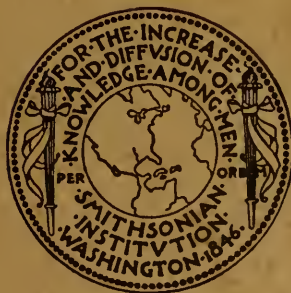


SMITHSONIAN MISCELLANEOUS COLLECTIONS
VOLUME 103, NUMBER 4

ARCHEOLOGICAL AND GEOLOGICAL
INVESTIGATIONS IN THE SAN
JON DISTRICT, EASTERN
NEW MEXICO

(WITH 9 PLATES)

BY
FRANK H. H. ROBERTS, JR.
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(PUBLICATION 3692)

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INTRODUCTION

In continuance of a study of early horizons in North American archeology a Bureau of American Ethnology-Smithsonian Institution expedition spent the field season, June 20 to September 6, 1941, conducting investigations in eastern New Mexico. Members of the party, in addition to the writer, were: Dr. Kirk Bryan, Department of Geology and Geography, Harvard University; Herbert J. Dick, Jr., University of New Mexico; Robert Easterday, Colorado State Teachers' College; Walter B. Greenwood, Bureau of American Ethnology; S. Sheldon Judson, Harvard University; Bert E. Lohr and Edison P. Lohr, Loveland, Colo.; Donald D. McPhail, Michigan State College; Robert H. Merrill, engineer, Grand Rapids, Mich.; Robert M. White, Harvard University; Eugene C. Worman, Jr., Harvard University; Beulah J. Lohr, Linda B. Roberts, and Mrs. Merrill. Numerous interested scientists and amateurs from nearby southwestern and other institutions visited the camp during the progress of the work.

Most of the excavations centered around a site on the north rim of the Staked Plains $10\frac{1}{2}$ miles (16.9 km.) south of the town of San Jon and 20 miles (32.2 km.) south of the Canadian River. At this location there is a shallow basin that appears to be a remnant of an old filled-in lake bed or series of ponds that had formed in the fill resulting when an original valley in the escarpment was blocked by sand deposits. The bottom of the basin is traversed by a series of deep ravines and broad arroyos (pl. 1, fig. 2) that come together and cut through the rim to join one of the intermittent tributaries of the Canadian heading in the brakes below. The local

name of the formation is Sand Canyon. Heavy erosion of the gully banks in recent years exposed deposits of alluvium and sporadic concentrations of animal bones including mammoth, bison, and deer as well as other smaller mammals, mainly of the Rodentia. Stone implements occurring near some of these outcroppings indicated that aboriginal hunters had been active in the area and suggested that both former camping places and associations between man-made objects and extinct species of animals could be found there.

The site was discovered by Keith Martin, a local ranchman, who reported the presence of the bones and showed the artifacts that he had found there to various people at the Museum of New Mexico and the Laboratory of Anthropology at Santa Fe, and at the University of New Mexico in Albuquerque. In the spring of 1940 Dr. Frank C. Hibben and a group of students from the Department of Anthropology at the University did some preliminary prospecting there and obtained a collection of animal bones and a few stone artifacts. In August of the same year the writer visited the site in company with Dr. Hibben. Because of the amount of work involved in a thorough investigation and the fact that its efforts were occupied with other archeological researches, the University of New Mexico offered to turn the site over to the Smithsonian Institution. The combination of features at the site and in the adjacent district was so promising that the offer was accepted. Permission to carry on the work was obtained from Mrs. George Wilburn, lessee, and Mrs. H. Bonem, owner, of Tucumcari, N. Mex.

Several factors were considered in making the decision to investigate the site. In addition to the occurrence of artifacts with fossil bones, there was the matter of the projectile points picked up from the weathered surfaces by Martin and found in situ by the University group. They are of the so-called Yuma type, a form purported to be of some antiquity but about which further data are needed to determine its true status. Furthermore, the location, some 130 miles (209.2 km.) south of the original Folsom bison quarry (Figgins, 1927; Roberts, 1935, 1940), and some 60 miles (96.6 km.) north of the important deposits along Blackwater Draw between Clovis and Portales where Folsom and Yuma materials occur (Howard, 1935; Roberts, 1940), as well as its proximity to some of the west Texas places where reputedly old finds have been made, seemed significant. In addition the area was the scene of considerable activity during late protohistoric and early historic times. It was hunting territory for numerous bands of the Apache—the Querechos of Coronado and

the Vaqueros of Benavides; possibly for some of the Jumanos—the Patarabueyes of Espejo and the Rayados of Oñate (Mera, 1935; Scholes and Mera, 1940); for occasional groups from the eastern Pueblos; perhaps for some of the Wichita roving that far west; for the later Comanche and Kiowa; and even some of the Pawnee. Coronado's party probably followed the Canadian north of the site and other Spanish explorers visited the region. One of the main Comanche trails, the northern, skirted the base of the bluffs. Numerous survey parties from the eastern States passed that way during and immediately after the Mexican War; the California emigrant trail from Fort Smith, Ark., followed the Canadian in 1849; and still later one of the famous trails of the cattle barons traversed the valley. All contribute a share of interest and enhance the possibility of adding to the fund of knowledge pertaining not only to the "early man" occupation of the region, but to later Indian groups and historic events as well.

The escarpment of the Staked Plains rising some 800 feet (243.8 m.) above the broad valley of the Canadian River is one of the striking topographic features of the district (pl. I, fig. 1). The brakes, from the rim to the plain below, are covered with juniper, piñon, and scrub oak, and there are sporadic clusters of cottonwood trees along the stream beds that start in the brakes and wind across the lower plain from the base of the bluffs. On top a sparse scattering of juniper and piñon extends back a short distance from the rim and occurs in protected places in gullies and ravines, but for the most part the upper level quickly merges into the vast, rolling, treeless terrain that so bewildered both the Spanish and early American explorers. Prior to the recent heavy cultivation of large areas for wheat and grain sorghums it was covered with a thick, heavy carpet of grass that furnished ample forage for the great herds of buffalo and antelope, as well as for the wild horses of the Canadian in historic times, that roamed its stretches. Several varieties of cacti, including the bushlike cholla or coyote candles, grow on the slopes of the escarpment and along the ravines, and yucca is fairly abundant. Wild grapes can be found in places along the base of the bluffs. There are several kinds of bushes with edible berries and numerous plants whose roots, tops, and seeds contributed in no small measure to Indian subsistence.

The winter and spring of 1941 were unusually wet in this district with an attendant abundance of plant forms. Among those noted were a number that are known to have been used by Indians in other

parts of New Mexico and it is quite possible that they may have served the peoples living here. Although it is not definitely known that all of the forms were present in earlier times, they are so widespread that it may be taken for granted that they were available. Included in this list are: The sunflower (*Helianthus annuus*) that furnished seeds for parching and for grinding into a paste used in thickening stews and making cakes; the four-o'clock (*Mirabilis multiflora*) the roots of which were used in tanning; purslane (*Portulaca oleracea*) that furnished greens; amole or yucca (*Yucca glauca*) with seed pods for food and roots for soap; datil (*Yucca baccata*) the fruit of which was eaten raw and cooked in various ways; rabbit-brush (*Chrysothamnus latissquameus*) the buds of which were eaten and the flowers of which were the base for a yellow dye; pigweed (*Amaranthus retroflexus*) that supplied fresh greens or was dried for winter use; lambsquarter (*Chenopodium leptophyllum*) the leaves of which were used as greens and the seeds of which were ground into meal; panic grass (*Panicum obtusum*) with seeds that were ground into a kind of flour; wild peas (*Lathyrus leucanthus*) that contributed the whole pod as well as seeds; wild potatoes (*Solanum fendleri* and *Solanum jamesii*) the small tubers of which were boiled with the skins on or were eaten raw with a white clay or talc to counteract certain unpleasant effects they otherwise might have.¹ Then, of course, there were the nuts from the piñons (*Pinus edulis*) and the prickly pears (*Opuntia* spp.) that were in high favor with the Indians.

The buffalo has disappeared, but a few antelope (*Antilocapra americana americana*) and white-tailed deer (*Odocoileus virginianus texanus*) can still be seen. Some of the local residents report that on occasions they have observed mule deer (*Odocoileus hemionus macrotis*) in the brakes. This is a little south and east of the normal range for that particular deer, but the animals would not need to stray far to wander into the district. Jack rabbits (*Lepus californicus melanotis*) and cottontail rabbits (*Sylvilagus audubonii neomexicanus*) are plentiful, the prairie dog (*Cynomys ludovicianus ludovicianus*) and pocket gopher (*Geomys breviceps llanensis*) are common. Coyotes (*Canis latrans*) were seen by members of the party, lynx or bobcat (*Lynx rufus baileyi*), badgers (*Taxidea taxus berlandieri*), a buff-gray fox (probably *Vulpes velox velox*, but this

¹ These plants were identified by Linda B. Roberts. For further information on native plants as sources of food in the Southwest see Castetter, 1935; Castetter and Opler, 1936.

identification is based on only fleeting glimpses of the animal), skunks (*Mephitis mesomelas varians*), rock squirrels (*Citellus variegatus grammurus*), striped and spotted ground squirrels (*Citellus tridecemlineatus arenicola* and *Citellus spilosoma major*), the hoary wood rat (*Neotoma micropus canescens*), and many kinds of small mice abound.

Birds are numerous in the locality and among those observed were: Lark bunting (*Calamospiza melanocorys*), the cowbird (*Molothrus ater ater*), mourning doves (*Zenaidura macroura marginella*), western meadowlark (*Sturnella neglecta*), horned lark (*Otocoris alpestris leucolaema*), western mockingbird (*Mimus polyglottos leucopterus*), kingbird (*Tyrannus tyrannus*), cactus woodpecker (*Dryobates scalaris cactophilus*), piñon jay (*Cyanocephalus cyanocephalus*), cliff swallow (*Petrochelidon albifrons albifrons*), western lark sparrow (*Chondestes grammacus strigatus*), Arizona scaled quail (*Callipepla squamata pallida*), road runner (*Geococcyx californianus*), western burrowing owl (*Speotyto cunicularia hypogaea*), sparrow hawk (*Falco sparverius sparverius*), western redtail hawk (*Buteo jamaicensis calurus*), nighthawks (*Chordeiles minor henryi* and *Chordeiles minor howelli*), Bullock's oriole (*Icterus bullocki bullocki*), and the Cassin sparrow (*Peucaea cassini*). Wild turkeys formerly were abundant along the Canadian near the Texas border but have not been reported since the middle of the nineteenth century. They probably were the eastern form (*silvestris*) and had worked their way up the river and into eastern New Mexico.

There are several kinds of snakes, including the diamondback and prairie rattlers, as well as a few lizards and the horned toad. From the standpoint of the flora and fauna the district by and large is still one that would hold considerable attraction for aboriginal peoples.

The general problem was attacked from several angles. One pertained to the locating of archeological materials and discovering what the associations were, if any, between different types of artifacts and animal remains. In this connection there also was the matter of determining to what extent the various kinds of stone tools and the bones could be correlated with the several strata in the fill. Then there was the question of a sequence in implement types and the possibility of obtaining important information on the relationship between the Yuma and points from already established cultural horizons. Another phase consisted of a careful study of the material in the fill in the basin at the main site, of deposits in the general

area, and of possible correlations of both with geologic phenomena of known age. To facilitate the recording of archeological information and to aid in the geologic studies a detailed 5-foot (1.524 m.) contour map of the basin and its gullies was prepared by Mr. Merrill.

Results were more gratifying in some cases than in others. This is in part attributable to an insufficient quantity of archeological evidence rather than to its quality, and to the fact that certain phases require further work. On the whole, however, an interesting outline of developments in the area is apparent from present information.

ARCHEOLOGICAL WORK

The archeological activities, under the writer's direction, were carried on by the students in the group. The grid system was followed in the digging. Areas to be investigated were staked off in 5-foot (1.524 m.) squares, the lines running east-west and north-south, and exploratory trenches were laid out in 5-foot widths with their lengths continuing as required on the basis of 5-foot units to provide consistency in the records and in order that the sections would be uniform in case it was found necessary to expand the trenches into larger areas. The men were given separate sections, each working his own from the surface to the bottom of the excavation (pl. 2, fig. 1). The material was removed layer by layer, following the natural strata, and the vertical and horizontal positions and the nature of the earth surrounding all objects found were carefully recorded. On the completion of a section a scale drawing was made of the face of the next section before work was started on it. In this way profiles showing the nature of the deposits as they occurred at 5-foot intervals throughout the digging were made available for study and as a part of the data pertaining to the excavations. The archeological material presented no handling difficulties, but in the case of the animal bones it was often necessary to harden them with preservatives and to apply plaster jackets before removal.

Excavations in three sizeable areas and four trenches in and around the basin (fig. 1), digging in four places on the level top of a terrace in the brakes, midway between the rim and the plain below, and in buried hearth levels exposed by gullies in the lower plain, produced an interesting series of implement types with geologic evidence for a sequence in some of the forms. This was also true for some of the animal bones, although the number of variations involved was not as great. Four types of projectile points came from the basin and its environs and from the terrace site. They occurred in four

stratigraphic horizons and while actual superposition of specimens was lacking, the geologic nature of the layers is such that there seems little reason to doubt that the sequence indicated is correct. A fifth type was found in a buried occupation level in the lower plain. Its position in the sequence is somewhat doubtful at present writing, yet it seems to be approximately contemporaneous with the third or next to most recent in the series from the basin.



FIG. 1.—Map showing outline of main arroyos in the basin and the break through the escarpment. Location of work areas, trenches, and places where bones were found without accompanying artifacts are also indicated.

The earliest type of point, a rather roughly chipped, thick-bodied blade with a square base, parallel sides and rounding tip (fig. 2, *a*), occurred in a layer of dark earth corresponding to the top level of the silt in one of the old ponds or lake beds. The point in general might be considered as an example of the Indeterminate Yuma (Wormington, 1939), but the lack of many of the characteristic minor details makes its assignment to that classification debatable. This doubtful status is accentuated by the fact that many obviously unrelated forms have been lumped together under the name Indeter-

minate, and it is very much a question whether any of them should be considered as belonging in the Yuma category. The uncertain nature of the class was emphasized by the discussions at a conference held at the Laboratory of Anthropology in Santa Fe, N. Mex., in September 1941 (L. L. Ray, 1942; C. T. Hurst (The Editor), 1942), when it was proposed that the Indeterminate group be dropped from the Yuma series. Consensus was that as each of the forms became established it could be named on the basis of its place of origin and proper relationships. In view of this it probably is best, for the time being, to refer to the present type as the San Jon point, adding the proper qualifier when its affinities have been determined.

The San Jon point was associated with the remains of a large bison, probably the extinct *taylori*.² The bones from this level are completely fossilized, and in many cases articulated members were so firmly mineralized that they were lifted from the earth as a unit. Numerous examples of articulated feet and lower leg bones were found in upright positions in the upper part of the silt or alluvium (pl. 3, fig. 1). They definitely suggested an animal wading out to drink, becoming inextricably mired in ooze and perishing there. Perhaps the Indians, certainly some of the carnivores in the area, preyed on the creatures trapped in this fashion because in many cases bones from the upper parts of the legs and the body were either entirely missing or else were considerably scattered.

The geologic age of this deposit is still to be established. At another part of the site, however, a portion of a true Folsom point was found weathering out of the same layer in association with fragments of similarly fossilized bone. This, coupled with the fact that a large bison is involved, points toward possible contemporaneity with the Folsom horizon, one of the oldest thus far recognized in North America and dated in the closing stage of the Pleistocene (Antevs, 1935; Bryan and Ray, 1940). But because the Folsom specimen was not wholly in situ and represents only a single occurrence it can be regarded merely as an indication. On the other hand the presence of man-made objects with extinct bison remains and the occurrence of mammoth bones, teeth, and tusk fragments in the same stratum a few feet away, although no direct associations have thus far been

² This material was identified by Dr. C. Lewis Gazin, assistant curator, division of vertebrate paleontology, U. S. National Museum, who stated that it obviously was from an extinct form closely approximating *taylori* in size, but because only lower jaws and leg bones are available for study the species cannot be indicated with certainty.

found between the latter animal and artifacts at this location, implies some antiquity. That contemporaneity of Indians and the mammoth in this region was within the bounds of possibility is indicated by the finds near Clovis (Howard, 1935; Cotter, 1937), at Sandia Cave (Hibben, 1941), and in various Texas sites (Sellards, 1940).

The second type of point, a characteristic Yuma of the form designated the Collateral (Wormington, 1939) and since the 1941 Santa Fe

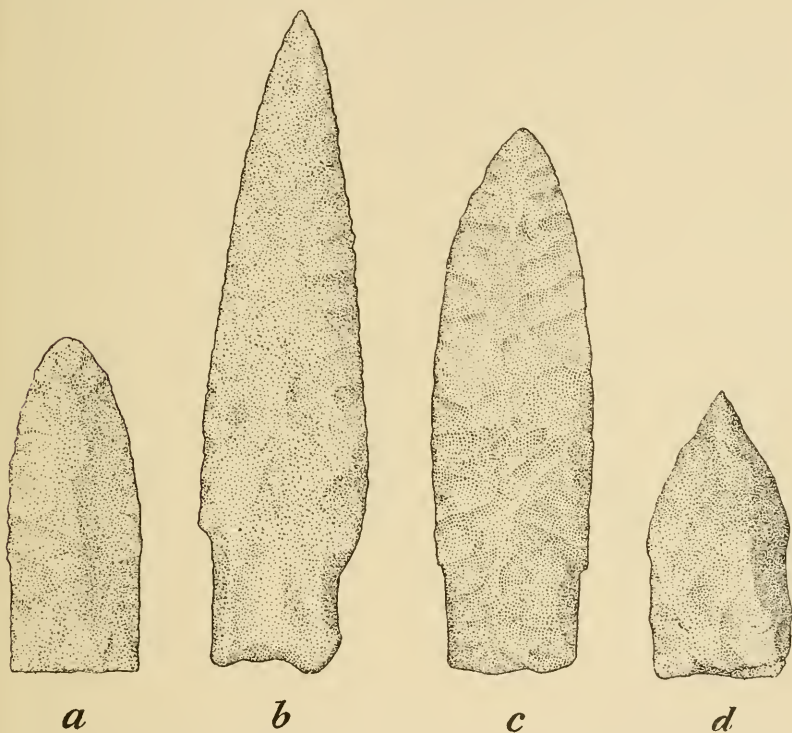


FIG. 2.—Some projectile point types. a, San Jon; c, Collateral or Eden Valley Yuma; b, and d, unnamed forms. (Actual size.)

conference tentatively called the Eden Valley Yuma, comes from a mixed layer of reddish clay and sand and is found in association with bones from an essentially modern species of bison, a much smaller animal than that of the lower level. The bones show some fossilization, although it is in much less degree than that of the first group. Geologic evidence is that this horizon was separated from the first by an appreciable period of erosion followed by marked deposition. This argues for considerable time lapse and a much younger age for the cultural material. The Collateral or Eden Valley

Yuma at San Jon has an elongated subtriangular shape with slightly convex edges, a rudimentary tang formed by a slight inset on the edges near the base, and a slightly convex base (fig. 2, *c*). There is a suggestion of the median ridge on the faces and the inset edges near the base are smoothed. All the Yuma points reported from the site have not been seen by the writer as some of the earlier finds have been scattered, but those that were studied conform to the above description. It is possible that some of the Oblique Yuma (Wormington, 1939) may be there, although the presence of one form does not necessarily imply that the other also will be found. There are numerous cases where only one of the types occurs at a site.

The third type of point, one with a long, leaf-shaped blade, rounding shoulders, and a roughly straight tang with a slight bevel to the left, and a concave base (fig. 2, *b*), is found at a little higher level in deposits essentially the same as in the case of the preceding form. This point suggests some of Ray's Clear Fork types (C. N. Ray, 1938), belongs in the same category as one from the Taos Plateau reported by Bryan and Butler (1940), possibly has some relationship to Sayles' Brazos River forms (Sayles, 1935), and also bears some similarity to points from the Big Bend region identified as forms frequently found in Pecos River sites³ (Kelley, Campbell, and Lehmer, 1940, pl. 5, fig. 1, *b*, upper left; fig. 2, *b*, left); yet it is sufficiently different to make correlation with the latter questionable. The only animal remains associated with these points are those of modern bison, the bones showing no traces of fossilization. The chief distinction between the remains of this and the Yuma horizon appears to be in the fossilization of the bones. In general the degree or absence of mineralization has little value as a criterion because of the varying rates at which it takes place under diverse conditions and in different localities. When the material comes from a small area at a single site where there is no difference in conditions, however, it probably does have some significance and can be considered as giving at least an indication of relative age. Hence on the basis of the nature of the bones and of the earth from which they and the points were dug it seems evident that they are somewhat, although not markedly, later than the Yuma.

The fourth type in the series is actually a group of several subtypes of the small, notched and tanged arrowheads common at recent Indian sites. Sporadic examples are found on the surface around the basin, on the slopes of the brakes, and on the plain below. In the excava-

³ Not the type of point named the Pecos River point, however.

tions, however, they occur just below the present sod line or, as in the case of those from the terrace in the brakes where there is no grass, are from 2 inches (5.1 cm.) to 4 inches (10.2 cm.) beneath the surface in the upper part of an ash- and charcoal-stained deposit underlying a layer of sterile sand. Curiously enough none of these seems to belong to any of the types identified as characteristic of the Apache, Wichita, Jumano, or Panhandle groups (Sayles, 1935) that might be expected to have left a few points in the region.

The triangular form with broad, expanding tang with convex base (pl. 4, *a*) appears sporadically over most of the southern plains, is occasionally seen in collections from the northern plains, occurs in some eastern Pueblo ruins, and may be found in sites east of the Mississippi River. It apparently does not occur in large numbers in any one locality and has not been correlated with any particular horizon or specific cultural group, but it undoubtedly is a relatively late type.

The same is true for the group with a longer, expanding tang and more rounding base (pl. 4, *c*). A comparable point is reported from a rock shelter in the southern escarpment of the Staked Plains in Winkler County, Tex., some 220 miles (354.1 km.) southeast from the San Jon site (Holden, 1938, pl. 28, No. 10). There the association included potsherds, some of Pueblo origin, other types of projectile points, knives, scrapers, drills, bone and shell artifacts. The culture represented is considered to be non-Puebloan, many of the points and artifacts seem to be Sayles' Wichita and Jumano types although other groups are also included, and evidently does not belong in an early category.

The triangular point with slightly convex and serrated edges, medium tang and concave base (pl. 4, *b*) suggests some of the Texas forms from the Edwards Plateau section, might possibly be derived from some of the bifurcated-base types found there, and also has a resemblance to examples occurring sporadically in the eastern periphery of the Pueblo area, yet it does not appear to have definite affinities with established cultural phases. Perhaps, like the others, it represents a minor type that had a rather widespread distribution and as far as present knowledge goes is without any particular significance.

The last in the group (pl. 4, *d*) is a type in which the basal portion constitutes a much larger proportion of the blade than is usually the case. The tip end is triangular in shape, while the section below the side notches is roughly rectangular with a deeply concave base.

Slightly variant examples of the type have been reported from numerous sites, mainly of the Classic and later periods, in the Pueblo area where they generally are considered as "unusual" forms (Cosgrove, 1932, pl. 51, *a*; Kidder, 1932, fig. 6). They probably bear some relationship to the more highly developed points found in Oklahoma, some of the southern States, and even in parts of Mexico, that are characterized by such deep basal concavities that they appear to have wings. Beyond their late horizon, however, they do not seem to have any special local significance and certainly cannot be regarded as a criterion for the presence of any specific group in the area. All four of these types of points are in association with bones from modern bison, deer or antelope, and jack rabbits.

The fifth type, found in a buried occupation level in the lower plain (pl. 3, fig. 2), is a rather stubby form with roughly parallel sides, flat base, and sharply tapering tip (fig. 2, *d*). First thought was that the implement was a drill made from a broken point, but careful reconsideration and study of several examples indicates that it probably was a form of projectile. In a general way it bears resemblance to some of the points from the Edwards Plateau district in Texas and also some of those from the Big Bend region, yet it is sufficiently distinct to be considered as representing a separate class. Possible relationships may be determined by future work in the region. Associations in this case consisted of modern bison, deer, and bones from small mammals. The type, as previously mentioned, appears to be contemporaneous with the third main group, yet eventually may prove to be somewhat older.

Projectile points were the only artifacts obtained from the oldest and subsequent Yuma horizons, unless a few nondescript flakes capable of utilization as knives or scrapers be considered as tools, and there is no information regarding other kinds of implements comprising the complexes to which they belonged. Further data along this line are essential to a proper understanding of the subject as a whole. Several kinds of scrapers, knives, choppers, hand hammers, and grinding stones were associated with the later type points. In the case of the fourth series there was the addition of potsherds.

The ubiquitous snub-nosed or end scraper (pl. 4, *c-k*) is one of the more prevalent forms in the group of scrapers. As is usually the case, most of the examples are of the uniface, planoconvex type with the flat side showing little or no chipping and the curved side having had just enough flakes removed to give the implement its characteristic shape. The convex, broad end and two edges were retouched by the

pressure method, the fine flaking producing sharp scraping surfaces. The smaller end, which on most examples still shows the bulb of percussion produced when the flake was struck from the original nodule, rarely has any flaking. An exceptional specimen is shown in plate 4, *k*, where the smaller end was given a concave edge of the form that was used for scraping and smoothing arrow shafts. No examples were found with a small, sharp point for perforating or graving purposes. In some localities these are a fairly common feature on snub-nosed scrapers and may occur at various places on the implement. In some cases they are at one of the corners formed by the convex end and one edge, occasionally they may be noted at both corners, or they may be along one of the edges or at the small end. Whether the absence of the feature from the San Jon examples is purely coincidence in that specimens bearing it just weren't found or is a matter of significance is not known at present. Taken as a group or singly, there is nothing to distinguish the scrapers in this series from similar forms found elsewhere in either Plains or Pueblo sites and they cannot be considered as a criterion for cultural or period identification. They apparently were concomitant with hunting among most Indian groups.

Side scrapers of simple form were common (pls. 5, 6). They were made from flakes of various sizes and shapes and in most cases exhibit a minimum of flaking, except along the functioning edge which was given a low-angled bevel. A few specimens have a fine, secondary flaking or retouch along the working edge, but for the most part the regular flaking seems to have been sufficient and there are examples where it occurs on only a portion of the edge. As a matter of fact numerous sharp flakes undoubtedly were used as scrapers without any attempt being made to better the edges through the flaking process.⁴ This is particularly true of various quartzite forms occurring in abundance at the places where the other types were found. Such flakes break away from a core or nucleus with a fine, straight edge that will stand considerable abuse before being dulled to the extent that it is no longer efficient. While such implements are in use, small flakes are generally knocked off the edge. This is a good criterion for identifying utilized flakes. Numerous examples in the collection show this feature. A large majority of the working edges are convex, only a few are straight, concave forms are rare, and there is no example of a double-edged tool in this series.

⁴ Flakes found in association with the San Jon and Yuma points belong in this category.

Closely associated with the foregoing implements is a similar group that is arbitrarily considered to consist of rough flake knives. The main distinction is that of thickness and the nature of the functioning edge. In the case of the knives the flakes are much thinner and the edge has an acute, longer-tapering bevel. Both scrapers and knives of this type are commonly regarded as fortuitous flakes and little attention is paid to them. They seem to have been an important part of the implement complex in this district, however. The closest similarities between them and artifacts from other localities are found in a series from caves along the Cimarron Valley in northeastern New Mexico and western Oklahoma (Renaud, 1930). The latter were part of a complex that has been considered as a primitive form of Basket Maker culture and although, because of peripheral lag, it may be later chronologically than the material from the main Basket Maker centers farther west, it is, if correctly identified, older than the San Jon specimens. In view of this situation, perhaps the main significance in the similarity of forms is their indication that in this general region the hunting peoples over a long period of time tended to rely on implements produced with a minimum of chipping.

Better knives of the more conventional type consist of bifaced blades of a general broad-leaf shape with rather blunt points and broad, convex base (pl. 6, *h, i*). The workmanship on these implements is not so good as that on the projectile points, but they are definitely made tools. There is nothing, however, to distinguish them from similar artifacts scattered abundantly and widely over most of the Plains area. Fragments from a diamond-shaped, double-ended or four-edged, beveled type of knife that is common in districts farther east in Texas and Oklahoma (Poteet, 1938), and extending northward along the western edge of the Plains, were found, but no complete specimen was obtained. This type of knife has been attributed to the Wichita (Sayles, 1935), yet it has been found under conditions suggesting that it may derive from other, and in some cases possibly older, groups. Whether the form actually was made in the San Jon district or was an importation is an unsettled problem. On the basis of its small representation and the lack of complete specimens it would seem to belong in the trade category. Sayles, however, notes that it was a common Panhandle artifact and the present fragments appear to be of Poteet's type B which is believed to center in the Panhandle. Hence it may be at home in the San Jon collection. The kinds of stone used in this instance are not much help as they occur locally as well as farther east. The implement

unquestionably belongs to the general bison-hunting complex of the Plains and where found in Pueblo sites of the eastern periphery is an introduced form and good evidence for trade relations. (Kidder, 1932, pp. 30-34).

Choppers consist of large pebbles or fragments of stone with broad flaking along one side or an end (pl. 7). In rare cases there was a little secondary chipping but they mainly were fashioned, like many of the scrapers, with a minimum of effort. Frequently the removal of one or two flakes sufficed to form a satisfactory working edge. The remaining smooth surfaces would serve to protect the hand of the user. From their occurrence in the excavations it was evident that these objects had been employed in cracking and splitting bones. This type of tool is commonly found at sites attributable to hunting peoples or those who depended on game for a large part of their sustenance.

Hand hammers are simple round or ovoid-shaped pebbles that generally exhibit a slight amount of pecking or pitting, probably the fortuitous result of use, along one side or on each end (pl. 7). They are of a size that can be gripped in the hand, 3 inches (7.6 cm.) to 5 inches (12.7 cm.) in diameter, and no doubt served for knocking flakes from nodules in the manufacture of implements and for general pounding purposes under conditions where such a tool was needed. Some are suggestive of what has been termed the Plains Maul (Sayles, 1935), although in no case is there any indication of polish around the central portion of the body nor the slightest trace of an encircling groove, features common to that implement. The Plains Maul usually is associated with the complex of agricultural and seed-gathering peoples. One of its purposes may have been that of pecking out depressions in stones intended for grinding and in shaping the smaller stones used with them, in which case it would be most efficient as a hand tool. That it had other functions, however, is indicated by the polished central portion or shallow groove evincing hafting in some sort of handle. There was not much indication that the inhabitants had practiced agriculture in the vicinity of the San Jon site, but that they took advantage of the abundance of natural products is suggested by the presence of hand stones or manos and milling stones or metates. Both of which may have been shaped by artisans employing hand hammers or mauls of the type found here.

The hand stone or manos for grinding are rather nondescript and all are of the single hand size (fig. 3). Some are oval in outline with one flat and one convex grinding face. Others are roughly

circular with one flat and one convex face. Still others are circular with two flat faces and a wedge-shaped cross section. There are examples that are little more than natural pebbles with a single flat or only slightly convex face. In some cases the edge between the two grinding surfaces was pecked, in others it was not. There

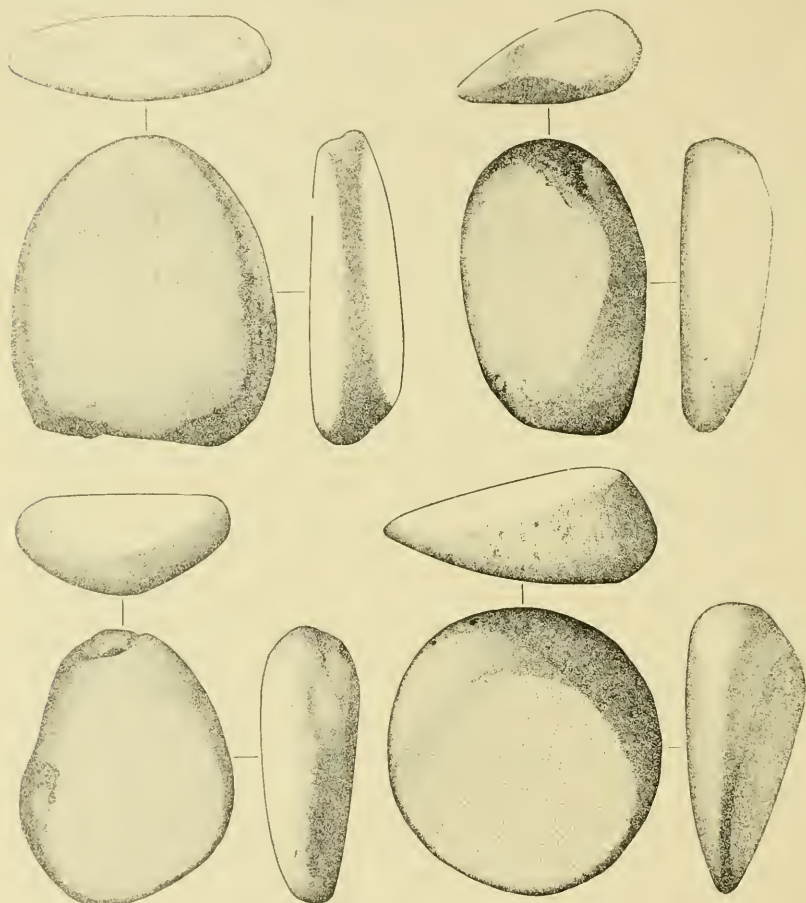


FIG. 3.—Manos or hand grinding stones. (One-third actual size.)

apparently is no correlation between outline, grinding surface forms, and the pecking of the edges. The latter may or may not be present on any of the two-faced forms. No one type of mano seems to have prevailed over the others or to be characteristically associated with one type of point. In general they are similar to those found at most sites throughout the region occupied by users of native food plants. In contrast to many locations, none of the San Jon examples has a

pit or depression in the face. The latter implements possibly were a combination type that could be used either as a grinding stone or as a hammer, the pits or depressions making it easy to hold the stone between the thumb and fingers and strike with the edge. Hard nuts and seeds could be cracked in this fashion and then be ground by rubbing with the flat surfaces without the necessity of changing tools in the process.

The metates or nether milling stones are of two types. One is a thin slab of stone with a shallow, oval or circular bowl and the other is a deep, narrow, troughlike stone that actually might be considered as boat-shaped. Little effort seems to have been made to give form or shape to the thin examples. A roughly rectangular or polygonal slab was obtained, and a shallow basin was pecked in one face. Through use the basin would be enlarged and deepened. The trough or boat-shaped type, fashioned from large tabular blocks, was given some external dressing, the rounding of sharp edges and the removal of projecting points, but most of the work was on the interior and pertained to the pecking of the groove or trough. The latter extended a greater part of the length and width of the block. The deepest portion was along the center with the bottom curving up toward the ends, the sides being fairly vertical. The ends of the trough were closed, not pecked open as in the case of the Pueblo milling stones. Both of these metate forms are reported for the Jumano and Panhandle groups, while the first is also attributed to the Wichita (Sayles, 1935) and extends northward into other portions of the Plains area. The difference in metates no doubt accounts for the difference in manos. The circular forms would be used for the most part with the shallow bowl type, the grinding being done with a circular motion of the hand and arm, while the longer oval examples would serve in the trough form, the grinding being accomplished with a backward and forward movement of the hand stone.

Materials used in the manufacture of implements consisted of chalcedony, chert, jasper, quartzite, dolomite, sandstone, and granite. The projectile points of the San Jon and Yuma types were made from gray and mottled chert. The points in the third group are all of quartzite, gray, brown, red, or yellowish white. There is greater variety in the fourth group, chalcedony, jasper, chert, and quartzite. Fifth type points were made from gray or white quartzite. The fragment of Folsom point is of dolomite. The snub-nosed scrapers are of jasper, chert, dolomite, and quartzite. Other types of scrapers are mainly quartzite, with a few of jasper. The flake knives are

mostly quartzite, although there are sporadic examples of jasper and chert. Jasper and dolomite were used in the four-edged knives. Choppers were made of quartzite and from granite pebbles. Hand hammers are quartzite, granite, and sandstone. Manos and metates are sandstone. Most of these materials could be obtained locally and there are several places on the slopes of the brakes where nodules have weathered out from the formation. At each of these locations there is definite evidence of workshop activities in the form of numerous chips and flakes, fragments from partially completed implements and hammer stones used in the breaking of nodules. Identical scraps and flakes were found in the digging around the basin and on the terrace site, showing that some of the material was carried back to camp and worked on there. Some of the chert probably came from deposits farther east and was mostly imported in the form of completed implements as there is little of that kind of stone in the chipper's debris around the basin. The dolomite is the silicified form generally known as Amarillo dolomite which occurs along the Canadian River and some of its tributaries and which was obtained by the Indians from extensive quarries near Amarillo, Tex. Some of this material undoubtedly was taken to San Jon, possibly in the form of blanks to be fashioned into completed tools at the maker's leisure, as small bits and flakes of it are found in the chips from the occupation areas. Sandstone and granite pebbles are available at numerous places in the vicinity of the basin and other sites.

One kind of stone used in snub-nosed and other types of scrapers seems to be a silicified sandstone that has actually become a quartzite. It has a characteristically laminated appearance suggestive of shale (pl. 5, center right), but in contrast to that material is very hard and compact. It is of particular interest because flakes, nodules, and implements made from it are abundant at a site lying between Big and Little Tucumcari Mountains a few miles south of the town of Tucumcari. Present evidence is that it was not extensively used elsewhere in the region which suggests a possible relationship between the occupants of the basin area at San Jon and the site near Tucumcari. This is also indicated by other factors and if contemporaneity should be established it would be of significance in the matter of certain geologic correlations still to be demonstrated. The source of this material has not been definitely located as yet, but it unquestionably is in the immediate district.

The potsherds found in association with the artifacts and fourth type points occur only in small fragments and are not numerous.

While they indicate that the people had a knowledge of and possessed some pottery, they also suggest that it was not a highly important trait in the complex as far as activities around the basin were concerned. Most of the sherds are from a buff or brownish-colored ware with smooth surface and hard, compact paste. The tempering material, as studied with a hand glass, appears to be sand. In a few cases there is a slight admixture of mica. None of the fragments show any form of decoration. Both bowls and jars seem to be represented. As a group the sherds fit the description for Sayles' Panhandle wares, although no paddle-marked examples were found. The Panhandle wares are associated with house ruins concentrated along the Canadian River (Sayles, 1935, p. 84) and on the basis of associated sherds from the Rio Grande have been dated as about middle fourteenth century. The affinities of the wares have not been definitely established. They probably belong to the broad basic form represented in the pottery of the Wichita and the Jumano which in turn points toward the Caddo. It is possible that the presence of such sherds near the basin at San Jon is to be attributed to hunting parties from the Canadian settlements to the northeast and that the small number is due to the fact that people on the move rarely burdened themselves with many pottery vessels.

There are a few black-on-white sherds from vessels that probably belonged to a type of pottery from an adjacent area to the west. This form has been called Chupadero Black on White (Mera, 1931) and is one that is commonly found in association with brown wares such as those represented by the sherds in the present collection. Chupadero Black on White is a Pueblo ware that was taken over bodily and adopted by the makers of the brown wares (Scholes and Mera, 1940, p. 293). Traces of it have been found as far east as the sand-dune camp sites in western Texas (Mera, 1935, p. 30). It was a late development out of an earlier type of Pueblo ware and seems to have been absorbed into the ceramic complex of the brown-ware region during the thirteenth century. It apparently persisted into early historic times and its presence in an assemblage of materials dating from the late fourteenth or early fifteenth century in the San Jon district is wholly in keeping with the general picture. Although both bowls and jars were made in this ware, jar fragments only were found during the San Jon investigations.

The occurrence of actual hearths was noted only in the horizons represented by the fourth and fifth point types. However, scattered pieces of charcoal and sporadic ashes were found in all of the archeo-

logical levels. In no case was the hearth an actual fire pit lined with stones or stone slabs. They were simple basins in former surfaces of occupation, were roughly circular or oval in outline, and were comparatively shallow. They ranged from diameters of 1 foot 4 inches (40.6 cm.) and 1 foot 6 inches (45.7 cm.) to 2 feet (61.0 cm.) and 3 feet (91.4 cm.), and from depths of 5 inches (12.7 cm.) to 8 inches (20.3 cm.). All of those examined contained ashes, charcoal, pieces of fire-burned rock, and sporadic chips and spalls from implement making. In a few cases charred fragments and splinters of bone, even complete small bones, were found mixed with the other debris. No traces of a habitation, tent circle, or shelter occurred in the vicinity of any of these hearths. As a matter of fact no such indications were found in any of the excavations. The probabilities are that any dwellings used by these people were of a temporary nature, tents made from buffalo skins being the most likely form, and as a consequence little evidence remains of their former placement.

GEOLOGICAL STUDIES ⁵

Considerable progress was made in the study of the deposits and their possible age. This phase of the investigations was carried on by Dr. Bryan and Mr. Judson. Two lines of approach were followed. The first pertained to the belt of plains between the Staked Plains escarpment and the Canadian River, and the second to the archeological site at the basin. In the plain three stages of alluviation followed by periods of erosion, arroyo cutting, and the formation of sand dunes were established. This sequence has many similarities to deposits in the Hopi country in Arizona (Hack, 1942) and the Big Bend region in Texas (Albritton and Bryan, 1939) but because of insufficient field work is subject to revision.

Interesting items appear in the sequence, even though the results are regarded as still tentative. The last cycle of erosion, continuing at the present time, is characterized by arroyos and sand dunes. The beginning and heavy cutting of the arroyos representing this stage appears to belong to the decade from about 1900 to 1910. The formation of the first dunes in the present series started about 1910. The

⁵ The present summary is mainly for the purpose of rounding out the account of the expedition's activities and to indicate the archeological concomitants of the results. It is based on notes furnished by Bryan and Judson and on statements made during discussions of the problems in the field camp. The authoritative and detailed geologic report will be issued by Bryan and Judson when their studies are completed.

third alluviation is indicated by loose and friable alluvium. Fire pits, animal bones, and stone artifacts, late in type, occur in this layer. The preceding stage of arroyo cutting and wind-blown sand, the second erosion interval, is correlated with Pueblo type potsherds that date in the period 1300 to 1540. The second alluviation is characterized by an alluvium, humic in places, with irregular, hollow, twig-like limestone concretions (calcareous tubules) in the finer portions. Fire pits, artifacts, and bones from modern bison are found in this level. The first erosion period was marked by arroyos and sand-dune formation, but thus far is not correlated with any evidence of human activity or animal remains. The deposit of the first alluviation contains large limestone concretions and compact humic alluvium in small bodies. Mammoth, sloth, and horse bones have been found in this horizon. Projectile points purportedly of Folsom and Yuma types are supposed to have come from this layer, but the authenticity of this occurrence and the kind of Yuma involved remains to be established. If substantiated, however, and the Yuma proved to be of the Indeterminate type the combination of features would be an important link in correlating the plain deposits and those in the basin on top.

The deposits in the basin form a complex but definite sequence, one that is in part reproduced in the next gulch to the east. There are 11 stages in all and, as previously suggested, the sequence is related to the filling of an original valley in the escarpment with layers of sand, the "basal sand" of the section. The last or present stage is characterized by the deep ravines and the broad arroyos in the basin and the continuing erosion of today. Preceding this was an interval of alluviation characterized by coarse alluvium that remains as terraces. The small barbed arrowheads, potsherds, and grinding stones probably belong to this horizon. The disconformity between this layer and the next lower alluvium is marked by deep, narrow arroyos. The latter were cut into alluvial fill consisting of reddish clay and sand. It is in this horizon that the Yuma (Collateral or Eden Valley) and third type points belong. Broad, shallow arroyos characterize the disconformity between this layer and the underlying alluvium composed of a sequence of clay, red sandier alluvium, and clay. The San Jon point and extinct bison and mammoth come from this deposit, the lowest level for either animal or human evidence. Below this is a layer of water-laid ash, volcanic in origin, resting on an iron cap and associated clays resulting from the deposition of limonite and clays under wet conditions. The iron

cap and clays were laid down in the hollows in the top of the white and buff cross-bedded sand filling the basinlike valley that had been formed in the top of the Tertiary beds underlying the area.

The question of the relationship and the correlation between the two sequences is an important one. Although there are certain indications that are suggestively significant, more work is needed to establish them as facts. On the basis of the similar circumstance of the alluvium of the first alluviation in the plain sequence being subsequent to a deposition of volcanic ash and the lowest alluvium of the basin sequence resting on such material, that both contain similar faunal remains, and that Folsom and possible Yuma points are reported from them, it would seem that they are approximately the same age. Because of the uncertain archeological evidence for the presence of Folsom and Yuma material in the first alluviation and of Folsom at the basin site such a tie can be regarded only as highly tentative at best. There is an additional complication in the nature of the Yuma points involved. If those from the first alluviation are the Indeterminate, even perhaps the San Jon type, the case is much stronger than it would be if they are the Collateral or Eden Valley form, as the latter definitely occurs in a much later horizon at the basin. No doubt much of the difficulty will disappear when there is more complete geologic and archeologic information from which to draw conclusions. At present it is not possible to estimate how long a period of time is represented by the first arroyo-cutting cycle and the second period of alluviation; hence it cannot be indicated how many years before the 1300-1540 second arroyo stage the first alluviation ended.

While studying the deposits in the valley floor some miles west of the main site Mr. Judson found an interesting cache of 44 stone implements. The artifacts, consisting of five large blades (pl. 8), end scrapers, side scrapers, and flake knives (pl. 9), had been placed in a hole beside a fire pit. The blades were lying side by side in a line extending in a general east-west direction. The other specimens were grouped around and above the blades in no particular order. The fire and cache pits were exposed by the caving of a gully bank. Their tops were 2 feet (61.0 cm.) below the present surface. The overlying deposits consisted of a layer of structureless sand containing numerous charcoal flecks, a layer of red-clayey sand, and the layer of modern buff-white blow sand. The pits were dug into a layer of water-laid buff-colored sand to a maximum depth of 8 inches (20.3 cm.). This layer corresponds to the third alluviation period

in the sequence for the valley plain. On the basis of the evidence from Pueblo type potsherds, previously mentioned, Judson concluded that the earliest possible date for the third alluviation was in the late 1400's. Hence at most the specimens could only just antedate the early historic period, and it is more likely that they actually belong in that stage.

Neither in the type of the implements nor in the material from which they were made, a gray chert, is there any suggestion of relationship to the artifacts excavated in and around the basin at the main site. The absence of projectile points adds to the difficulty of attempting to correlate the material with any definite group or cultural horizon. The writer has seen blades and scrapers of this type, made from similar stone, that came from Lipscomb County, Tex., and adjacent Ellis County, Okla. Similar blades and scrapers are also found in southern Kansas, north of this Texas-Oklahoma district in what has been called the Province of Quivira (Brower, 1898, 1899), in fact large blades of this type have been called the Quivira Blade. Throughout this general area are large deposits of gray chert where much material was quarried by the Indians and the present specimens may have come from there. That is old Wichita country and on the basis of a fifteenth-century date it is possible that the implements may indicate the presence of hunting parties from that tribe in this New Mexican area. In his listing of typical Wichita artifacts, however, Sayles (1935) does not include such blades and scrapers; hence they may have belonged to some other group. Such caches are not uncommon in areas farther east and north but, as far as evidence in the literature is concerned, seem to be rare in this district. A similar series of blades is reported to have been found about 10 miles (16.1 km.) south of the present location. They were not seen by any of the field party and the occurrence has not been verified. That these blades were actual implements and not blanks intended for further refinement into more specific tools is demonstrated by the secondary chipping along some of the edges and a certain amount of polish, in some areas on their surfaces, such as is acquired through use. Implements of this type were employed in the preparation and dressing of skins, particularly those from the buffalo. The snub-nosed and side scrapers in the series are of the types usually found in a hunting complex, although as a group the sizes are larger than similar tools from the basin and buried sites in the plain.

The fire pit, measuring 2 feet (61.0 cm.) by 3 feet (91.4 cm.), had no lining. It contained charcoal, ashes, splinters and fragments of charred bone, several vertebrae, one of which showed the effects of fire, and a calcaneum. The vertebrae and calcaneum are from the American antelope or pronghorn (*Antilocapra*).⁶ There was an additional fire pit nearby, and a few bones from modern bison⁷ were found in the vicinity, but no other cultural material was recovered.

MOLLUSKS

Numbers of mollusk shells were found in the digging, and in order that there would be sufficient material for comparative purposes, specimens were collected from typical wet-weather lakes in the area surrounding the site. Others were gathered from shallow depressions where sand and surface soil had been blown out by wind action. These shells were sent to Dr. Frank C. Baker, University of Illinois, who reported that the collection contained a number of land and fresh-water species. Commenting on the collections Dr. Baker writes:⁸

The species of *Helisoma* from the pits and fossil deposits are the same as those living in the Recent fauna; none are extinct, as is the case among some of the vertebrates. The other species of land and fresh-water mollusks are also the same as typical members of the Recent fauna. This difference in geological faunal contents has been observed in many other places and is to be noted especially in some Pleistocene deposits where the mollusks show little change in form while the vertebrates, principally the mammals, contain several species now extinct.

It is interesting to note, although there may be no particular significance in the fact, that all the shells from the excavations around the basin are from a single, fresh-water species (*Helisoma tenue sinuosum* Bonnet) common in New Mexico, Arizona, Texas, and northern Mexico. Dr. Baker states that the form is "Usually named *tenuis* but it is a distinct race of the typical *tenuis* which is confined to Mexico, the types being described from the vicinity of the City of Mexico." The fact that the material from the basin represents a fresh-water species is additional corroboration for its having been a lake or series of ponds.

⁶ Identified by Dr. David H. Johnson, assistant curator, division of mammals, U. S. National Museum.

⁷ Bones identified by Dr. C. L. Gazin, assistant curator, division of vertebrate paleontology, U. S. National Museum.

⁸ Letter to Dr. Paul Bartsch, curator, division of mollusks, U. S. National Museum.

Samples from the deposits representing the bottoms of the various filled-in ponds were examined for fossil diatoms by Paul S. Conger, custodian, section of diatoms, United States National Museum. None were found, however, and no help toward determining the age of the deposits was obtained from this possible source of information.

SUMMARY AND DISCUSSION

From excavations on the northern rim of the Staked Plains, the brakes below, and the plain of the Canadian River valley south of the town of San Jon, N. Mex., came an interesting sequence of projectile point and other artifact types that sheds some light on the aboriginal occupation of that portion of the Southwest. Faunal associations and geologic horizons give good indication of relative age, but more evidence is needed before an actual chronology can be suggested. The investigations to date tend to corroborate implications observed in finds made elsewhere, particularly with respect to the relationship between certain kinds of projectile points, yet do not furnish the complete and detailed evidence essential to a thorough understanding of developments in the earlier stages of the lithic industries in the western Plains. Later types of stone tools and implements probably were made by Indian groups known to have hunted over that area. On the basis of present knowledge, however, it is not possible to assign specific forms to definite peoples. There unquestionably was a mixing of materials in late times when various bands swept back and forth across the region, following the great herds of bison, camping at the same water holes, and otherwise making use of the same territory. Until sites attributable to occupancy by single groups have been worked and the character of the artifacts made and used by them is established to the extent that they are readily recognized the identification of different objects in a mixed series as the product of a definite tribe is not feasible. The best that can be done is to suggest certain probabilities.

The oldest horizon in the district is represented by one type of projectile point occurring in association with the bones of an extinct species of bison and coming from a stratum in which mammoth bones and teeth also are present. The point is of a type that might be called Indeterminate Yuma, but in order to clarify a confusing situation with respect to that classification it is designated the San Jon point. Indications are that it may be contemporaneous with the Folsom horizon, one of the oldest thus far established, but more

satisfactory evidence is necessary to establish that fact. In some ways this type of point is quite like others found under somewhat similar circumstances, points also identified as Indeterminate Yuma, that apparently have a late contemporaneity with Folsom types and that persisted after the latter were no longer made (Roberts, 1940, pp. 64-65). Hence it is possible that this early San Jon level dates from the closing stages of the Folsom horizon, some 10,000 to 15,000 years ago. Geologic studies tend to substantiate such a conclusion, although it must be regarded as tentative until more work has been done on that particular phase of the problem.

The next oldest remains comprise an assemblage of modern bison and deer bones and points of the Collateral or Eden Valley Yuma type. The significant factor in connection with this horizon is that geologic evidence demonstrates that between it and the preceding occupation there was a lengthy period of erosion followed by another during which there was considerable deposition of new material. The time lapse indicated is a relatively long one and during the interval the large bison were replaced by a smaller species, the modern buffalo. The cultural material from this level is unquestionably much younger than that from the underlying one, a fact that has important implications with respect to the status of different types of projectile points in the Yuma series. There has been a general tendency to regard all forms of the Yuma as more or less contemporaneous and indicative of the same cultural age. If the San Jon point from the oldest level is considered as an example of the Indeterminate Yuma, a questionable classification discussed in the detailed consideration in preceding pages, it is obvious that at least two of the Yuma forms occurred in sequence and are characteristic of chronologically different stages. The present evidence tends to support a previous suggestion to the effect that some of the generalized points regarded as Indeterminate Yuma may represent the form out of which the true Yuma developed. The definite break in occupation between the two levels here, however, shows that the transition did not take place in the San Jon district but if it actually did occur was accomplished elsewhere.

The break in occupancy evinced by the nature of the deposits is of interest because it is in accord with indications noted in other areas. For some as yet unexplained reason at most sites where traces of the earliest hunting cultures now recognized are found there is a definite hiatus between them and the following stages. Whether there actually was an interval during which the regions where these mani-

festations occur were uninhabited or whether it was only the particular sites that were not lived on, the people camping elsewhere and leaving materials not yet properly identified, is a problem still to be solved. The consensus of many is that there was an actual interruption in the stream of migration flowing from the Old to the New World and that for a time vast stretches of the western Plains and the Great Basin were uninhabited; that the first peoples had pushed on southward and into Middle America, although traces of them have not yet been found there, and those who were following had not yet arrived. Others maintain that once man had reached the North American continent there was no break in the continuity of occupation, that the evidence just has not been found or else has not been recognized. There are places where an unbroken sequence from early to modern times is suggested (Sayles and Antevs, 1941), but there still is a question as to whether or not there is a gap between the beginning of that series and some of the other older forms. Perhaps the correct conception is that in some districts remnants of the early migration persisted and ultimately were joined by incoming groups of a later movement, while in other sections the dispersal of peoples into the more southerly regions left large areas unoccupied sufficiently long for natural agents to cover their former camping places before others drifted in and settled at the same locations. Such certainly seems to have been the case at San Jon.

From the appearance of the Yuma type points down to late proto-historic times there was no break in the occupation of the area investigated. Projectile points progress through forms similar to some of those found in the Texas area to the east to the small, notched types associated with late sites in many parts of the country. Accompanying these are stone implements of the kinds that normally occur in the complex of hunting or hunting-seed-gathering peoples. In addition the material from the latest level contained potsherds. Among the stone objects are forms similar to those that have been attributed to the Wichita and the Jumano Indians, others that are like artifacts from sites in the Panhandle district along the Canadian, and still others that can be duplicated in material coming from eastern Pueblo ruins. The potsherds are of two types, one a buff or brownish-colored ware similar to that occurring in house ruins along the Canadian River that probably belongs to the broad, basic type represented in the wares of the Jumano and the Wichita, that have some relationship to those of the Caddo, and the other a black-on-white ware that was derived from a Pueblo type. The latter, called Chupadero Black

on White, is commonly found with brown wares such as those in the San Jon collection, and is a form that was taken over bodily, becoming a part of the ceramic complex of the brown-ware-making peoples. Considered as a whole, the series of implements from the late horizon definitely indicates that several different Indian groups used that area as hunting territory, a fact that is borne out by historical documents of later times.

On the basis of geologic studies and the presence of certain types of Pueblo potsherds in deposits at other locations in the district, supplemented by the evidence of the Chupadero Black on White at the basin site, the period of the last horizon is judged to be in the late fourteenth or early fifteenth century. Even with full allowance for an appreciable interval for the intervening point types, the period of the Collateral or Eden Valley Yuma is much later than has generally been supposed. If the San Jon point horizon is approximately of the age suggested, the gap between the two is indeed a broad one. Subsequent work on the geology may show that the deposits containing the San Jon point and extinct species of animals is more recent than indicated at present, but the break in the sequence would still be of sufficient proportions to cast doubt on the idea of a continuity of peoples in the area.

In general it may be said that the remains in the San Jon district are those of a hunting and hunting-seed-gathering peoples whose closest affinities were with the Plains cultures. Such traits as are suggestive of the Pueblo pattern to the west were either borrowed or are present because of trade relations. Pueblo peoples on occasion did get that far east, as is shown by sporadic finds along the Canadian and in later times by historical records, but apparently did not linger long enough to have any marked effect on the archeological picture. The earliest occupants of the region depended on the large bison for subsistence, while later groups hunted buffalo, deer, and antelope, and gathered the native food plants.

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1. VIEW OF THE NORTH RIM OF THE STAKED PLAINS

Photograph by Edison P. Lohr.



2. MAIN ARROYO

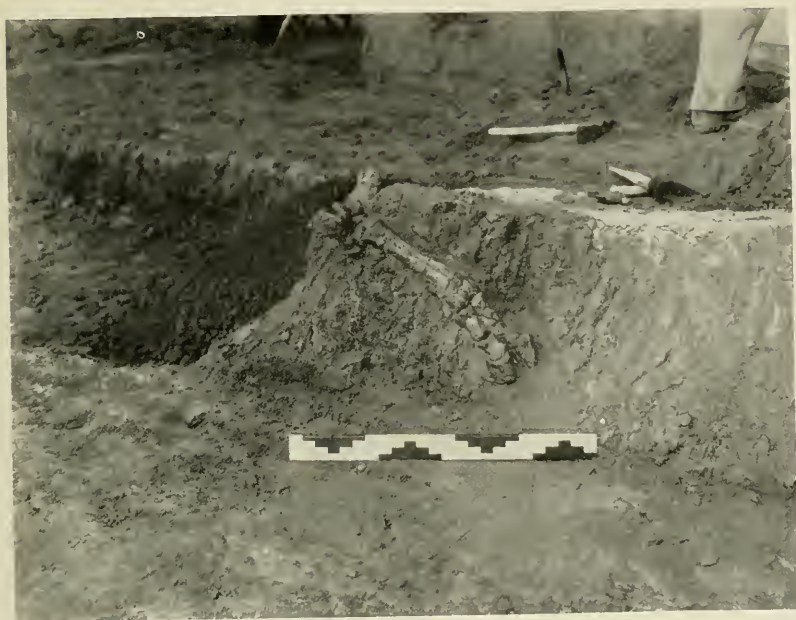
Line of old lake bottom can be seen along top of light-colored earth.
Expedition camp at left.



1. STARTING EXCAVATION IN ONE OF THE ARCHEOLOGICAL AREAS



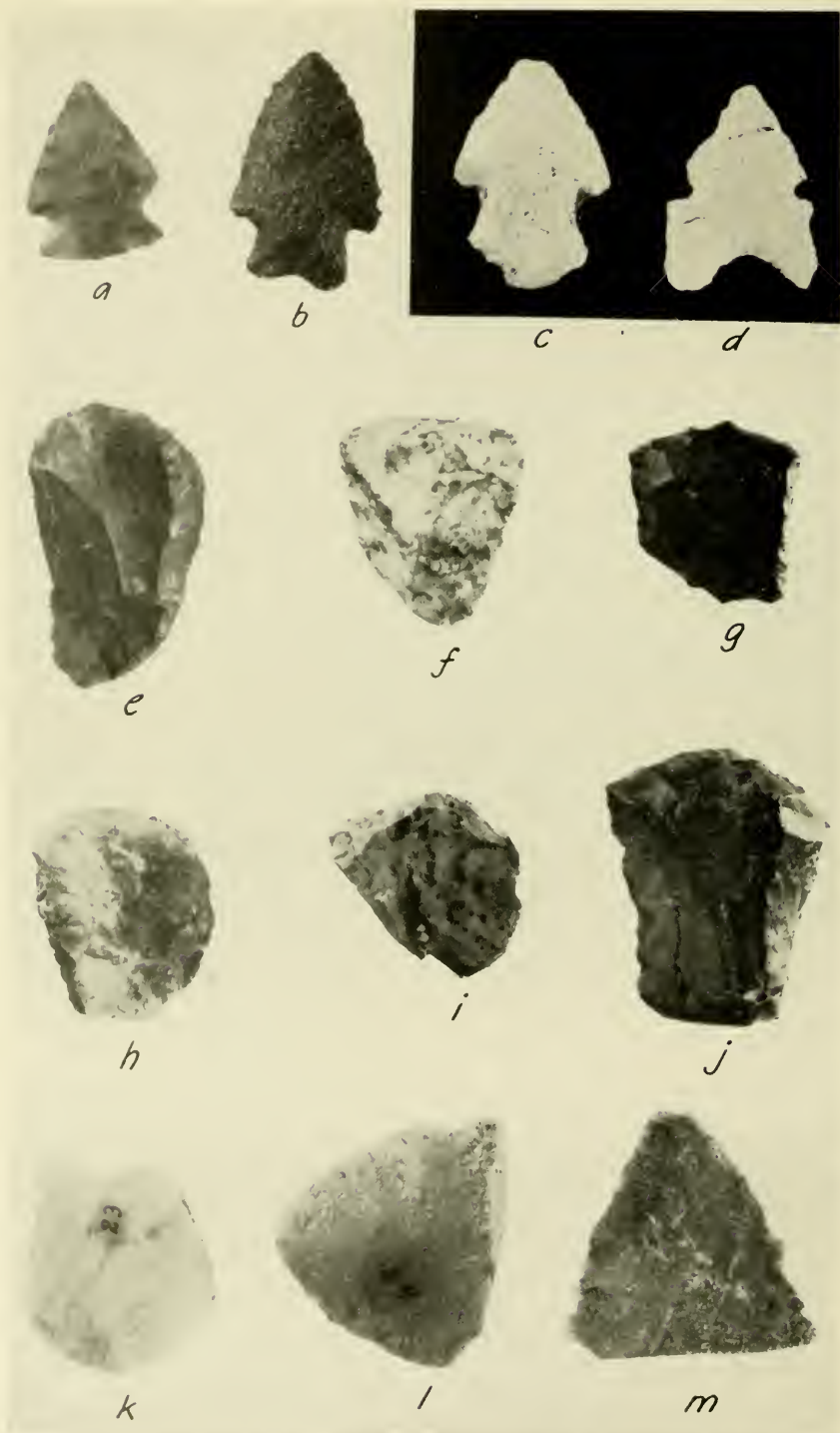
2. MASS OF BISON BONES AT BOTTOM OF ONE OF SECTIONS



1. BISON FOOT AND LOWER LEG BONES IN SILT LAYER AT BOTTOM OF FORMER POND



2. OCCUPATION LEVEL EXPOSED IN ARROYO BANK IN LOWER PLAIN
Workman pointing to hearth.



ARROWHEADS, SNUB-NOSED SCRAPERS, AND POINTS FROM KNIFE BLADES

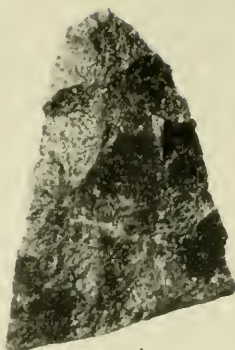
(Actual size.)



SCRAPERS AND ROUGH FLAKE KNIVES
(Actual size.)



a



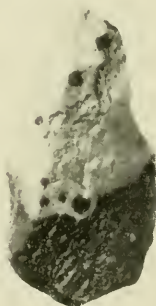
b



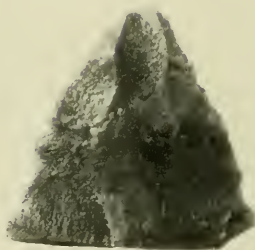
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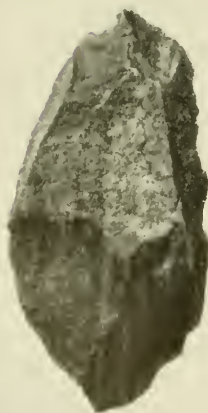
d



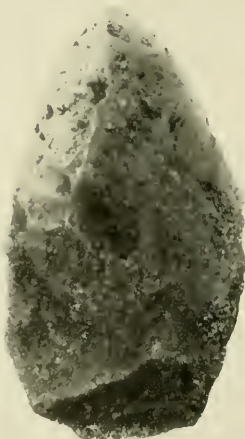
e



f



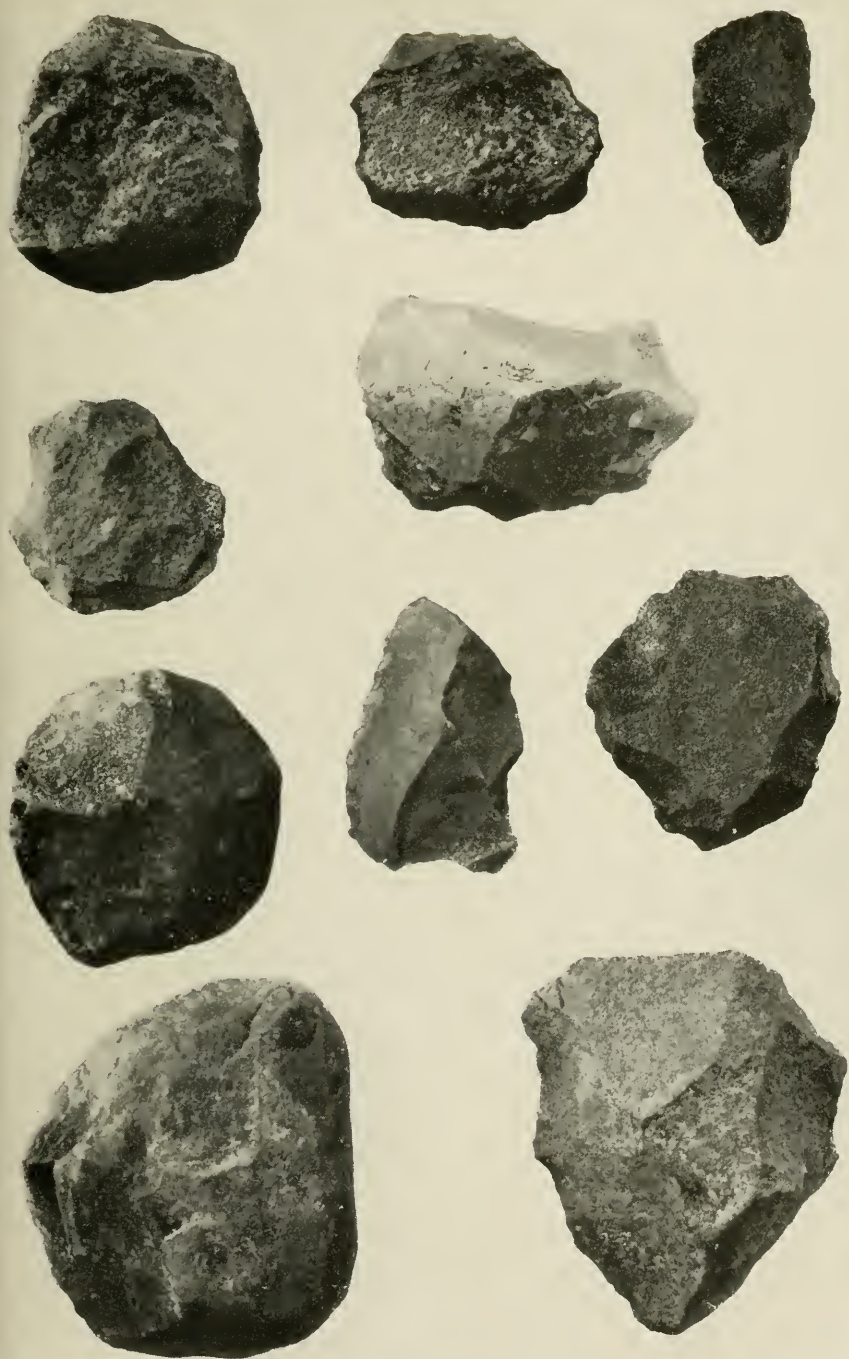
g



h



i



CHOPPERS AND HAND HAMMERS
(One-fourth actual size.)



LARGE BLADES FROM CACHE IN LOWER PLAIN



SCRAPERS AND FLAKE KNIVES FROM CACHE IN LOWER PLAIN
(One-fourth actual size.)