fallen from the roof: careful search, however, failed to detect the presence of flint in roof or walls.

Hence (outside of the slight possibility of their having entered by way of the fissure) it is believed that the flakes and implements have all been carried into the cave or produced within it by human agency.

Much of the flint was obtained from the hills near by; but judging from the lithological character of other pieces, it is evident that they have been brought from a distance, some of them, probably, from the flint hills of central Kansas.

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[1] Editors' note.

V. DESCRIPTION OF JACOBS CAVERN

METHODS OF EXCAVATION

Jacobs Cave opens on a hill slope forming the northwestern boundary of the valley of Little Sugar Creek. It is 12 m. in perpendicular distance above the valley floor and a former main channel of the creek.

The opening, like that of most of the caverns of the district that show occupation, is toward the southwest.

The length of the opening from northwest to southeast is 21 m. 20 cm.; the greatest depth inward, measured from southwest to northeast, is 14 m.

The "bone-recess" extends northwestward from the northwestern angle of the cavern for 5 m.

The height of the roof above the undisturbed surface of the ash deposit varied according to the place where measurements were taken.

In front at the eastern end of the opening the height was . .	2 m. 10 cm.
In front at the western end of the opening the height was .	2 m. 60 cm.
Inward 7 m. from the opening at the east side the height was	1 m. 40 cm.
Inward 7 m. from the opening at the west side the height was	1 m. 30 cm.
At the northwest corner in front of the fissure the height was	1 m. 20 cm.

The "bone-recess" varied from 50 cm. to 80 cm. in height.

In the exploration of Jacobs Cavern four things were made the subjects of study: the layer of fine ashes covering the floor, the underlying clay stratum, the stalactites and stalagmites, and the "bone-recess."

The layer or stratum of ashes was from 50 cm. to 1 m. 50 cm. in thickness.

The method of excavation was, first, to divide the surface of the ashes into square metres by rows of stakes, and then to remove the ashes in order, front to back, using the lines of stakes as coördinates to determine the position of any objects found.

The linear distances of 1 m. were numbered from northwest to southeast in Arabic numerals from 1 to 21, and lettered from southwest to northeast from A to Q.

The amount and the contents of the ash stratum will be

discussed later. Their character was such as when disturbed during the work seriously to affect the throats and lungs of most of the workmen. Wet sponges tied over the mouth proved effective as preventives against a recurrence of the trouble.

A difficulty during the removal of the ashes was presented by the large blocks of limestone, fallen from the roof since the beginning of the formation of the ash stratum.

Some of them weighed over 1000 kg., and a block and tackle were required for their removal, as well as the services of strong and expert stone-breakers.

The exceedingly irregular presence and the partial clearing away of these blocks interfered greatly with a regularity of excavation, readily adhered to in mounds and sites of homogeneous composition.

The presence of skeletons and of large bones and specimens could, of course, be noted on the first disturbance of the ashes.

For the detection of small implements and fragments of bone, stone, and pottery, men were stationed with hand trowels to examine the ashes as they were placed on the outside slope from the wheelbarrows used in their removal.

To determine the composition of the clay stratum underlying the ashes, pits were sunk through it to the true limestone floor of the cave at metres B/C–9/10, J–10, and G–14.

The same succession and the same composition of strata were observed in all cases. A typical vertical section may be thus shown:

Top to Bottom

1. Stratum A.	*a.* Ashes	71 cm.
	b. Ashes with limestone blocks	66 cm.
2. Stratum B.	Clay mixed with limestone fragments . .	94 cm.
3. True limestone floor.		

A trench at the back of the cavern in front of the row of stalagmites was dug in the clay stratum (B).

From the evidence of the trench and the pits the conclusion was arrived at that no traces of human occupancy were concealed in the clay or lower down than the ash stratum (A).

At the back of the cavern is a row of stalactites, stalagmites, and stalactite-stalagmites.

The following table gives the dimensions and some of the characteristics of the most important of these; most of the measurements were taken by Mr. Jacobs.[1]

No.	Position at Summit Square Metre	Circumference of Base	Height under Original Level of the Ashes	Height above Original Level of the Ashes	Greater Diameter of Base	Notes
		m. cm.	m. cm.	m. cm.	m. cm.	
S.-S. 1	I–18	2 80	1 20	1 00	1 10	With an upper and a lower "stool"
Stal[m.] 2 . . .	J–17/18		0 70	0 30	0 70	50 cm. below a corresponding stalactite
S.-S. 3 Lower "stool"	K–16	2 50	0 80	0 00	0 93	
S.-S. 3 Upper "stool"	K–16		0 40	0 40	0 60	
Stal[m.] 4 . . .	K–14	4 70	0 80	0 00	1 50	Entirely below ash-level. The summit is 1 m. 25 cm. below a corresponding stalactite
Stal[m.] 5 . . .	L–11	6 30	0 70	0 00	2 20	Entirely below ash-level. The summit is 1 m. 20 cm. below a corresponding stalactite
Stal[m.] 6 . . .	L/M–9/10	4 70	0 55	0 00	1 70	Entirely below ash-level. The summit is 1 m. 30 cm. below a corresponding stalactite
S.-S. 7	N–6	2 60	Stal[m.] 1 00	0 00	1 20	Stalagmite entirely below ash-level
S.-S. 8	O–6		1 05		1 50	Stalagmite entirely below ash-level
S.-S. 9	O–2/3				1 55	"Stools" of stalagmites 10 cm. to 30 cm. below ash-level

[1] Abbreviations: Stal[m.] = stalagmite; Stal[ct.] = stalactite; S.-S. = stalactite-stalagmite.

Some of the stalactite-stalagmites were attached on one side to the wall, presenting the appearance of half-columns.

One stalagmite (No. 5) was taken to pieces and taken away, as well as one pendent stalagmitic "stool."

At the close of operations most of the stalagmites were thickly covered again with soil and stones; this was a precautionary measure of preservation.

The following abstract from Mr. Jacobs's report on the "bone-recess" is based on the work done after the departure of the directors.[1]

The "bone-recess" extends 5 m. in a northwesterly direction from the northwestern corner of the cavern. At the entrance are several irregular stalagmites numbered 7 and 8; their summits are all below the original level of the ashes in the cavern. Outside of this stalagmitic barrier the ashes, when examined, showed the same contents as elsewhere in the cavern, but with an increasing percentage of animal bones near the barrier.

Specimens of the material and contents of stalactite-stalagmites 7 and 8 were obtained, and then work was begun upon a soft deposit within the recess just back of the barrier; this was found to contain decayed organic matter, but fewer ashes; what bones and implements there were, were similar to those from the larger cavern.

In square metre O–4/5 a pit was sunk down to the underlying clay (Stratum B); the soft deposit above was 1 m. 5 cm. in depth, and contained stones of various sizes up to a thickness of 30 cm.

At a distance of 1 m. 50 cm. back from the entrance a heavy stratum of animal bones was met, embedded in the soft deposit above a large flat stone.

This continued for nearly 1 m. backward into the recess. One bone awl and a few flint chips formed part of the bone stratum, which itself was dry and in probably the driest part of the recess. In the rear there were many stones, 10 cm. to 40 cm. down in the soft deposit. This part is damper, and the

[1] The complete report may be consulted at the Department of Archaeology of Phillips Academy.

decomposition of the bones may account for their lessened frequency here. A stalactitic-stalagmitic mass adhering to the south wall was numbered stalactite-stalagmite 9.

A cross-section of the "bone-recess," 80 cm. in from the entrance, shows the recess already described to be at that point but the lower of two chambers.

The second chamber is perpendicularly above the first, and is separated from it by two blocks of fallen limestone. Of these the lower, 55 cm. thick, forms the roof of the lower chamber and a part of the floor of the upper; the upper block, lying partially on the lower, forms the remainder (on a different level) of the floor of the upper chamber. The walls of the upper chamber are lined with stalactitic deposits; there are none depending from the roof. Animal bones, "bone dirt," and stalactites enclosing bones were found in the upper chamber, but no stone implements.

The total height from the clay (Stratum B) to the roof of the upper chamber is 3 m. 20 cm. at a point 80 cm. within the entrance.

VI. HUMAN BURIALS

Six human burials were found in the ashes of Jacobs Cavern, from 45 cm. to 1 m. 30 cm. down.

They were in poor preservation, and in cases incomplete.

The known types of Indian burial called the "bundle" type and the "scissors" type were represented; these types have also been observed in the mounds of Mississippi.

A detailed description is subjoined.

Skeleton No.	Position	Depth		Orientation by End at which the Skull was found
		m.	cm.	
1	A–15	0	80	West
2	D-14/15	1	30	South
3	F–11	0	45	North
4	F–15	0	70	Northeast
5	J–8	0	50	Southwest
6	I–10	1	30	North

VII. THE BONES OF ANIMALS

Seven-tenths of a cubic metre of animal bones were removed from the cavern; they are whole or in fragments; most of the latter have the appearance of having been split for marrow, others of having been boiled or otherwise cooked.

The following animals have been identified[1] from bones in the collection at Andover; they are contemporary with man's occupancy of the cavern:

Deer (*Cariacus virginianus*).
Raccoon (*Procyon lotor*).
Opossum (*Didelphys virginiana*).
Bear (*Ursus americanus*).
Beaver (*Castor canadensis*).
Turkey (*Meleagris galloparo americanus*).
Gray Wolf (*Canis occidentalis*).
Elk (*Cervus canadensis*).
Buffalo (*Bos americanus*).
Woodchuck (*Arctomys monax*).
Tortoise (*Cistudo carolina*).
Hog (*Sus scrofa domestica*).

VIII. THE IMPLEMENTS OF STONE

The collection at Andover may be considered characteristic, though not complete; there are in the Department of Archaeology a collection from Jacobs Cavern, two surface collections, one carefully made by Mr. J. L. B. Taylor, the other gathered by the boys of Pineville, and a small collection from McElhaney Cavern.

The remainder of the specimens from Jacobs Cavern are, the majority of them, in the possession of the Smithsonian Institution of Washington or in that of Mr. Jacobs himself.

From Jacobs Cavern the larger implements were almost wanting.

Three stone metates (one of sandstone and one of them broken), one stone axe, one celt, and fifteen hammer-stones were found.

In projectile points and knives the collections are rich. A rough classification follows. In many cases a rejected, broken, or incomplete implement of one kind may have been used as

[1] By Dr. W. C. Farabee of Harvard University.

a perfect implement of another. The hard and fast lines of division vary with the personal equation of the examiner, but the general proportion of types is a correct one.

THE COLLECTION FROM JACOBS CAVERN

1. Implements, knives, or projectile points, when complete, 5 cm. or more in length:

A. Without stem:

a. More or less circular in form[1]			50
b. Oblong, generally without shoulder	*α.* Complete		13
	β. Incomplete		10
c. Flakes, generally long and thin			53
d. Pointed	*α.* At one end		31
	β. At both ends[2]		3
e. Scrapers, "humped type"			11
Total 1. A			171

A subdivision of 1. A. *d. α* (pointed at one end):

More or less triangular	*αα.* Base concave	4
	αβ. Base straight	3
	αγ. Base convex	3
	αδ. Base irregular	3
Leaf-shaped	*αε.* (Sides expanding from both ends)	18
Total		31

B. With stem:

a. Stem tapering:

α. Base of stem concave	Barbed[3]	0
	Not barbed	11
β. Base of stem straight	Barbed	4
	Not barbed	18
γ. Base of stem convex	Barbed	1
	Not barbed	12
δ. Base of stem pointed	Barbed	1
	Not barbed	7
ε. Base of stem irregular		2
Total 1. B. *a*		56

[1] Some of these, doubtless, were scrapers. [2] Sides convex.

[3] "Barbed" is defined as having an acute or reëntrant angle between the stem and the shoulder or shoulders.

b. Stem with sides straight:

a. Base of stem concave	Barbed	0
	Not barbed	3
β. Base of stem straight	Barbed	2
	Not barbed	0
γ. Base of stem convex	Barbed	1
	Not barbed	3
δ. Base of stem irregular		1
Total 1. B. *b*		10

c. Stem expanding:

a. Base of stem concave	Barbed	4
	Not barbed	11
β. Base of stem straight	Barbed	8
	Not barbed	2
γ. Base of stem convex	Barbed	23
	Not barbed	8
δ. Base of stem irregular		3
Total 1. B. *c*		59

C. Shouldered knives:

a. Broad type	*a.* Chipped on both sides		8
	β. "Spalls," or chipped on one side only		3
b. Long type	*a.* Chipped on both sides	Two cutting edges	37
		One cutting edge	6
	β. "Spalls" or chipped on one side only		4
Total 1. C			58

D. Perforators 5

E. Doubtful form 1

2. Implements, when complete, less than 5 cm. in length:

A. Without stem:

a. Knives, round type	*a.* Chipped on two sides	4
	β. "Spalls," or chipped on one side only	9
b. Knives, long type	*a.* Chipped on two sides	1
	β. "Spalls," or chipped on one side only	6
c. Points, triangular or leaf-shaped with sides	*a.* Concave	0
	β. Straight	0
	γ. Convex	8
Incomplete form		1
Total 2. A		29

B. With stem:

a. Stem tapering	*α.* Base of stem concave 0	Barbed . .	0
	β. Base of stem straight 1	Not barbed .	7
	γ. Base of stem convex . 5		
	δ. Irregular 1		
b. Stem with sides straight	*α.* Base of stem concave 0	Barbed . .	1
	β. Base of stem straight 1	Not barbed .	1
	γ. Base of stem convex . 1		
c. Stem expanding	*α.* Base of stem concave 5	Barbed . .	13
	β. Base of stem straight 6	Not barbed .	4
	γ. Base of stem convex . 6		
d. "Bunts"			4
Total 2. B			30

Summary of the Collection

1. Implements 5 cm. or more in length:			
A. Without stem		171	
B. With stem:			
a. Stem tapering	56		
b. Stem straight	10		
c. Stem expanding	59	125	
C. Shouldered knives		58	
D. Perforators		5	
E. Doubtful		1	
Total 1 (A, B, C, D, E)		360	360
2. Implements less than 5 cm. in length:			
A. Without stem		29	
B. With stem:			
a. Stem tapering	7		
b. Stem straight	2		
c. Stem expanding	17	26	
d. "Bunts"		4	
Total 2 (A, B)		59	59
Total Jacobs Cavern collection[1]			419

[1] In addition to these, hundreds of cores, fragments, "spalls," and "rejects" of flint were brought to Andover for purposes of study and comparison.

THE SURFACE COLLECTION OF J. L. B. TAYLOR

A.	Implements without stem:		
	a. Knives, round form	25	
	b. Knives, leaf-shape	11	
	c. Knives, long form	11	
	d. Knives or points, triangular	17	
	e. Points, triangular, small	3	
	f. Scrapers	3	70
B.	Implements with stem:		
	a. Stem tapering	39	
	b. Stem straight	17	
	c. Stem expanding	99	155
C.	Shouldered knives		41
D.	Perforators		2
E.	"Bunts"		5
F.	Small stemmed points		10
	Total J. L. B. Taylor collection		283

Incomplete Objects

Knives, round	11
Knives, leaf-shaped	1
Knives, long form	12
Triangular forms	3
"Spuds"	2
Celt	1
	30

SURFACE COLLECTION FROM THE VICINITY OF PINEVILLE

A.	Implements without stem:		
	a. Knives, round	13	
	b. Knives, leaf-shaped	3	
	c. Knives, long form	2	
	d. Knives or points, triangular	3	
	e. Scrapers	3	24
B.	Implements with stem:		
	a. With stem tapering	33	
	b. With stem straight	7	
	c. With stem expanding	82	
	d. Lance-point, stem expanding	1	123
C.	Shouldered knives		36
D.	Perforators		4
E.	Axe, chipped		1
	Total Pineville collection		188

THE COLLECTION FROM McELHANEY CAVERN

Knives or points, triangular		4
Knives or points with stem	Tapering	9
	Straight	0
	Expanding	5
Total McElhaney collection		18

FROM EDEN BLUFF

Knife or point with stem expanding	1

Noteworthy, from an examination of these lists, are the following facts:

First, the large number in proportion of knives of the round type; flat, rough, often chipped to the edge on one side only, these objects seem yet to have the right of being considered complete implements.

Second, the large proportion of knives, more or less rudely chipped, of the long, shouldered class; often a natural chip struck off from a core or a mass of flint will take a form almost ready for use, as such, as an implement.

Third, the comparative abundance of specimens with stems; in the Jacobs Cavern collection the stemmed specimens are 155 out of a total of 419, or 37 per cent.[1]

Fourth, the small proportion of specimens less than 5 cm. in length.

Fifth, the fact that while in the Jacobs Cavern collection, among the specimens with stem, there are with stems expanding 76 out of a total of 151,[2] or 50 per cent, in the J. L. B. Taylor collection they are 99[3] out of 155, or 64 per cent, and in the Pineville collection they are 83 out of 123, or 67 per cent.

This is a distinction possibly arising from a naïve selection in collecting surface specimens.

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[1] Shouldered knives are not considered stemmed.

[2] "Bunts" are here not counted.

[3] "Small tanged points" are here not counted.

Besides the collection at Andover there have been taken from Jacobs Cavern the following:

Knives	5
Knives or projectile points	21
Projectile points (smaller)	7
Perforators	3
Hammer-stones, etc.	24
Polishing stones	2
Metate, limestone	1
Metate, sandstone (broken)	1
Unfinished specimens	177
	241

Also there were removed hundreds of chips, "spalls," and cores showing human workmanship.

The rarity in this region is to be noticed of the larger "neolithic" implements, such as celts, grooved axes, pestles, "spuds," "plummets," and pipes; also the total absence of the so-called "ceremonials."

IX. POTTERY AND BONE

Fragments of pottery were present, but not abundant, in the ashes of Jacobs Cavern.

No complete vase, whole or in parts, was found. The type of pottery was rude, with primitive decoration and no attempt at coloring save by firing. The tempering was, as usual, of shell.

From the shape of the fragments the vases seem to have been, many of them, bowls or "pots," swelling considerably in the middle.

The most usual implement of worked horn or bone was the awl or needle of the long, tapering type. They were present in considerable numbers in the ashes.

The stalagmitic deposits, the "polished rocks," and the outside evidences of habitation may better be considered later.

X. EVIDENCES AS TO THE TIME, DURATION, AND CHARACTER OF THE OCCUPATION BY MAN OF JACOBS CAVERN

The evidences of man's occupancy may be classified as follows:

1. The quantity of the ashes.
2. The type of human remains.
3. The type of animal remains.
4. The type of implements and fragments.
5. The stalagmitic deposits.
6. The polished rocks.
7. Outside evidences.

1. At an estimate probably much below the true figure, there were 115 cu. m. of ashes in Jacobs Cavern; they covered the entire clay stratum (B) to a height of 50 cm. and more with a fairly homogeneous mass.

The presence of ashes in such quantities precludes the assumption of purely natural causes.

Fires produced by spontaneous combustion or by lightning, either inside or outside of the cavern, could not produce such a mass within and leave no trace without.

While no exact calculation of the rate of accumulation of ashes may be hazarded, there are certain determining conditions.

First, the daily occupancy of the cavern was probably longer in winter than in summer; hence a longer time would be required for the production of the ashes than were a constant fire to be assumed for the purpose of cooking and heating.

Second, the fires must have been either outside or inside: if outside, but a part of the ashes have been preserved; if inside, the conditions of smokiness must have necessitated small fires; in either case a long time of human occupancy must be assumed.

Third, a singular persistency in occupation is observed. Before excavation, the surface of the ashes was less than 2 m.

below the roof. The inhabitants must have found their later presence in the cavern to necessitate either a cramped position or a very limited floor space; it is conceivable, therefore, that the later accumulation went on more slowly, owing to more infrequent occupation.

The testimony of the ashes is, then, to establish long occupancy, not necessarily continuous, of the cavern.

2. Nothing indicating great antiquity has been inferred from examination of the human remains.

It is to be considered, however, that among the fragments of skeletons found in Jacobs Cavern the maximum femoral length is 43 cm., not that of a large man.

The Osages, the historical owners of the region, were according to Catlin the "largest and best-appearing" Indians seen by him. It is possible, therefore, that the burials are of another, hence earlier, people.[1]

From the carelessness and irregularity of the burials compared to the usual carefulness in this regard of the Red Indian, it is unlikely that these were deposited during the time of the apparently leisurely occupancy while the ashes were accumulating.

Occasional burials, much fewer in number than the deaths occurring in the course of nature, seem unlikely to have been made in the growing refuse-heap.

It is more probable that the six burials are posterior to the deposition of the ashes. The occupants producing the ashes would then appear to have been earlier than those who made the burials, and these in turn to have preceded the Osages.

The scant evidence, accordingly, of the skeletons is toward the greater antiquity of the earlier occupation.

3. No bones of extinct animals were found; all are of comparatively late animals of historical times.

The presence of the bones of domestic animals need not appear surprising; dogs or wolves can at any time readily

[1] Cf. *Catalogue Raisonné de la Galerie Indienne de Mr. Catlin*, Paris, 1845, p. 8, *s.v.* "Osages."

carry bones away from the farmyards and deposit them in the cavern.

The evidence, then, of the animals fails to show any great antiquity in any part of the ash stratum, and, from the absence of testimony to man's occupancy below this stratum, the ashes in their gradual accumulation may safely be taken to be representative of the whole of such occupancy from beginning to end.

4. The types of stone implements are quite different from those of the neighboring Arkansas-lower-Mississippi basin.

They are here ruder in form and finish, and the small arrow- and spear-points of the lower region are almost absent.

The large proportion of very rough knives — round, oblong, shouldered, and not shouldered (often by haphazard) — characterize the Ozark district, and are almost sufficient in themselves to determine a race of occupants different from the so-called "mound-builders."

This distinction is enforced by the absence of the finer pottery, as characteristic itself of the Arkansas-Missouri culture as are in Jacobs Cavern the knives.

To one versed for years in excavation, there comes a certain inexplicable feeling that the specimens from Jacobs Cavern "look old" in comparison to the mound specimens.

While again no proof is forthcoming, the tendency of what the specimens have to say is toward the greater antiquity.

5. The nine stalagmites, so far as observed, contained, from their base on the limestone clay up to the level of the ashes at the time of excavation, charcoal, animal bones, and flint chips in such numbers and embedded in such a way as to prove to the excavators the presence of man in the cavern during the period requisite for the formation of that part of the stalagmites. The deepest specimen found was buried 50 cm. perpendicularly down from the stalagmite's surface.

It remains to investigate the rate of growth of stalagmites, and unfortunately absolutely nothing can here be adduced with precision.

Observations made elsewhere are pertinent.

In Ingleborough Cave, Yorkshire, in the case of the stalagmite "Jockey Cap," through continual dropping the rate of increase was annually, from 1845 to 1873, 0.2946″ or 0.75 cm. in height.[1]

A stalagmite in Wyandotte Cave,[2] Indiana, has been observed to increase annually 0.01″ or 0.0254 cm.

Taking a stalagmite 50 cm. in height, if the rate of growth were that observed in Ingleborough Cave, 66 years would be required for its formation; if that in Wyandotte Cave is assumed, 1968 years would be required.

Hence we are forced to agree with Boyd-Dawkins,[3] Gordon,[4] and Martel[5] that thickness of stalagmitic deposit is of comparatively little moment in the determination of its age.

That this is so, it is only necessary to consider the determining factors in the growth of a stalagmite:

Rainfall.
Vegetation and the character of the surface soil.
Composition of the limestone medium.
Size of the crevices through which trickling takes place.
Rate of evaporation within the cave.
Presence of diverting bodies under the water flow.
Shifting of the stalactitic point of departure.

6. Outside and near the entrance to Jacobs Cavern are large rocks, presenting on large parts a brilliant polish, quite different from weathering and akin to that found especially on the "spades" and "hoes" of Tennessee, produced, we may suppose, by friction between the implement and skins or some other oily substance.

That the rocks have been polished by the naked bodies or the skin clothing of human beings becomes more probable when

[1] Boyd-Dawkins, *Cave-Hunting*, pp. 39–40.
[2] H. C. Hovey, *Celebrated American Caverns*, pp. 137, 139, 191.
[3] *Cave-Hunting*, p. 40.
[4] *Caverns of Copan*, Mems. Peabody Museum. Vol. I, No. 5, p. 12 (148).
[5] *La Spéléologie*, Paris, 1900, pp. 102–103.

we find that, though a few other rocks with a similar polish exist in the Ozark district, they are not present where other evidences of man's occupancy are lacking. The polished rocks indicate a long occupation. The only similar cases known to the explorers are provided by the walls of the stone gallery at Tiryns, where the polishing is said to be due to the herding of sheep for centuries in that celebrated place.

7. The historical owners of Jacobs Cavern were the Osage Indians, a Plains tribe owning and rejoicing in horses in white men's times.

At Eden Bluff are pictographs upon the rocks, presumably done by the occupants of caves in the vicinity. These contain the usual cosmic symbols, but no suggestions of horses; the same absence of horses elsewhere, notably in the Southwest, has been noted.

It is probable that either the pictographs are the product of another, and therefore earlier, race than the Osages, or that they were done in prehistoric or protohistoric times by the Osages themselves.

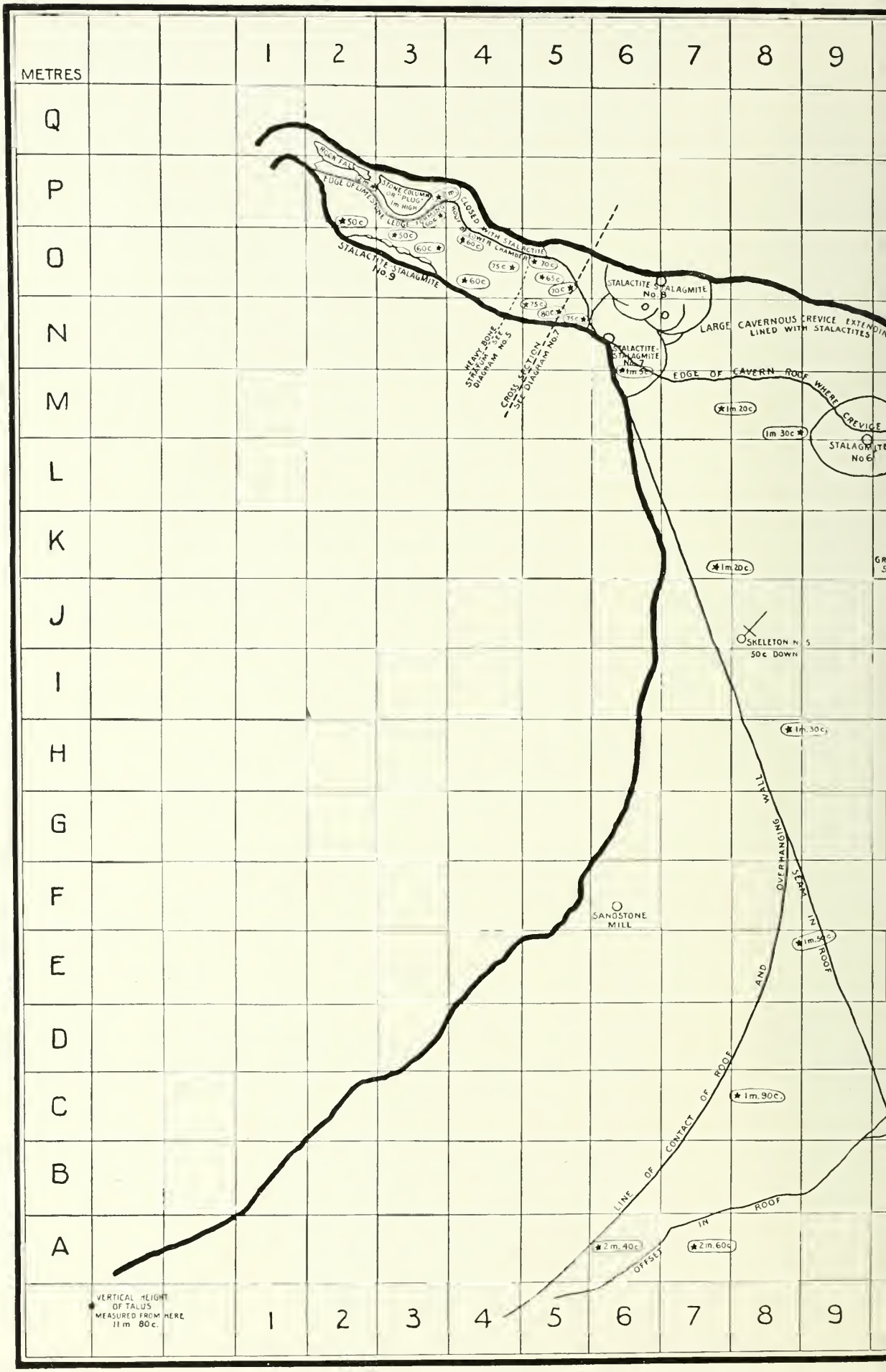
XI. CONCLUSION

The evidence from the quantity of the ashes, the types of implements, the stalagmitic deposits, is toward the assumption of a very early and protracted occupancy of Jacobs Cavern by man.

That the occupants were different from the Osages and also from the lower Mississippi tribes is negatively suggested by the human remains, the pictographs, and again by the types of implements.

The polished rocks point to a long occupation, and its date and length, while not supported, is not denied by the animal remains.

An early inhabiting of the cavern by man, who continued to abide there, perhaps hundreds, perhaps thousands, of years, is all that may at present be asserted.


METRES
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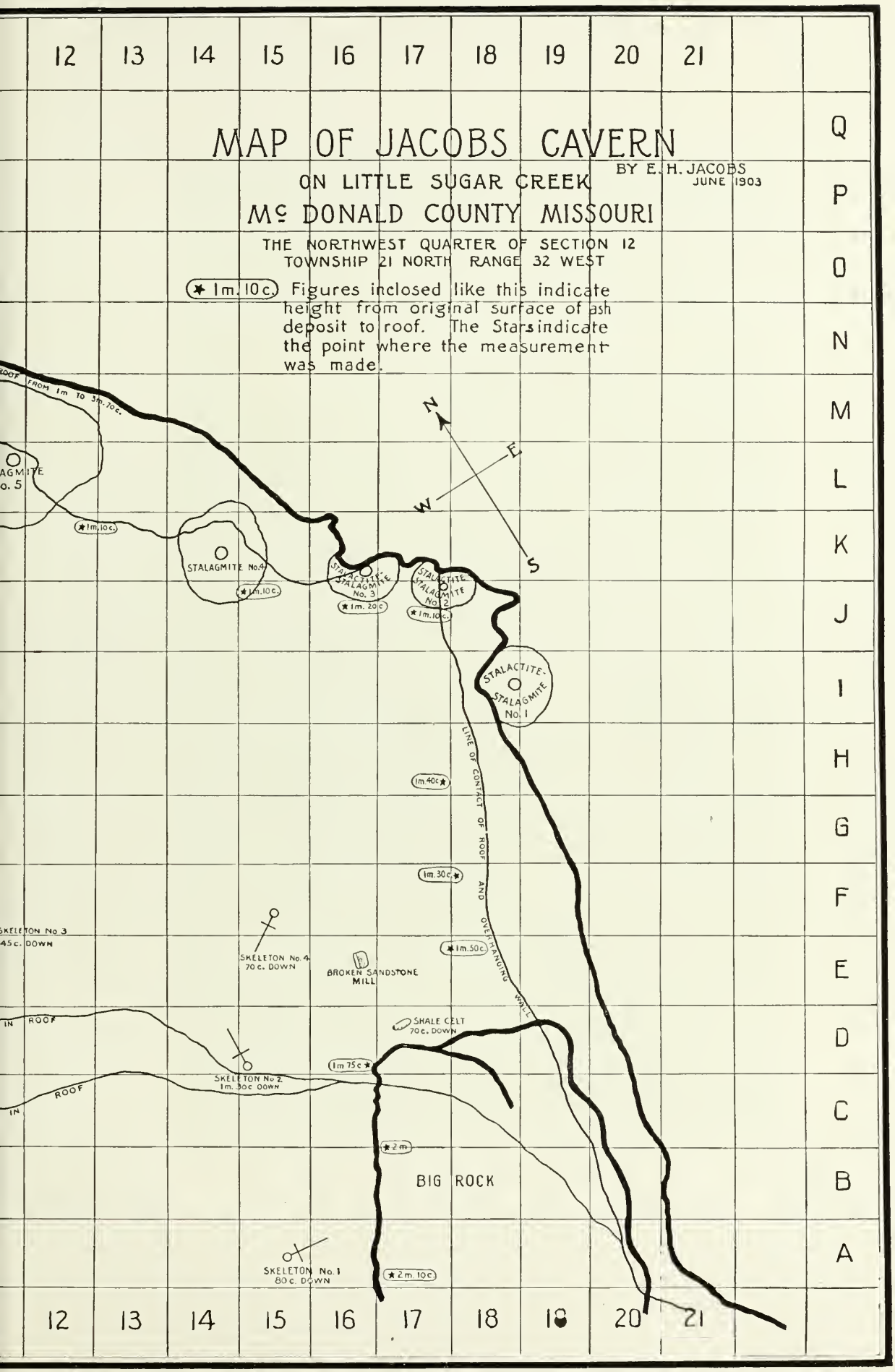
STALACTITE STALAGMITE No. 9
STALACTITE STALAGMITE No. 8
STALACTITE STALAGMITE No. 7
STALAGMITE No. 6
LARGE CAVERNOUS CREVICE EXTENDING
EDGE OF CAVERN ROOF WHERE CREVICE
SKELETON No. 5
50c DOWN
SANDSTONE MILL
OVERHANGING WALL AND SEAM IN ROOF
LINE OF CONTACT OF ROOF
OFFSET IN ROOF
VERTICAL HEIGHT OF TALUS MEASURED FROM HERE 11m 80c.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MAP OF JACOBS CAVERN
ON LITTLE SUGAR CREEK
Mc DONALD COUNTY MISSOURI
BY E. H. JACOBS
JUNE 1903
THE NORTHWEST QUARTER OF SECTION 12
TOWNSHIP 21 NORTH RANGE 32 WEST
★ 1m. 10c. Figures inclosed like this indicate height from original surface of ash deposit to roof. The Stars indicate the point where the measurement was made.
N
E
W
S
ROOF FROM 1m TO 3m. 70c.
AGMITE
o. 5
★1m. 10c.
STALAGMITE No. 4
★1m. 10c.
STALACTITE-STALAGMITE No. 3
★1m. 20c
STALACTITE-STALAGMITE No. 2
★1m. 10c.
STALACTITE-STALAGMITE No. 1
LINE OF CONTACT OF ROOF AND OVERHANGING WALL
1m. 40c★
1m. 30c★
SKELETON No. 3
45c. DOWN
SKELETON No. 4
70c. DOWN
BROKEN SANDSTONE MILL
★1m. 50c
IN ROOF
SHALE CELT
70c. DOWN
★1m 75c
SKELETON No. 2
1m. 30c DOWN
IN ROOF
★2m
BIG ROCK
SKELETON No. 1
80c. DOWN
★2m. 10c

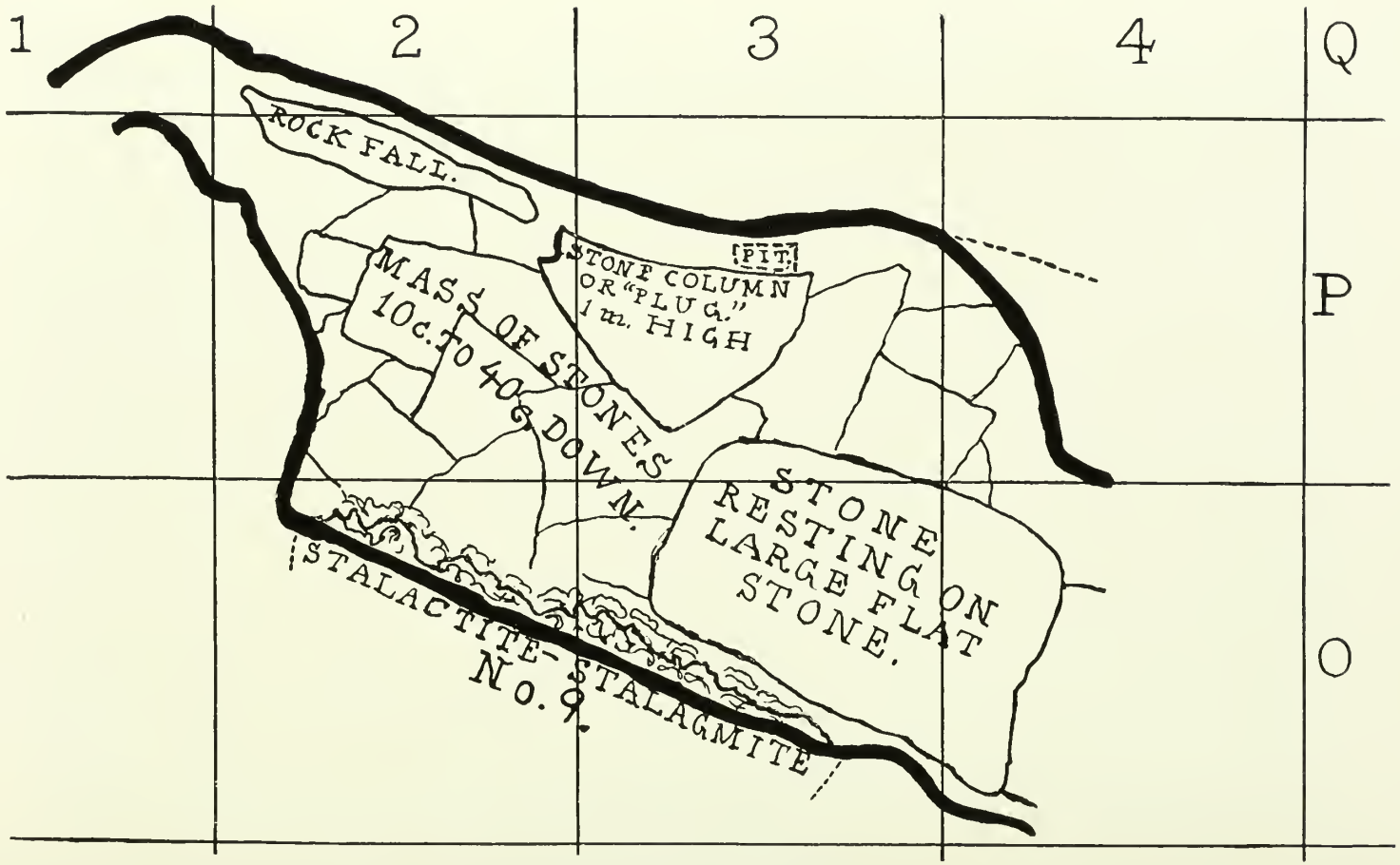
PLATE I

JACOBS CAVERN: OPENING FROM THE WEST

PLATE II

JACOBS CAVERN: ROW OF STALACTITES AND STALAGMITES

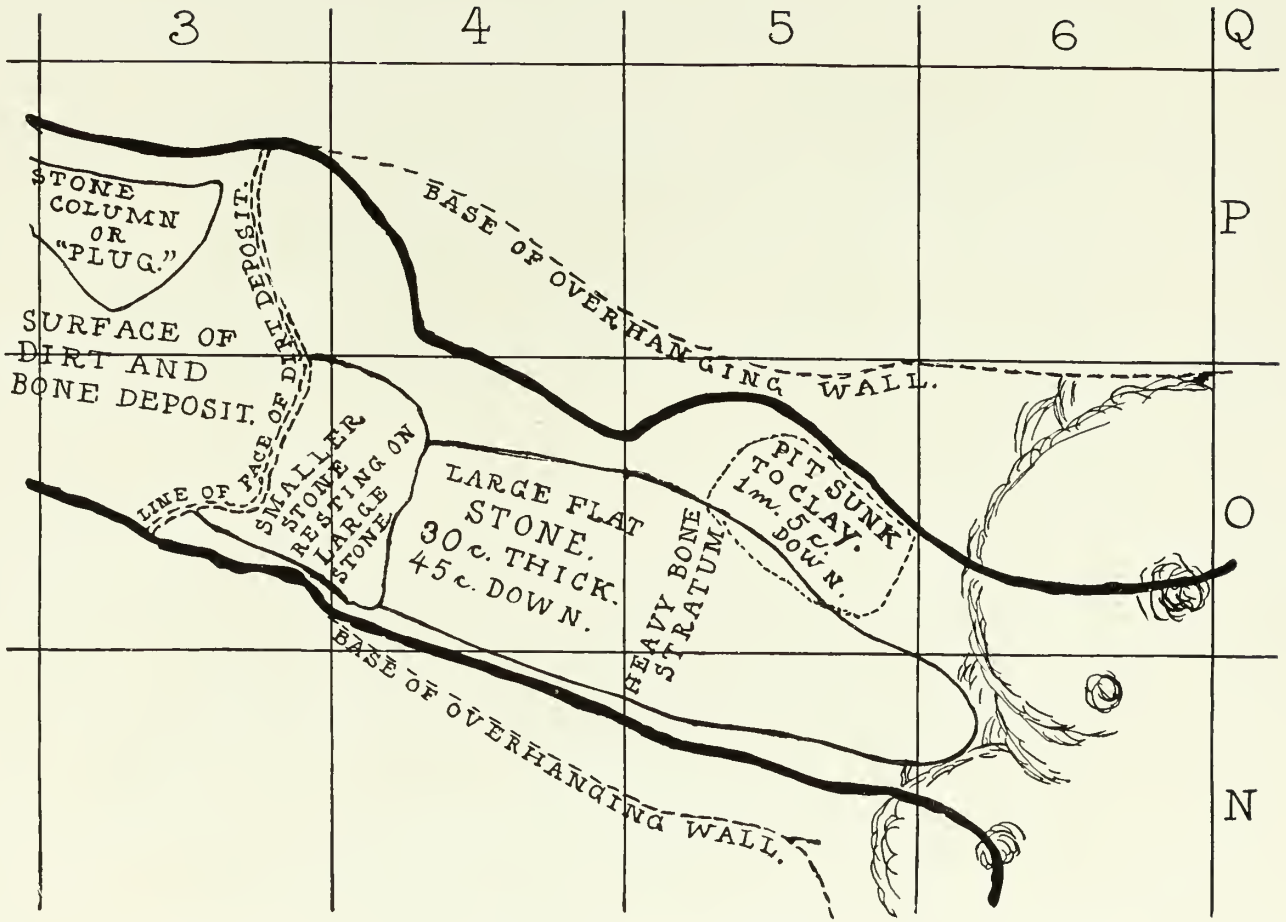
PLATE III



JACOBS CAVERN: BONE RECESS

BY E. H. JACOBS

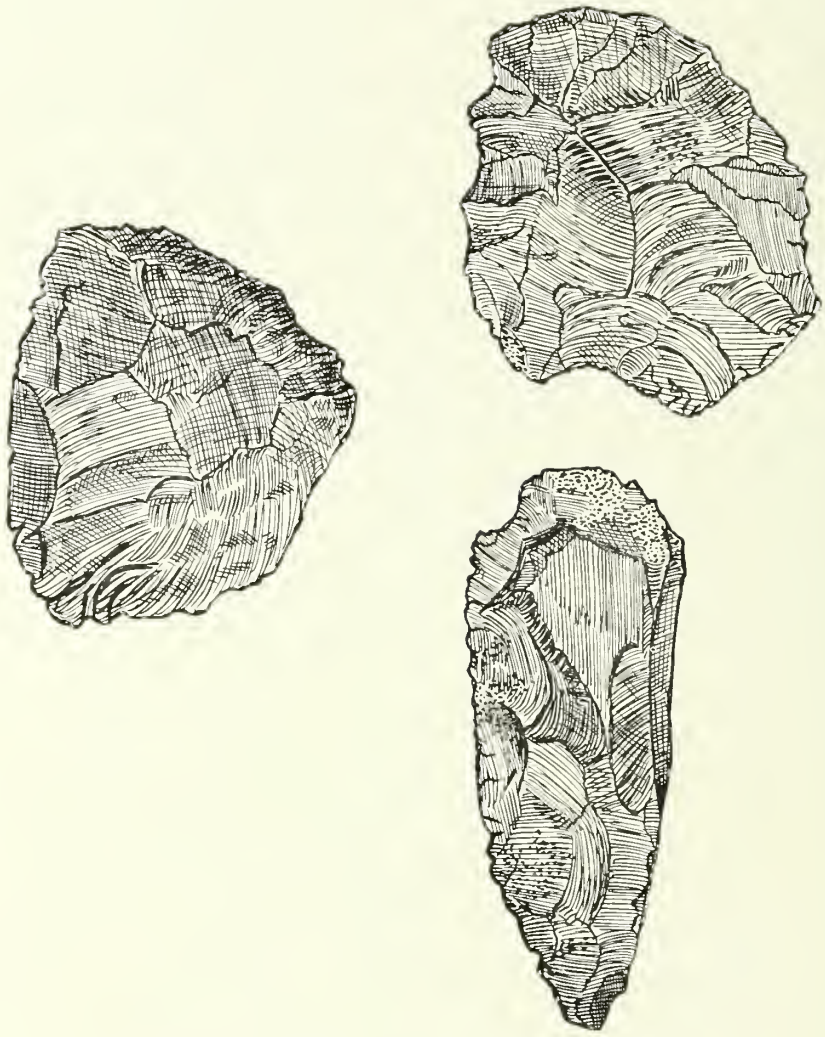
PLATE IV



JACOBS CAVERN: BONE RECESS

BY E. H. JACOBS

PLATE V

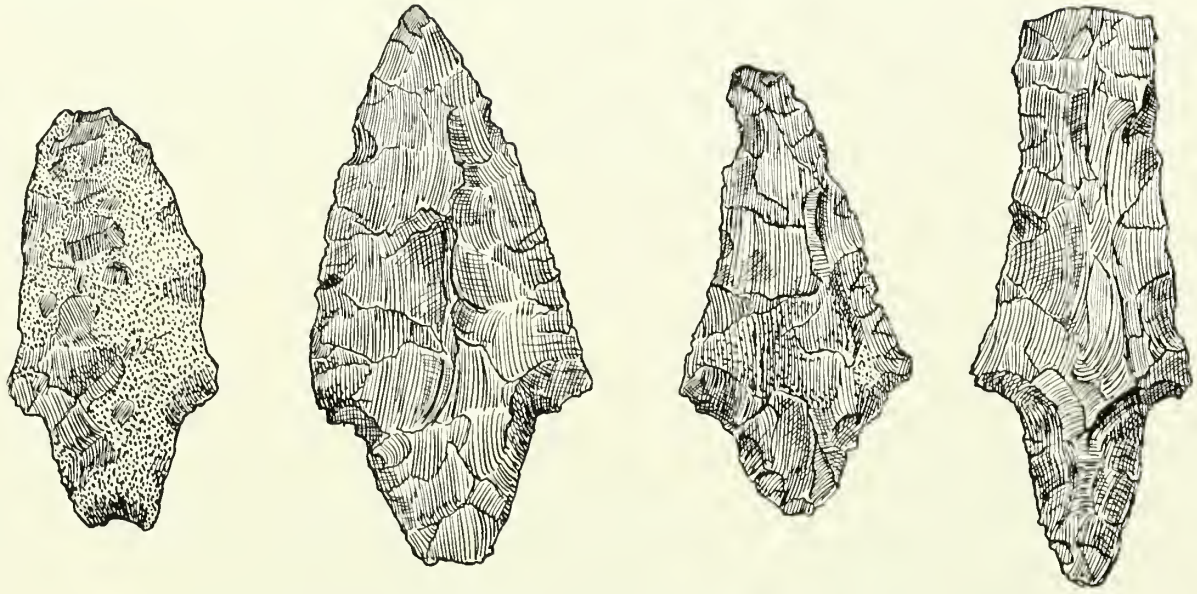


JACOBS CAVERN: KNIVES OF STONE. SIZE ½

PLATE VI

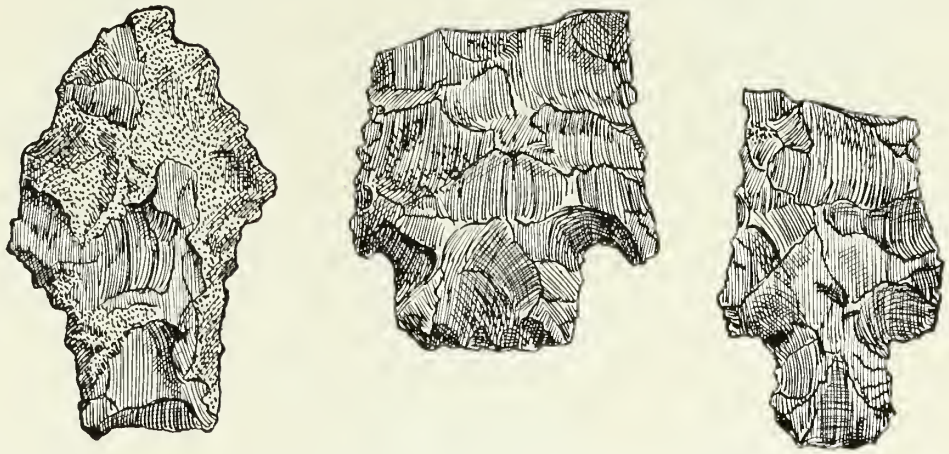
JACOBS CAVERN: KNIVES OF STONE. SIZE $\frac{1}{1}$

PLATE VII



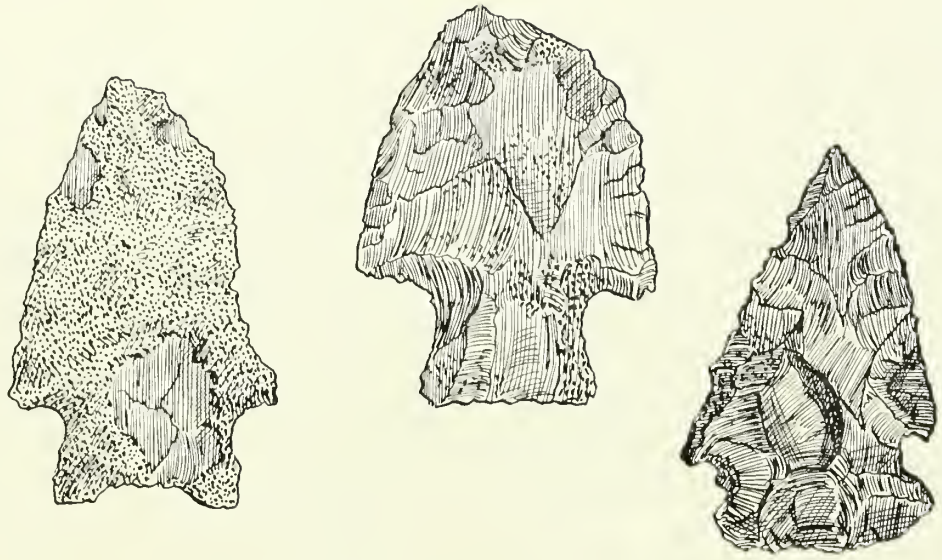
JACOBS CAVERN: IMPLEMENTS WITH STEM TAPERING. SIZE $\frac{1}{1}$

PLATE VIII



JACOBS CAVERN: IMPLEMENTS WITH STEM NEARLY STRAIGHT. SIZE $\frac{1}{1}$

PLATE IX

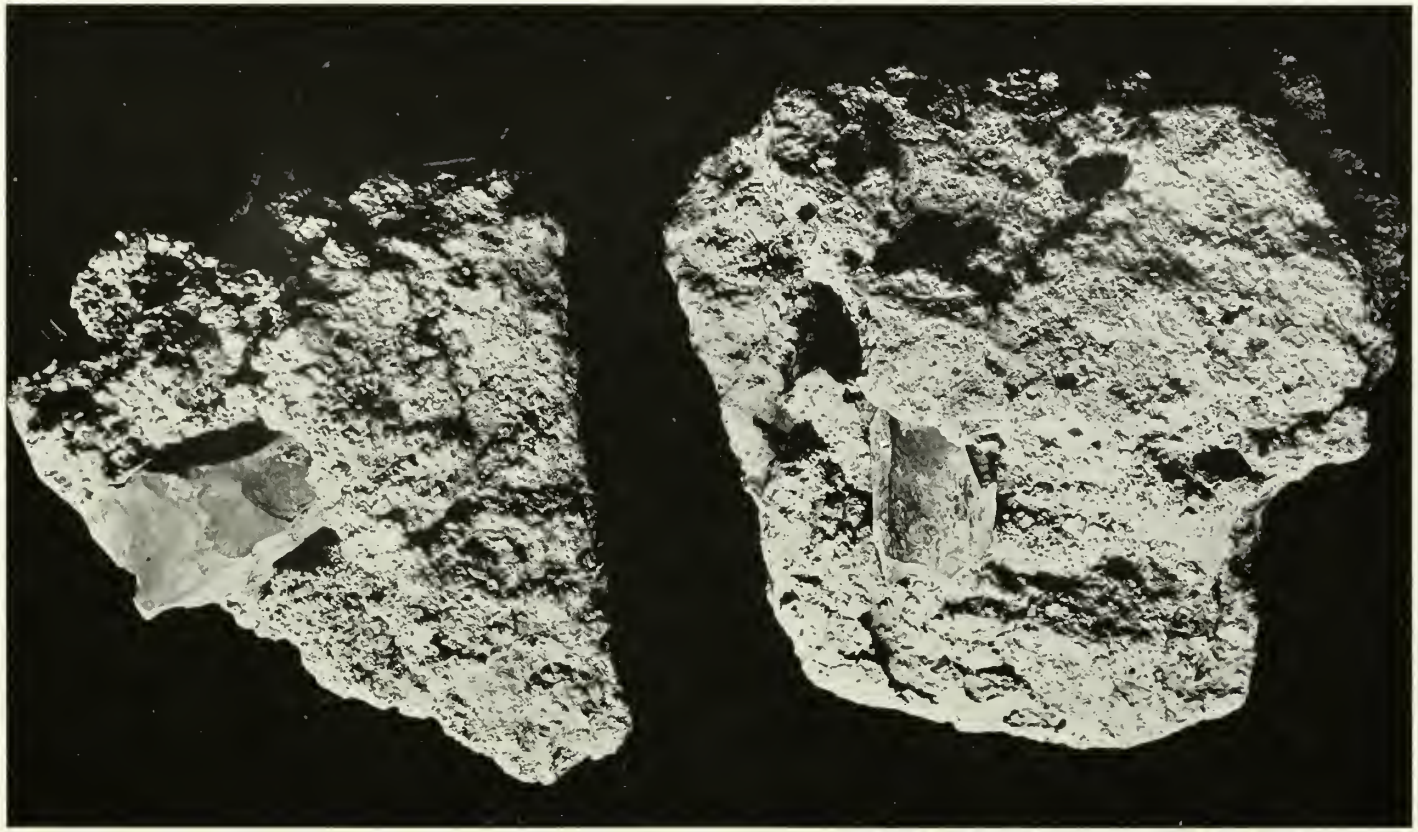


JACOBS CAVERN: IMPLEMENTS WITH STEM EXPANDING. SIZE $\frac{1}{1}$

PLATE X

JACOBS CAVERN: SMALLER CHIPPED IMPLEMENTS. SIZE $\frac{1}{1}$

PLATE XI



JACOBS CAVERN: STALAGMITIC MATERIAL WITH FLINT AND BONE

INDEX

INDEX OF APPENDIX

Because Dr. Peabody's pages and illustrations were not renumbered, it is necessary to present a sub-index of his portion of this report.

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