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SMITHSONIAN INSTITUTION  
Bureau of American Ethnology  
Bulletin 154

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River Basin Surveys Papers, No. 3  
The Woodruff Ossuary, a Prehistoric Burial Site  
in Phillips County, Kansas  
By MARVIN F. KIVETT



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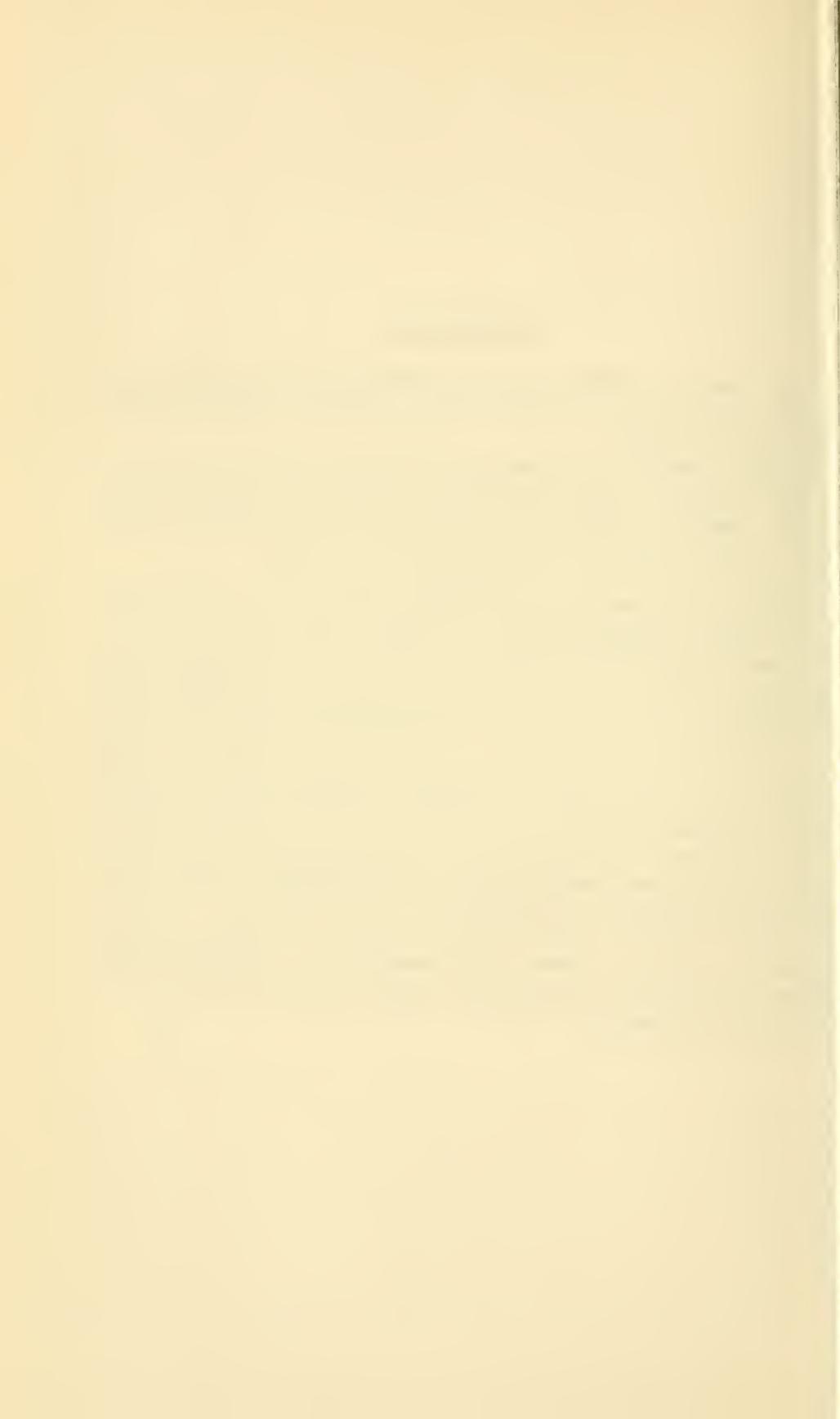
## FOREWORD

The report that follows is based primarily on data collected for the River Basin Surveys, Smithsonian Institution, during the summer and fall of 1946.

Other comparative data were gathered by personnel of the River Basin Surveys during the field season of 1948 in Frontier County, Nebr. Data for many of the sites came from the collections made by A. T. Hill, which are now at the Nebraska State Historical Society. Many people assisted in the investigation of those sites.

The excavation party during the fall of 1946 included J. M. Shippee of the River Basin Surveys, A. T. Hill, director emeritus of the Nebraska State Historical Society who, because of his long interest in this problem, spent considerable time at the site, and the writer. One local man, Carol Franke, of Woodruff, Kans., assisted part time.

I wish to express our thanks to John Horrell, of Woodruff, Kans., who granted permission for the excavations and assisted in many other ways. For criticisms and suggestions as this report progressed, I am indebted to Dr. Waldo R. Wedel, Paul L. Cooper, and Dr. John L. Champe. Robert B. Cumming, Jr., has provided a preliminary study of the skeletal material. Identifications of shell specimens were made by Dr. J. P. E. Morrison and Dr. Harald A. Rehder, Division of Mollusks, United States National Museum. I wish to thank Dr. James C. Olson, superintendent of the Nebraska State Historical Society, for permission to use certain data from the collections of the Society.



# THE WOODRUFF OSSUARY, A PREHISTORIC BURIAL SITE IN PHILLIPS COUNTY, KANSAS

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By MARVIN F. KIVETT

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## ENVIRONMENTAL BACKGROUND

Phillips County is situated in the Loess Plain area of north-central Kansas and borders on Nebraska to the north. The county is part of a broad, gently eastward-sloping, loess-mantled plain, which has been modified by the valleys of Prairie Dog Creek in the northwest section and of the North Fork Solomon River in the southern half of the county. Numerous north-south drainages tributary to these streams have carved the surface of the plain into a series of long, nearly parallel, north-south divides which extend at about right angles to the major streams. To the north, between Prairie Dog Creek and the Republican River in Harlan County, Nebr., drainage channels are numerous and the upland surface has been carved into a rather intricate system of steep-sided canyons separated by narrow and, in many places, sharp divides.

Prairie Dog Creek, a perennial stream, heads in Sherman County, northwest Kansas, and flows in a generally northeast direction to its confluence with the Republican River in Harlan County, Nebr. The course of the stream is meandering, but the current is rather swift so that the channel is gradually being deepened. A few springs occur on the valley slopes along the Republican River and Prairie Dog Creek.

Alluvial lands, which include the terraces and flood plains, occur in continuous strips along both Prairie Dog Creek and the Republican River. The width of the alluvial lands, which is greatest along the Republican, varies from a few yards to  $2\frac{1}{2}$  miles. Lower terraces or benches are well developed and usually occur at heights of 10 to 25 feet above the bottom lands. The flood plains occur in strips of various widths bordering both sides of the channels, and are subject to inundation in places during periods of high water.

The Prairie Dog Valley is now utilized mainly for the growing of corn, but some small grain is also grown. The uplands and steeper slopes are often grass-covered and are given over to grazing. Native timber borders the stream bed; cottonwood, willow, elm, ash, and box elder are the main species. Wild fruits such as plums, chokecherries, and grapes are rather abundant along the stream course.

For a description of the area as it appeared a century ago, we turn to an account of John C. Fremont's second westbound expedition of 1843. The party camped for 1 night on the stream which still bears the name they gave it, "Prairie Dog" (Fremont, 1887, p. 174). They entered the area from the south, after traveling up the North Fork Solomon River. Fremont observed bands of antelope and immense herds of bison to the south and, on June 23, 1843, noted the following:

At noon on the 23d, we descended into the valley of a principal fork of the Republican, a beautiful stream forty feet wide and four feet deep, with a dense border of wood, consisting principally of varieties of ash. It was musical with the notes of many birds, which, from the vast expanse of silent prairie around, seemed all to have collected here. We continued during the afternoon our route along the river, which was populous with prairie dogs (the bottoms being entirely occupied with their villages), and late in the evening encamped on its banks.

The prevailing timber is a blue-foliaged ash (*Fraxinus* near *F. Americana*), and ash-leaved maple. With these were *Fraxinus Americana*, cottonwood, and long-leaved willow. We gave to this stream the name of Prairie Dog River.

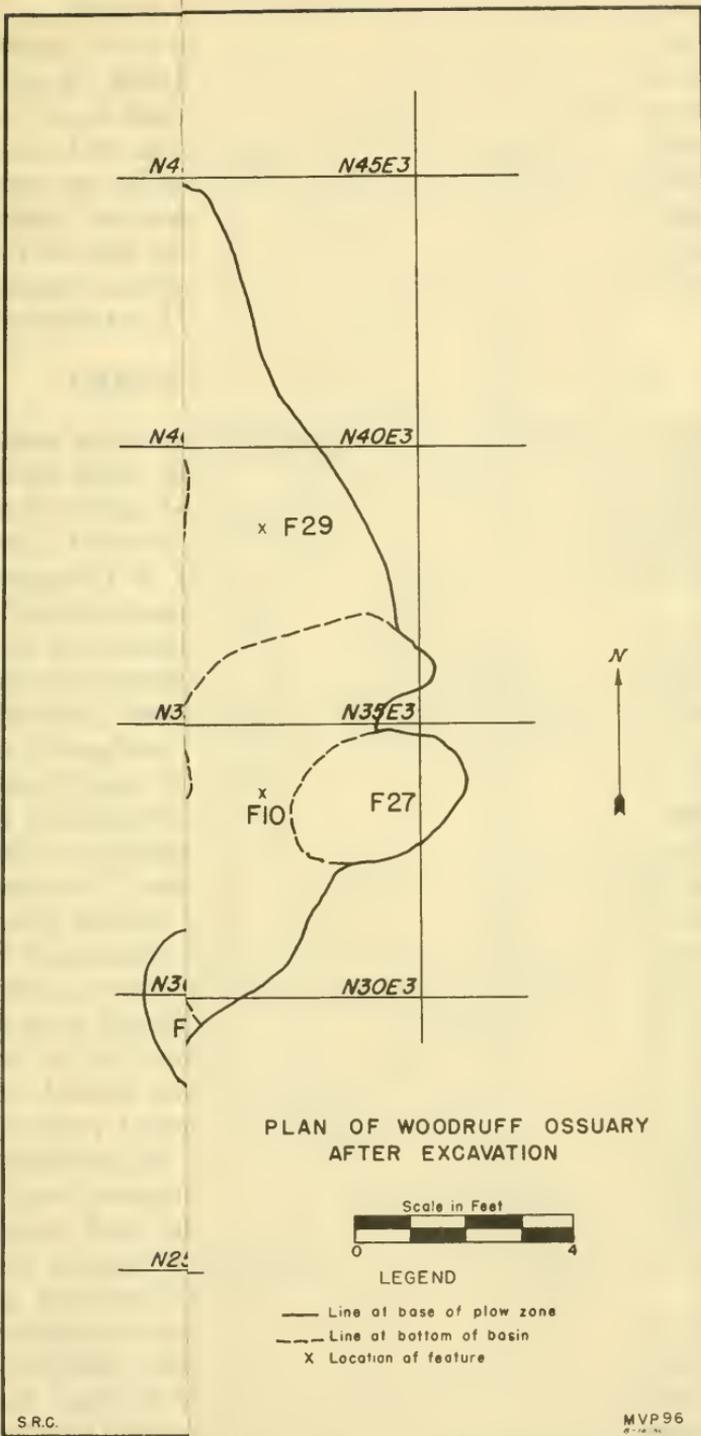
On June 25, while traveling west along the high smooth ridges south of the Republican River, the party observed "buffalo in great numbers, absolutely covering the face of the country" (Fremont, 1887, p. 174).

Since the advent of white men, large game such as bison and antelope have disappeared but considerable small game, including rabbits, opossums, raccoons, skunks, coyotes, prairie dogs, and pheasants, is common in the area today. There are some beaver and waterfowl along the stream.

It is evident that the area offered many inducements for primitive horticultural peoples, as well as for those wholly dependent on the results of the chase. Tributary streams such as Prairie Dog Creek, with a supply of wood, shelter, game, and arable ground, were readily available. Flood-free benches and terraces along the streams provided safe sites for villages. Sufficient timber was at hand for firewood and for lodge construction. The rich alluvial soils in the valleys, sufficient rainfall, and a frost-free growing season adequate for the maturing of such native-grown crops as maize, beans, and squash, made the area especially attractive for groups dependent in part on horticulture. The vast herds of bison which roamed the area would have provided a plentiful meat supply.

During and probably for several centuries before the historic period, the area which includes the lower sections of the Prairie Dog Valley made up part of the Pawnee hunting grounds. Their nearest historic village appears to have been the Hill site (25WT1)<sup>1</sup> on the

<sup>1</sup> Site designations used in this report are trinomial in character, consisting of symbols for State, county, and site. The State is indicated by the first number, according to the numerical position of the State name in an alphabetical list of the United States; thus, for example, 25 indicates Nebraska, 14 indicates Kansas. Counties are designated by a two-letter abbreviation; for example, HN for Harlan County, PH for Phillips County, etc. The final number refers to the specific site within the indicated State and county.



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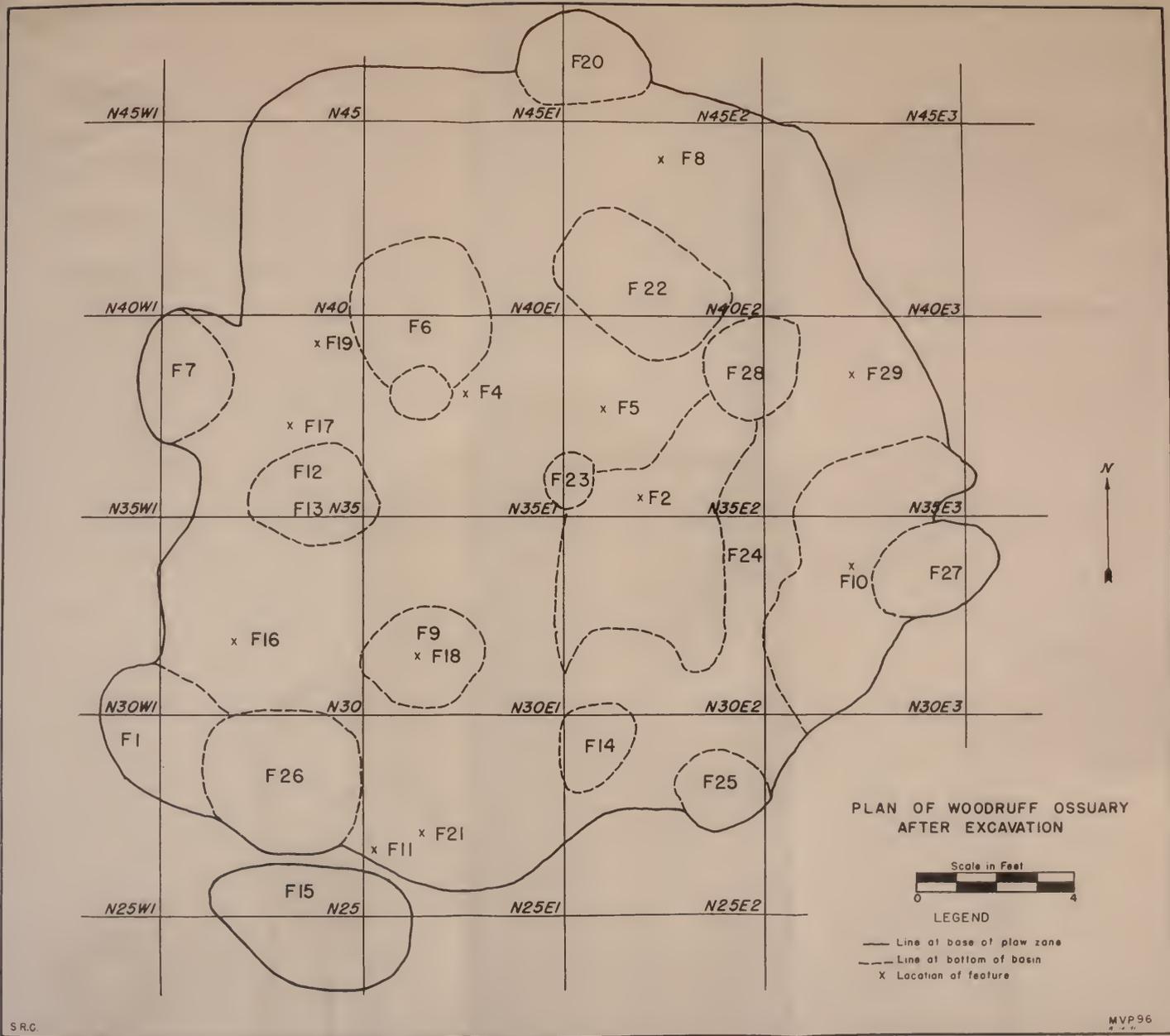
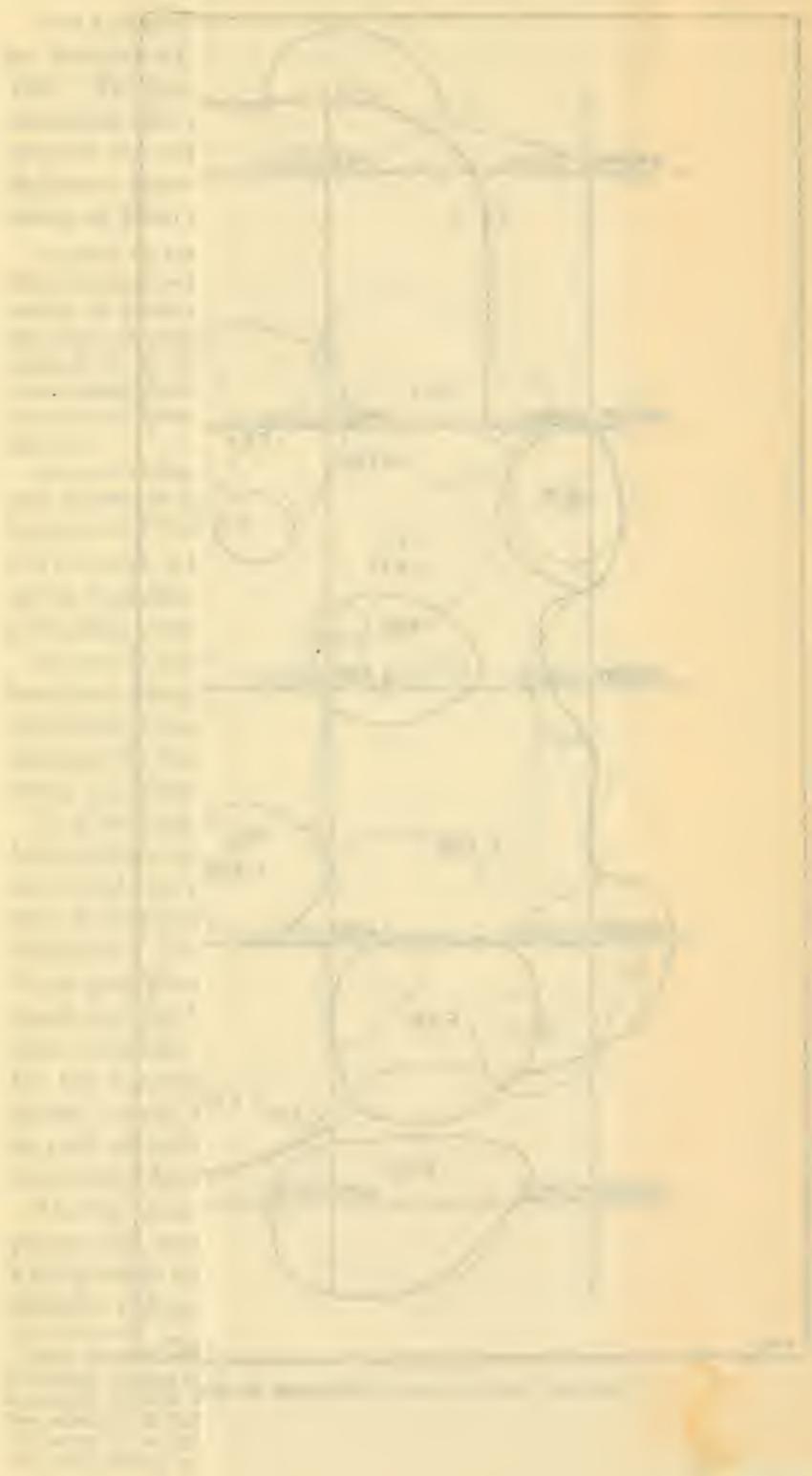


FIGURE 2.—Plan of Woodruff Ossuary after excavation.

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Republican River in Webster County, Nebr., some 60 miles to the east. The village, so far as can be determined, was visited in the summer of 1806 by Lt. Zebulon M. Pike while he was en route to the headwaters of the Arkansas (Wedel, 1936, p. 17). Other historic groups such as the Oto and Cheyenne also made some use of the valley.

At least one village site, 25HN37, located approximately 8 miles downstream, has been examined and assigned to the Dismal River aspect (Champe, 1949, pp. 285-292). This complex is believed to be assignable to a late prehistoric and early contact period and may be attributable to a Plains Apache group.

### PREVIOUS ARCHEOLOGICAL WORK

The area which comprises Harlan County and the valleys of the Republican River and its tributaries to the east in Franklin and Webster Counties, Nebr., has been the scene of considerable archeological work. Prior to 1930, numerous sites were found in the Republican drainage by A. T. Hill, later director of the Nebraska State Historical Society Museum.

During the summer of 1930 the Nebraska State Archeological Survey under the direction of Dr. W. D. Strong excavated sites in Webster, Franklin, and Harlan Counties, as well as in several other counties throughout Nebraska. Excavations by the Survey in Harlan County were confined largely to two burial sites on the south bank of the Republican River. The first of these, the Graham Site (25HN5), is situated on the summit of a rounded hill, southwest of the junction of Prairie Dog Creek with the Republican River. Here, in a nearly circular basin, which was 23 to 24 feet in diameter and 3 feet 6 inches deep in the center, were found human remains associated with a considerable number of artifacts. The majority of the remains were disarticulated, but two of the burials, both of infants, appeared to be primary interments. Scattered throughout the pit with the human remains were numerous pottery sherds; rocks of varying sizes; fragments of charcoal; some bone, stone, shell, and antler artifacts; and the remains of two copper-covered wooden disks. The cultural remains from the ossuary exhibited a close similarity to materials from sites of the Upper Republican aspect in the area and were assigned by Strong to the Lost Creek focus of that aspect (Strong, 1935, pp. 103-114).

One additional site of a similar nature in the area, the Alma Ossuary (25HN2), was excavated during the summer of 1931 by A. T. Hill and reported by Strong. The situation at this site, with its disarticulated human remains, is reported to have been comparable to that at the Graham site. A comparison of the artifacts from the two sites indicated a very close similarity (Strong, 1935, pp. 122-123).

A somewhat different type of prehistoric ossuary examined by Strong was the Marshall site (25HN1), located on a point of the river bluffs 3 miles west and 2 miles north of the Graham site. Although the area had been badly disturbed by local collectors, Strong was able to find and excavate some small undisturbed areas. Disarticulated human bones, many of them broken and some burned, were associated in three areas or pits with an abundance of shell disk beads and blanks. These pits were round or oval in outline and in each case were sunk at least a foot into the hard undisturbed soil at the bottom of the deposit. Some charcoal occurred in the fill, and many of the beads were calcined.

Shell disk beads were the predominating type of artifact recovered from the site; all of them appeared to have been made from the shells of fresh-water bivalves. They included finished beads, others perforated but not ground on the edges, and rough unperforated blanks. Other artifacts included two broken triangles of thin shell, with holes bored in two corners; a small bead with two intersecting perforations, one bored lengthwise and the other at right angles to it; and a fresh-water pearl with a single perforation. The only bone artifact was a broken and calcined object which Strong suggested may have been the head of an awl. Pottery, worked stone, copper, and marine shells appeared to be absent (Strong, 1935, pp. 116-122).

Another burial site, Holdrege 5 (25FR9), was investigated during the summer of 1934 by the Nebraska State Historical Society. It is located on the left bank of Rebecca Creek about 2 miles south of the Republican River in Franklin County. Like the Marshall site, it consisted of a group of small pits which yielded broken and disarticulated human remains, with which were associated nearly a thousand shell disk beads and blanks. Broken shell pendants of triangular form and a type reported to be similar to the "bear claw" form described by Wedel (1935, pp. 203-204) were found. The latter type is represented only by fragments which also suggest a crescent form of pendant.

Burial grounds similar in character to the Marshall and Holdrege 5 sites appear to occur rather commonly throughout the upper Republican drainage, both on the Republican River and on its tributaries. These sites, which are characterized by an abundance of finished shell disk beads and a large number of blanks, have for the most part yielded few diagnostic artifacts which would aid in assigning the associated burials to a cultural complex. A general relationship between sites such as the Marshall Ossuary and those such as the Graham Ossuary is suggested by the fact that in both instances there is reinterment of the mixed bones of the dead with offerings, and by the occurrence of some shell disk beads in the sites, like the Graham Ossuary, which also yield pottery. There is, however, considerable

difference between the types of artifacts from the shell bead ossuaries containing thousands of blanks and those from the ossuaries which contain pottery of Upper Republican types and a few finished shell disk beads. Only those ossuaries containing Upper Republican pottery were assigned by Strong to the Upper Republican aspect. The characteristic shell bead ossuary was placed in an unclassified category (Strong, 1935, p. 246).

#### DESCRIPTION OF WOODRUFF OSSUARY (Site 14PH4)

As it nears the Nebraska line in the vicinity of Woodruff, Kans., Prairie Dog Creek has a meandering course in a general northeast direction to its junction with the Republican River, some 12 miles distant in Harlan County, Nebr. The valley here has a width of nearly a mile, and numerous small tributary streams flow from the south across broad, level terraces. Little timber is present on the terraces and slopes, but the immediate banks of the stream support a dense growth.

The present stream channel is near the left valley slope where it is cutting into numerous spurs extending from the general terrace surfaces. It is on the point of such a terrace that site 14PH4 is situated (pl. 16, *a*). At its south edge, the terrace drops some 30 feet to the channel of Prairie Dog Creek, while to the west and east, the slope is less abrupt to rather narrow but level flood plains, subject to inundation during periods of high water. The general terrace level continues for more than a half mile to the north, where a transition to the uplands is effected by means of a long gradual slope. Erosion is accelerated on this slope by cultivation, so that considerable soil has been deposited on the terrace surface below.

The Nebraska-Kansas State boundary line crosses the north edge of the site less than one hundred yards north of the ossuary. The field in which the site lies was in native grasses some 40 years ago, but since that time it has been under cultivation, with corn the principal crop. Less than a half mile to the east the stream has shortened its course by cutting off an ox bow, which tends to be swampy during periods of excessive rainfall. The general terrace level, with an elevation of 2,000 feet, is well above the limit of flooding and only the north edge would be subject to wash from the higher hills above.

Although several archeological sites in the Prairie Dog Valley were known locally, none were recorded by research institutions above the mouth of the stream prior to investigations by the River Basin Surveys during the summer of 1946. At least one occupational site, 14PH5, which is situated less than a half mile east of 14PH4, had received some attention from residents of the locality. This site appears to be assignable to a variant of the Upper Republican aspect. Although

some surface materials have probably been collected at 14PH4, there was no report or evidence of digging by local people.

The site was first recorded during the course of a brief preliminary archeological reconnaissance of the proposed Harlan County Reservoir area during the month of August 1946 by the River Basin Surveys. Limited tests in a surface concentration revealed dark soil containing charcoal, human bones, shell disk beads, and mussel-shell fragments to a depth of more than 4 feet over an area approximately 20 feet in diameter. Although surface examination revealed an area of darker soil and a concentration of cultural materials, there was no evidence of a mound or depression. Such features, if present, may have been obliterated by 40 years of cultivation.

During the period October 17 to November 11, 1946, an intensive investigation of site 14PH4 was undertaken by the River Basin Surveys. After additional tests had indicated that the most promising location for excavation lay at the southwest edge of the terrace, the area was laid out in 5-foot squares. A north-south base line was established, starting 25 feet south of the area of dark soil and continuing north beyond its apparent limits for a total distance of 60 feet. The south end of the line was designated "N zero." At intervals of 5 feet from the "N zero" stake, the line extending north was set off by stakes and numbered consecutively in 5-foot units preceded by the letter N; thus square "N25" would have its southeast corner 25 feet north of the "N zero" stake. These points served to designate the 5-foot squares west of the line and each square was designated by the number on the stake in its southeast corner. Sections in the first row of 5-foot squares west and east of the base line were designated by the N series of numbers to which were added W1, W2, W3, and E1, E2, E3, respectively, depending on the location of the southeast corner 5, 10, 15, or more feet west or east of the base line. Thus, the southeast corner of a square designated N35 E2 would lie 35 feet north and 10 feet east of the "N zero" point. Similarly, the southeast corner of square N25 W3 lies 25 feet north and 15 feet west of the "N zero" stake.

Within each 5-foot square the soil was troweled out in 12-inch levels to within 2 inches of the outer limits of the square. This 2-inch section was left standing and, together with the 2-inch section from the adjacent square, produced a central block 4 inches wide. Disarticulated bones and scattered shell beads and blanks, which were relatively abundant, were sacked according to the 12-inch level in which they occurred. Less common materials, such as concentrations of human bone, stone and bone artifacts, sherds, and significant shell artifacts, were sacked separately with exact horizontal and vertical provenience recorded.

The total area excavated measured slightly more than 500 square feet, and varied in depth from 12 inches at the outer edges of the

excavation to slightly more than 6 feet in the deeper sections. Profiles were drawn and photographs were taken of the 4-inch control sections left at the edges of the squares. Prior to any deeper excavation of any squares, the entire area of discoloration was cleared of soil disturbed by cultivation. This loose soil, which varied in depth from 6 to 8 inches, contained a quantity of human bone fragments, broken mussel shells, and shell disk beads, as well as partially decayed corn stalks. The general outlines of a roughly oval area of dark soil, which were then discernible, were photographed and mapped (pl. 16, *b*).

TABLE 1.—*Summary of dimensions and contents of pits at site 14PH4*

Feature No.	Location: Square	Depth		Diameter	Contents
		From ground surface	Into sub-soil		
1.....	Under stake N30 W1.	Inches 36	Inches 0	Inches 36 N-S x 38 E-W..	Charcoal, flint chips, burnt earth, bone fragments, two pottery sherds, one tubular bone bead, perforated and blank shell disk beads.
6.....	N35 E1 and N40 E1.	56	18	60 N-S x 40 E-W..	Charcoal and burnt earth; ribs; vertebrae; fragments of human long bones; flint chips; shell disk beads, some calcined, concentrated in bottom of pit; one worked antler section.
7.....	N35 and N35 W1..	34	12	38 N-S x 24 E-W..	Disarticulated human adolescent bones, shell disk beads in lower 12 inches of pit, charcoal and burnt earth.
9.....	N30 E1.....	65	23	32 N-S x 34 E-W..	Disarticulated human bones, adult and adolescent; charcoal; burnt earth; concentration of shell disk beads in lower 12 inches of pit.
12.....	N30 and N35.....	60	12	20 N-S x 36 E-W..	Disarticulated human bones, charcoal, burnt earth, shell disk beads, broken projectile point, bone beads, shaft wrench.
14.....	N25 E2 and N30 E2.	64	14	27 N-S x 20 E-W..	Disarticulated human bones, charcoal, burnt earth, shell beads, flint chips, one pottery sherd at depth of 54 inches, one projectile point.
15.....	N20 E1, N25 E1, N20, and N25.	60	48	36 N-S x 48 E-W..	Disarticulated human bones, charcoal, burnt earth, shell beads, two antler tools, worked flint, tubular bone beads, one pottery sherd.
20.....	N45 E2 and N45 E1.	70	22	30 N-S x 39 E-W..	Disarticulated human bones, charcoal, burnt earth, shell beads.
22.....	N35 E2 and N40 E2.	74	26	60 N-S x 36 E-W..	Disarticulated human bones, charcoal, burnt earth, shell disk beads.
23.....	N35 E1 and N35 E2.	76	18	18 N-S x 16 E-W..	Human bone fragments, charcoal, burnt earth, shell disk beads.
25.....	N25 E2.....	42	12	25 N-S x 26 E-W..	Disarticulated human bones, charcoal, worked shell.
26.....	N25.....	58	12	42 N-S x 47 E-W..	Disarticulated human bones, charcoal, burnt earth, shell disk beads.
27.....	N30 E2 and N30 E4.	56	14	30 N-S x 36 E-W..	Disarticulated human bones, charcoal, burnt earth, shell pendant, shell disk beads.
28.....	N35 E2 and N35 E3.	52	20	30 N-S x 28 E-W..	Disarticulated human bones, charred timber, shell disk beads, burnt earth.

Initial excavations were made in square N25 at the southwest edge of the discoloration and in square N40 at the northwest edge. The removal of the mixed soil in these two sections revealed undisturbed loess

in the west side of square N40 and in the southwest corner of square N25. A similar system of excavation was extended throughout the area of discoloration (pl. 17, *a*). Upon the removal of all disturbed soil, the limits of an oval basin were discernible (fig. 2). The presence of some individual pits which occurred beneath the basin was suggested by a greater concentration of human bones and shell beads traceable from the surface to the bottom of several pits (pl. 17, *b*). The exact limits of the majority of the pits could not be determined, however, except where the bottoms extended some distance into the yellow loess soil below the general area of mixture. The depth to which these pits penetrated into the subsoil varied considerably and it is possible there were other pits which did not extend into the yellow sterile soil and were not discerned. The walls of several pits which intersected the large basin and extended beyond its general limits were discernible just below plow level. Cultural materials from individual pits below the basin level were segregated by levels and sacked separately. Feature 15 (table 1), an oval pit, was located outside the limits of the large basin at the southwest edge (pl. 18, *a*; fig. 2). Tests around the edge of the basin, as well as elsewhere on the terrace, failed to reveal other disturbed areas.

With the exception of one skeleton (Feature 21), all of the burials were secondary. A second burial (Feature 16) exhibited some articulation, but certain of the bones were missing (pl. 18, *b*). In other isolated instances, lower arm and hand bones, vertebrae, and bones of the foot were articulated (pl. 19, *a*).

Skulls were few in number and were in most cases in a poor state of preservation, so they were of little aid in determining the total number of individuals present. A count of individual bones indicates that some remains of at least 61 individuals were placed in the basin and pits, and it seems likely that the total number was somewhat greater. Some remains were evidently destroyed during the last 40 years by cultivation, while others may have decayed.

With the exception of the one fully articulated individual and a partially articulated burial, all of the bones appeared to have been deposited in a haphazard manner; there was no evidence of bundle burials (pl. 19, *b*). Many of the bones were broken and some were burned. Calcined shell disk beads, blanks, and mussel shells were common, and several bone artifacts show evidence of fire. Skeletal remains represent individuals of various ages from infants to old adults.

Bones of the single flesh burial, an adolescent, were well preserved and showed no evidence of fire (pl. 20, *a*). This may be accounted for by its greater depth on the floor of the basin in square N25 E1, 35 inches below the surface. The skeleton was semiflexed, and lay on the

left side facing to the west, with the skull to the south. Extending around the skeleton in the pelvic area were rows of shell disk beads in alinement. Other rows of beads extended up the chest and around the neck. Many of the rows were of well-ground and evenly matched beads, while others included bead blanks that had been perforated and evidently strung but had not received the final smoothing which characterizes a finished bead. Triangular shell pendants occurred on both the upper and lower sides of the skeleton, particularly in the vicinity of the skull (pl. 20, *b*). Specimens associated with this burial, other than the abundant fresh-water shell disk beads, include worked sections of marine shells and one bone implement. This implement, which projected from beneath the distal end of the left humerus, is fashioned from the tibia of a deer. It is perforated near the proximal end and suggests a shaft-wrench type of tool or possibly a digging stick handle.

The general outline of the basin was symmetrical except where it was interrupted by smaller pits. The slope of its walls was rather steep on the north but more gradual on the other three sides. Although charcoal fragments—some of which appear to be elm—ranging up to 6 inches in diameter were common, there was no evidence of post molds. Charred timber sections lying horizontal were common through the basin and most of the pits, but small charred twigs and branches were more common in the lower sections of these features (fig. 3). Some areas of burnt earth occurred in the upper portions of the basin fill where the charcoal fragments were most plentiful, but there was no evidence of prepared hearths or prolonged burning. The calcined condition of the bones and artifacts appeared to have resulted from burning within the basin with no indication of planned cremation.

Many disarticulated human bones were scattered throughout the burial area (pl. 21, *a*). These apparently represent secondary burials with which shell disk beads, ornaments, and other artifacts may have been associated originally. The majority of the human remains are well preserved; others are in a fragile condition which may have resulted from exposure of the corpse on scaffolds or in trees. After decomposition of the flesh, the scattered beads and weathered bones were presumably gathered up and deposited in the various pits. Other bones which show little evidence of exposure may have been exhumed from graves elsewhere and brought to a central burial pit for final interment. The single articulated skeleton lying on the floor of the basin may represent an individual who was placed directly in the community burial area without undergoing exposure or previous separate interment. The abundance of shell beads and other artifacts scattered throughout the basin fill suggest that other corpses may at one time have been comparatively well adorned.

The occurrence of some bones in their natural alinement resulted from sufficient tissue remaining on the bones at the time they were placed in the pit to maintain their articulation. The rather numerous occurrences of from 3 to 20 evenly matched beads in close alinement probably indicates that a majority of the beads were originally in strings like those with Feature 21 and were disarranged during the subsequent period of exposure and reinterment. The unperforated shell bead blanks, which could not have been strung, may have been scattered over the various individual burials or placed in bags.<sup>2</sup> There is some indication at the Woodruff Ossuary, as well as at other sites of a similar nature, such as Guide Rock (25WT3), that a majority of the shell ornaments were associated with infants and adolescents.

## ARTIFACTS

Strong has emphasized the absence of pottery and artifacts of material other than fresh-water shells in the Marshall Ossuary. "It [the Marshall Ossuary] was truly a 'shell bead burial' and therefore different from the Graham Ossuary, both in content and structure" (Strong, 1935, p. 121).

The Woodruff Ossuary was apparently similar in construction and content to the Marshall Ossuary with its predominance of shell artifacts; in particular, both contained bead blanks as well as finished shell disk beads. The Woodruff excavation, however, yielded a greater variety of artifacts. These include pottery sherds; artifacts of stone, bone, and antler; and objects fashioned from both fresh-water and marine shells. Artifacts occurred throughout both the large basin and the smaller pits.

## POTTERY

The rather scanty pottery remains occurred at various depths in the general basin fill, as well as in the individual pits. The sherds, which are all from the bodies of vessels, are uniform in appearance and appear to represent a single pottery type (pl. 21, *b*). They consist of 10 sherds which vary in diameter from 7 to 50 mm. There is sufficient variation in the characteristics of the sherds to suggest that more than one vessel is represented.

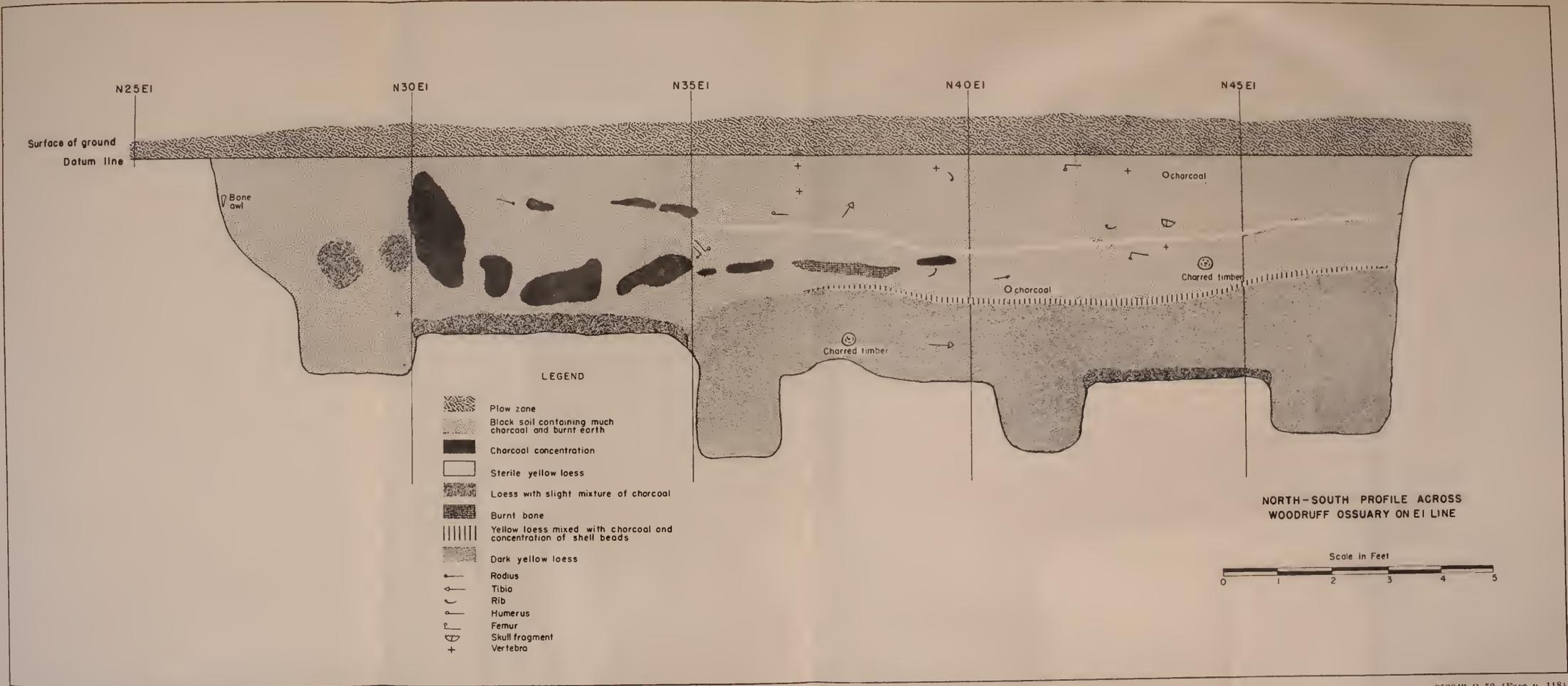
Tempering in all of the sherds includes crushed calcite, used rather abundantly. There is a limited amount of limestone in two of the sherds; sand, grit, and other aplastics do not appear to be present. Calcite crystals are found in various shales which are exposed along the Republican River and can be freely extracted on the weathered

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<sup>2</sup> A burial custom which may be comparable in some respects to that represented by the remains at 14PH4 is described for the Huron Tribe by Jean de Breboeuf in the year 1636 (Kenton, 1927, pp. 297-308).





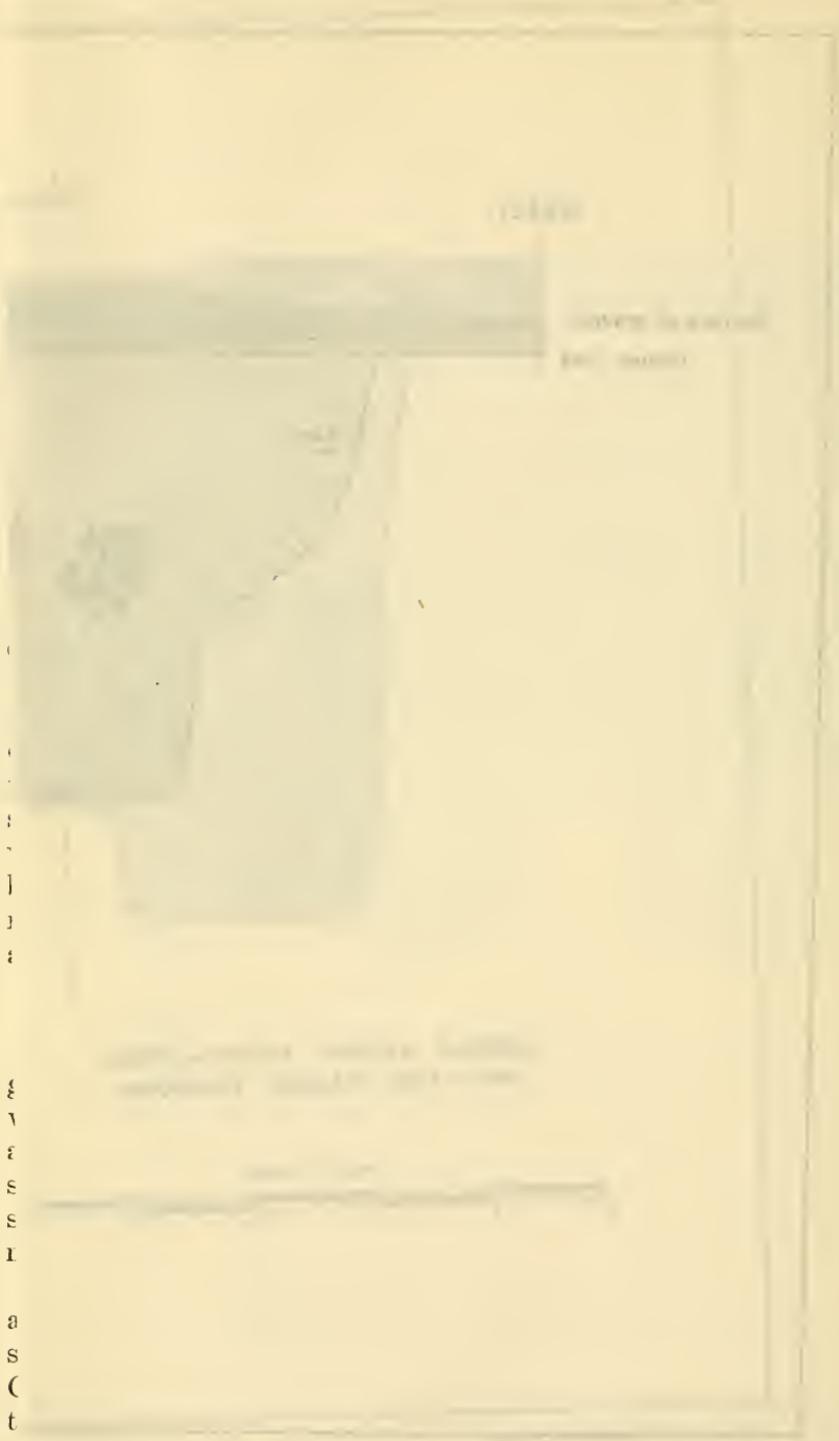


- LEGEND
- Plow zone
  - Black soil containing much charcoal and burnt earth
  - Charcoal concentration
  - Sterile yellow loess
  - Loess with slight mixture of charcoal
  - Burnt bone
  - Yellow loess mixed with charcoal and concentration of shell beads
  - Dark yellow loess
  - Radius
  - Tibia
  - Rib
  - Humerus
  - Femur
  - Skull fragment
  - Vertebra

NORTH-SOUTH PROFILE ACROSS WOODRUFF OSSUARY ON E1 LINE

Scale in Feet  
0 1 2 3 4 5

FIGURE 3.—North-south profile across Woodruff Ossuary on E1 line.



1870

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1870

slopes. There may be other sources in the immediate vicinity. The calcite inclusions range in size from fine (less than 0.25 mm. diam.) to very coarse (over 7 mm. diam.), with most falling between 1 and 3 mm. The paste is buff to dark gray in color. The interior surface of the sherds has a thick carbon coating which may be scratched off easily. When viewed in cross section, approximately one-fourth of the sherds' thickness adjacent to the interior surface is black. Freshly broken surfaces are very irregular and have a granular appearance with a tendency to shatter. Hardness ranges from 3 (calcite) to 4.5 (chabazite), with 6 of the sherds about 3.5 (celestite). Thickness ranges from 9 to 13 mm., with 7 sherds having thicknesses of 11 to 13 mm. The exterior surfaces of all the sherds are cord-roughened. The cord marks are medium fine to coarse and lie parallel; impressions of individual twisted cords are visible in several instances. Although the soot-encrusted interior surfaces are difficult to observe, they appear to have been smoothed. There is no evidence of decorations, handles, or other appendages. The few body sherds, all of which are small, give no indication as to vessel shapes.

#### WORK IN ANTLER AND BONE

Artifacts of bone and antler, although not common at the site, were rather well preserved. There are 8 specimens of antler which appear to represent two types of tools. Five of the implements, one incomplete, are made from the proximal end of the antler with a remnant of the "burr" evident as a slight swelling at one end (pl. 22, *a*, 5). The length of the antler sections varies from 47 to 75 mm. The original rough surface has been retained on the sides, but the ends are rounded and moderately smoothed. The distal end of one specimen has a roughly circular cavity with a diameter of 11 mm. and a depth of 19 mm. The specimen is in a fragile condition and it cannot be determined whether the cavity is the result of decay or is due to modification by human agency. These implements are somewhat suggestive of the antler tapping tools or "cylinders" of the Upper Republican and other Central Plains aspects (Cooper, 1936, pl. 20, 1-3). In general, however, the length of the specimens from 14PH4 is considerably less and the specimens are less carefully finished. Similar objects have been described as "drifts" for working stone (Webb, 1939, p. 32, pl. 13, *b*).

Three antler tines were also recovered from the excavation (pl. 22, *a*, 4). The proximal ends of all three are roughly finished. The distal ends of two are scarred and nicked in a manner which suggests their use in pressure flaking; one is worn diagonally to a chisel point while the other has a rather blunt tip. The distal end of the other specimen is lacking. The sides of all three sections are smoothed and

moderately polished. The specimens vary in length from 72 to 80 mm., and the greatest diameter, at the base, varies from 18 to 24 mm.

Tubular bone beads are represented by 28 specimens, 9 of which came from the floor of Feature 12, a pit (pl. 24, 3). The remainder were found at various levels throughout the excavation. All but one are small and well made; they were probably fashioned from small bird bones. Their lengths range from 9 to 14 mm. and the diameters vary from 3 to 6 mm. Characteristically, they have a circular cross section throughout. The nature of two of the beads which are not finished on the ends indicates that the small bone was cut part way through and then snapped off. Subsequent polishing has eliminated evidence of this process on most of the beads. A somewhat larger type of tubular bone bead is represented by a single calcined specimen (pl. 24, 4), which is slightly curved longitudinally. It is 30 mm. long and has a diameter of 11 mm. Its ends are smoothed and rounded and its sides appear to have been well polished prior to burning. None of the beads are incised or otherwise decorated.

Bone awls are represented by a single incomplete specimen (pl. 22, *a*, 3). Its original length cannot be determined, but a considerable section of the base appears to be missing. The surface of the break is rough and unpolished, and shows no evidence of use subsequent to fracturing. The present length is 16 cm. and the greatest width, near the break, is 18 mm. The specimen appears to have been fashioned from the split metapodial of a deer. The point has been rounded and polished, while the shaft retains the original exterior contour of the bone. The cancellous tissue has been removed from the interior.

From a depth of 14 inches in square N35 E1 came a deer metapodial from which the distal end has been removed by cutting and breaking (pl. 22, *a*, 1). A circular hole 9 mm. in diameter appears to have been made near the center of the proximal articular surface and the cancellous tissue has been removed so that a cavity extends the length of the specimen. The exterior surface appears to be otherwise unmodified. The specimen has a length of 19 cm. Whether it had a function in its present condition or was in the process of being fashioned into a tool is not known. Bones similarly treated, except for the hole in the articular surface of the proximal end, are found in sites attributable to the Upper Republican aspect and appear to represent a stage in the making of awls (Wedel, 1935, p. 200).

Beneath the lower left arm of the articulated burial (Feature 21) in section N25 E1 was an implement made from the metapodial of a deer (pl. 22, *a*, 2). A second very similar implement was found at a depth of 39 inches in Feature 12, a pit. A calcined fragment of a third specimen of this type lay surrounded by burnt earth and charcoal in section N30 E1, at a depth of 24 inches. The distal ends of

the two specimens which appear to be complete have been removed, apparently by breaking, as the end, although well polished, is uneven. The proximal end of the specimen excavated from Feature 12 has been partially removed and the end has then been rounded. At a distance of 19 mm. from the modified proximal end of this specimen is an oval hole which averages 14 mm. by 10 mm. in diameter. Opposite edges of the greater diameter are slightly beveled. One complete specimen, associated with Feature 21, has a length of 13.5 cm. while the other has a length of 11.6 cm. There are two shallow incised intersecting lines near the end opposite the perforation. The calcined fragment, which consists of the proximal end extending approximately halfway through the perforation, appears to have been similar to the other two. Three short parallel diagonal lines have been incised on one side in the vicinity of the perforation. The two complete specimens are highly polished on the sides and the cancellous tissue appears to have been removed from the interior of the bone. These objects are similar to the so-called shaft wrenches which occur in nearly every Central Plains complex. They are more commonly made from rib bones of large mammals, but specimens made from leg bones of cervids do occur in the Upper Republican aspect. Whether these specimens served a function similar to those made of ribs is not known.

Various burnt animal bone fragments which appear to have been cut or polished were found. At least one such fragment, which may be from the scapula of a rather large animal, is well smoothed and polished. Its original use cannot be determined. Large numbers of rabbit teeth occurred scattered near Feature 16. They were unmodified and their purpose is unknown.

#### WORK IN STONE

Artifacts of chipped stone were not abundant at the site, but they represent considerable variety. Jasper appears to have been utilized to the near exclusion of other materials for making various chipped stone artifacts. This material outcrops locally in the Republican drainage and occurs in various shades of yellow, brown, red, and gray. A few chalcedonic flakes have surfaces suggestive of water polishing and may have been picked up as stream pebbles and utilized. Dark red quartzite was used for making one specimen.

A total of five projectile points sufficiently complete to permit classification came from the excavation (pl. 23, *a*, 3). The original form of four broken points cannot be determined. Two of the larger points exhibit relatively coarse flake scars on the flat surfaces but the edges are finely chipped. The three smaller specimens show rather fine over-all chipping. In quality of workmanship, the smaller points

equal the finely chipped triangular, side-notched points of the Upper Republican aspect. The edges of one broken point are rather finely serrated. In cross section the blades of all points are double-convex with the greatest thickness (3-7 mm.) along the midline.

On the basis of form,<sup>3</sup> the five projectile points appear to represent three types, all variants of a stemmed form. All have expanding stems and are shouldered and barbed. Three have convex bases (SCb1), one has a straight base (SCb2), and one has a concave base (SCb3). The three with convex bases vary in length from 21 to 26 mm. and in width from 13 to 15 mm. One of the other two specimens (SCb2) has a length of 48 mm. and a width of 38 mm., while the length of the other (SCb3) is 55 mm. and the width, 31 mm.

Six crudely chipped specimens which appear to fall into one class came from various levels throughout the excavation and may be classified as celts (pl. 23, *b*, 2). All are made of yellow to dark brown jasper and are roughly triangular in shape. The bit at the widest end is rounding and has been thinned by secondary chipping. The poll is less well shaped and may be either rounding or slightly pointed. A lime matrix, which probably represents the surface of the original jasper slab, is present on one lateral surface, and sometimes on both. The specimens vary in length from 5.9 to 8.2 cm.; the greatest width, which is just above the bit, varies from 3.8 to 5.2 cm. Maximum thickness is in the vicinity of the greatest width and varies from 1.5 to 2 cm. These specimens are very similar to the chipped celts from the Upper Republican aspect, but as a series average much smaller.

There are 35 rough flakes with one or more retouched edges (pl. 23, *a*, 2). They exhibit no uniformity in shape and appear to be hastily improvised implements. The retouched edges on many are very fine, while on others they are coarse. They may have had a scraping or cutting function.

Six end scrapers, one of which came from the surface, are of the plano-convex type (pl. 23, *a*, 1). They vary to some extent in shape but common to all is a plane or slightly curved ventral surface. The smallest is 27 mm. by 24 mm., while the largest is 54 mm. by 31 mm. They do not appear to differ significantly from specimens occurring in nearly every Central Plains archeological complex.

A few broken, roughly chipped sections, worked on both faces and double-convex in cross section, may be knife fragments. A rounding end is suggested by two fragments. Two complete specimens have lengths of 45 and 38 mm. and widths of 25 and 28 mm. The broken sections appear to be from specimens of somewhat greater size. Similar specimens were found at 25VY1 (Hill and Kivett, 1941, p. 172).

<sup>3</sup> After Strong, 1935.

A brown jasper slab measuring 13 cm. by 6 cm. by 2.5 cm. is roughly flaked and may represent raw material in the form in which it was brought from the quarry or stream bed. A lime matrix visible on three sides indicates the thickness of the original seam.

Three stream-polished quartz pebbles show evidence of use as pecking or hammer stones (pl. 23, *b*, 1). They do not appear to have been intentionally shaped but have been slightly modified by use. One, from the surface, is roughly rectangular in shape and has its two opposite ends rounded through use. It has a length of 6.5 cm. and a width of 3.4 cm. The other two specimens, which were excavated, are somewhat round in outline. One shows evidence of battering on only one end but the other has been used on all edges. The larger has a diameter of 8.2 cm. and a thickness of 4.5 cm., while the other has a diameter of 6 cm. and a thickness of 4 cm.

#### WORK IN SHELL

Artifacts of shell were very abundant on the surface as well as throughout the excavation. The majority of the thousands of specimens are fashioned from fresh-water mussels, but some were made from marine forms.

Disk beads and blanks of shell representing all stages of manufacture were extremely abundant throughout the excavation. Groups of as many as 30 evenly matched, ground and perforated beads were found in alinement just as the strings of beads were presumably thrown into the pit. The single complete articulated skeleton appears to have been wrapped in the pelvic area and up the chest with strings of beads. All the beads and blanks have been bored but many are not ground down. The unfinished beads appear to have been strung separately from the ground and finished specimens. A few unbored and unground blanks were scattered above the lines of beads (pl. 22, *b*, 1). Many of the individual strings contained more than a hundred beads. The process of making the beads appears to have been as follows: The mussel shells were broken into sections which were then ground or broken into a roughly circular shape. The blanks were then drilled from the interior surface and the outer surface was smoothed and flattened to enlarge the drill hole (pl. 22, *b*, 2.). They were probably then strung before they were ground and polished to their final matched form (pl. 22, *b*, 3). Strong (1935, p. 120) has suggested this method for almost identical specimens from the Marshall site. He describes the process as follows:

Apparently, the shells of a fresh-water bivalve were broken up, ground approximately round on sandstone or broken to shape, bored, strung on some stiff wood fiber, and then rolled on a slab or between two slabs until perfectly smooth and round. This is the method employed by the Pomo and

other California tribes, and the same sequence is suggested by the complete series from the present [Marshall] site.

Although some of the thicker finished beads from 14PH4 have been drilled from both sides, the majority, like those from the Marshall site, were drilled only from the interior side. There is considerable variation in the size of the finished beads (pl. 22, *b*, 3). They range in diameter from 6 mm. to 18 mm., with the majority being not more than 9 mm. across. The holes are usually well centered but in some cases they are very near the edge, particularly on those specimens which are ground down to a diameter of 7 mm. or less.

There are 9 nearly complete crescent-shaped pendants with a perforation at each end for suspension and fragments which appear to represent 14 additional specimens of the same type (pl. 25; 11). They are cut from the ventral margin of fresh-water bivalves along the pallial line. Their length appears to have been determined by the size of the shell. The outer curved surface follows the ventral margin of the shell, while on the inner edge the shell has been cut along the pallial line. Three complete specimens which were found associated are of graduating sizes and suggest that several may have been worn together. They vary in length from 6.2 cm. to 12.5 cm. The maximum width, taken near the midpoint, varies from 1.2 cm. to 1.5 cm. The specimens taper to a rounded point at each end. Several were re-drilled at the ends after the original perforations for attachment wore through or were broken. The edges of all specimens have been smoothed and polished to a rounded surface, but the sides show little modification. Perforations vary in diameter from 2 to 4 mm.; they appear usually to have been drilled from the interior surface of the shell.

A second type of pendant is represented by a single specimen which came from square N40 E1 at a depth of 42 inches. This object was fashioned from a fresh-water mussel shell and is subrectangular in shape with rounding corners (pl. 25; 1). A hole drilled from the interior is located near each of two corners. The shell has been cut longitudinally so that the upper margin of the gorget was originally near the center of the shell and the lower margin retains the pallial line and ventral margin. The edges are well rounded and smoothed. The specimen has a length of 9.5 cm. and a width of 4 cm. A similar object has been reported by Strong (1935, p. 115) from an unassigned burial near the mouth of Prairie Dog Creek, in Harlan County, Nebr. Two similar pendants were also recovered, during River Basin Survey's excavations in 1948, from a burial assignable to the Keith focus (Woodland) in the Medicine Creek Reservoir area in Frontier County, Nebr. (Kivett, 1949, fig. 69, 1, *e*).

Near the mouth of a partially articulated skeleton (Feature 16) in square N30, at a depth of 46 inches, was found a cut shell fragment which may represent an incomplete pendant or gorget (pl. 25; 10). This appears to have been worked from some heavy shell, probably a marine form such as a Gulf Coast conch. It is roughly triangular in shape and curved longitudinally. One edge is cut to a bevel, while the other edges are rounded and smoothed. There are no perforations for attachment. The length of the specimen is 9.5 cm., the width at the base of the triangle is 3.6 cm., and the greatest thickness near the apex is 4 mm. It is stained a rusty brown and is somewhat chalky and weathered.

Seven triangular pendants fashioned from fresh-water bivalves came from various levels throughout the excavation (pl. 25; 2, 3, 4). Four were found near the skull of Feature 21. The majority approximate the shape of an isosceles triangle, with the base 4 to 10 cm. longer than the sides. Perforations in each of two corners have been drilled from the interior and vary in diameter from 3 to 7 mm. Bases vary in length from 4.2 to 7.6 cm., while the sides vary from 3 to 6.4 cm. Edges are well rounded and smoothed.

Two specimens are somewhat similar to the triangular, biperforate pendants described above but tend toward a crescentic shape (pl. 25; 5, 6). The edge between the two perforations is concave while the opposite edge curves to a rounding point. One specimen has a length of 4.3 cm. and a width of 2.1 cm.; the other has a length of 4.6 cm. and a width of 2.3 cm. Both are broken at the perforations, which are estimated to have been 3 mm. in diameter.

A section from the stem of a Gulf of Mexico conch shell, *Busycon contrarium* (Conrad),<sup>4</sup> has been drilled longitudinally from both ends to form a tubular bead or pendant (pl. 25; 7). The exterior surface has been rounded and smoothed, but the spiral of the stem is still discernible. It has a length of 5.5 cm. and a diameter of 1.7 cm. The perforation narrows from a diameter of 7 mm. at one end to approximately 3 mm. near the midpoint, then widens again to 5 mm. at the other end. This specimen was found near the right mastoid process of Feature 21, the single flesh burial.

Two irregular fragments of chalky shell also appear to be from marine forms (pl. 25; 8, 9). One is roughly rectangular in shape, rounded on one end, and is well polished. The opposite end is uneven and has been broken. The second specimen appears to have been weathered and shows little polish. It is roughly oval in shape, and has a circular perforation 4 mm. in diameter near one rounded and

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<sup>4</sup> Identified by Dr. J. P. E. Morrison, Associate Curator, Division of Mollusks, U. S. National Museum, Smithsonian Institution.

smoothed end. The original shape or purpose of these two specimens cannot be determined; presumably they were for decoration.

Scattered throughout the ossuary were 21 olivella (*Olivella sp.*, probably *nivea* Gmelin)<sup>5</sup> shells with the spire removed and a hole bored in line with the natural opening; the cut end is well rounded and smoothed. They vary in length from 11 to 15 mm. Several have pitted and eroded surfaces, while others are well preserved (pl. 24; 2). This type of bead was reported by Strong (1935, p. 113) from the Graham Ossuary, and unworked shells of the same species are reported from an Upper Republican village site (Strong, 1935, p. 101).

A total of 12 beads fashioned from the stems of marine shells, probably *Busycon contrarium* (Conrad) from the Gulf of Mexico, were recovered (pl. 24; 5). They vary from subrectangular to slightly triangular in cross section. They are drilled lengthwise and have rounded and smoothed ends. Length ranges from 18 to 30 mm., diameter from 14 to 24 mm. Although the majority are pitted and have little luster, the lowermost side of one is smooth and well preserved.

One rather unusual type of bead, which appears to have been fashioned from fresh-water mussel shells, is represented by eight specimens (pl. 24; 1). These are rounded in cross section but have one side ground to a flattened surface. The ends are flattened to rounding. A hole has been drilled into the flattened surface to intersect at right angles another perforation bored lengthwise from one end. The specimens have an average length of 11 mm. and a diameter of 6 mm. at the widest point, which is near the center. The diameters of the perforations average 3 mm. and narrow to an average of 1 mm. at the junctions of the intersecting perforations. A single example of this type of bead is reported by Strong (1935, p. 120) from the Marshall Ossuary.

## RÉSUMÉ

In the foregoing pages, the results of excavation and of laboratory analysis of material from a prehistoric burial site, 14PH4, in northern Kansas, have been presented. Though the data leave many questions unanswered, they are important for the new light they throw on certain little-known burial complexes in the Central Plains.

Present information suggests that burial sites of this type, generally characterized as "shell-bead ossuaries," center in the Republican River drainage in south-central Nebraska. Thus far, such sites have not been investigated east of Adams County or west of Harlan County in Nebraska.

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<sup>5</sup> Identified by Dr. Harald A. Rehder, Curator, Division of Mollusks, U. S. National Museum, Smithsonian Institution.

There are unconfirmed reports, however, that they may extend well into Kansas to the south and perhaps to the east in the Nemaha and Blue River drainages.

The majority of the remains at 14PH4 were secondary burials which appeared to have been deposited with little regard for orderly arrangement. Although there appeared to be a concentration of materials above some pits in the floor of the larger basin, it is suggested that the various individual pits which occurred both inside and outside of the basin may have been excavated prior to the basin. At a later time an oval basin was excavated, removing the upper portions of many of the earlier individual pits. There can be little doubt that a basin was intentionally excavated at 14PH4, although Strong (1935, p. 121) was of the opinion that the mixed area above the pits at the Marshall site (25HN1) resulted from the intersecting of the pits. The bottoms of several deeper pits were discernible below the floor of the basin. Other pit walls extended beyond the limits of the basin. A single pit (Feature 15), which showed as a darker area just below the plow line, was located and excavated and found to lie entirely outside the basin. Human remains in this pit were disarticulated and scattered, and differed little from the general arrangement within the basin. It is not clear whether these pits served as primary depositories for remains which were later exhumed and placed in the basin or whether they served some other function. Wedel does not report a basin such as this at Holdrege 5 and perhaps this additional feature was not always constructed.

Although there were no definite hearth areas, considerable burning had occurred in the basin, and various layers of charred timbers and twigs appear to have separated the human remains. Some human bones and many shell-disk beads were charred. A single articulated skeleton lay on the floor of the basin with a considerable number of artifacts, the majority fashioned from shell. Other objects of bone, shell, and stone were scattered throughout the basin.

Implements of hunting, and perhaps warfare, included small to large barbed and stemmed projectile points. Small chipped celts and retouched flakes were relatively common, and end scrapers which differ little from the usual type in the area were present. Cylindrical antler sections and antler tines, perhaps for working stone, occurred. Awls are represented by a single specimen, but it is likely that such implements were in common use.

Items of personal adornment or grave goods include the bulk of the specimens, with the greater emphasis on those fashioned from fresh-water and marine shells. Shell-disk beads in all stages of manufacture were present by the thousands. In general, they appear to differ little

from those which occur in very limited quantities in nearly every archeological complex in the Central Plains. Their importance as a diagnostic trait appears to rest primarily on their relative abundance and on the presence of unfinished beads and blanks. Two distinct types of pendants made from the shells of fresh-water mussels, a triangular and a crescent form, are less common and have been reported only from shell-bead ossuaries. A rather unusual type of bead with two holes on the same plane, one bored lengthwise and the other at right angles, is also known only from burials of this type (pl. 24; 1). Beads, pendants, and sections cut from *Busycon* shell appear to differ considerably from those reported from sites such as the Graham Ossuary (25HN5).

Small tubular bone beads were relatively rare at this site but were common at Holdrege 5 and other sites which appear to be assignable to the same complex. Rabbit mandibles may have been perforated and worn for personal adornment, or the teeth may have been mounted on wood or other material for ornamentation. A single mandible of a badger found near a partially articulated burial was not modified and its purpose is unknown. Implements fashioned from deer leg bones may be comparable to the shaft wrench which occurs in many ceramic horizons throughout the Central Plains.

Pottery, although represented by only a few sherds, is important in suggesting cultural relationships. The sherds are relatively thick, cord-roughened over-all, tempered with crushed calcite, and granular in structure. Interiors are commonly soot-encrusted and the exterior color is gray to buff. Hardness averages around 3. Fabric or cord impressions do not occur on the interior surfaces of the limited number of sherds from 14PH4 but have been found on sherds from village components of the Keith focus, such as site 25FT18 in Frontier County, Nebr. (Kivett, 1949, p. 282, fig. 69, *e*). Thus far, the use of calcite appears to have important diagnostic value as a marker for this complex. It seems likely, however, that pottery of this type may be found with other aplastics, since calcite is not readily available in all sections of the Central Plains.

TABLE 2.—Comparison of traits from site 14PH4 with those from other burial sites in the immediate area<sup>1</sup>

Culture traits	Woodruff 14PH4	Guide Rock 25WT3	Graham 25HN5	Marshall 25HN1	Alma 25HN2	Orleans 25HN3	Flag Creek 25HN4	Robb 25WT4	Holdrege 5 25FR9	Dunn 25FR2	Illustrations
Location of site:											
Hilltop		+	+		+			+			
Slope							+				
Bluff point				+							
Bench or terrace	+					+			+	+	Pl. 16, a. Pl. 13, a.
Oval to circular basin containing individual pits.	+	?		?		?	?	?			
Oval to circular basin without individual pits.			+		+						Strong, 1935, fig. 10.
Individual pits, not in basin.	+	+							+		Wedel 1935, pl. 4.
Type of burial:											
Extended											
Flexed									+		
Semiflexed	1	+									Pl. 20, a.
Bundle											
Disarticulated and scattered	+	+	+	+	+	+	+	+	+	+	Pl. 19, a.
Partially articulated	2	+	+	?		?	+	+	+	?	Pl. 18, b.
Evidence of some burning in pit or basin.	+	+		+		+	+	+	?	+	
Shell artifacts:											
Disk beads	2 M	M	85	M	3	M	M	M	M	M	Pl. 22, b.
Bead blanks, perforated and unperforated.	M	M		M		M	M	M	M	M	Pl. 22, b.
Triangular pendants	7	24		2		1	?	6	+	+	Pl. 25, 2, 3, 4.
Crescent pendants	23	8		?		?	?	8	?	?	Pl. 25, 11.
Bear claw pendant			11		3						Strong, 1935, pl. 9, fig. 2 I-N.
Right-angle-perforated beads.	6	6		1		2	?	2		+	Pl. 24, 1.
Conch beads	12	4									Pl. 24, 5.
Olivella beads	21	10	5	?		6	?	2			Pl. 24, 2.
Conch pendants	2		2								Pl. 25, 8, 9.
Cylindrical beads			9		5						Strong, 1935, pl. 11, fig. 2, E.
Gastropod beads		6	16		+			2		+	Strong, 1935, pl. 11, fig. 2, f.
Conch sections	1		+		2	?	?			+	Pl. 25, 10.
Chipped stone artifacts:											
Small celts	6	1		+		+	+	1		2	Pl. 23, b, 2.
Retouched flakes	35	+	+		?	+	+	+	+		Pl. 23, a, 2.
End scrapers	6	4		+		+					Pl. 23, a, 1.
Side-notched points			5		2						Strong, 1935, pl. 7, fig. 1, d.
Stemmed points	5	4	?							2	Pl. 23, a, 3.
Stemmed point, serrated edges.	1	1								2	Wedel, 1935, pl. 9, fig. 1, e.
Diamond-shaped beveled knife.			1								Strong, 1935, pl. 7, fig. 2, c.
Rectangular knife	?							1			
Oval knife	1										
Work in ground stone:											
Paired shaft pebbles			4								Strong, 1935, pl. 17, fig. 1, f.
Pipe, stone, right-angle			1								Strong, 1935, pl. 16, fig. 2, n.
Hammerstones	3	+				+					Pl. 23, b, 1.
Work in antler and bone:											
Bow guard			1								Strong, 1935, pl. 10, fig. 2.
Antler cylinders	5			?		?	?	?			Pl. 22, a, 5.
Antler-tip flakers	3					?				2	Pl. 22, a, 4.
Rib shaft wrench			1								Strong, 1935, pl. 6, fig. 1, c.
Deer leg bone shaft wrench	3					?					Pl. 22, a, 2.
Tubular bone bead	28	8	2		4			4	+		Pl. 24, 3, 4.
Tubular bone beads, incised.		2						2	+		Schultz and Spaulding, 1948, pl. 30, o.
Awls	1		+	?		?					Pl. 22, a, 3.
Perforated canine teeth		25				7	2	4			Pl. 26, a, 2.
Rodent mandibles	1	9				?	?				
Evidence of copper			+		+						
Pottery	10	13	+		+					+	
Tempering:											
Crushed rock or sand			+		+						Strong, 1935, pl. 9, fig. 1.
Crushed calcite	10	13					3	+	+		Pl. 21, b, pl. 23, b, pl. 27.
Structure:											
Granular	10	13	+		+		+	+	+		
Flaky											

See footnotes at end of table.

TABLE 2.—Comparison of traits from site 14PH4 with those from other burial sites in the immediate area <sup>1</sup>—Continued

Culture traits	Woodruff 14PH4	Gulde Rock 25WT3	Graham 25HN5	Marshall 25HN1	Alma 25HN2	Orleans 25HN3	Flag Creek 25HN4	Robb 25WT4	Holdrege 3 25FR9	Dunn 25FR2	Illustrations
Surface treatment :											
Smoothed.....									++		
Cord-roughened over all.....	10	13	+		+		+		++		Pl. 27.
Lip :											
Rounded.....											
Flattened.....		1									Pl. 26, b, pl. 27.
Rim profile :											
Collared or braeed.....			+		+						Strong, 1935, pl. 9, fig. 1.
Straight.....		1									Pl. 26, b, pl. 27.
Flaring.....											
Decorative technique :											
Inlaid.....			+		+						Strong, 1935, pl. 9, fig. 1.
Plain.....		1									
Harlan Cord-Roughened type.....	+	+		?		?	+	?	+	?	Pl. 21, b, pl. 26, b, pl. 27.
Upper Republican types.....			+		+						Strong, 1935, pl. 9, fig. 1.

<sup>1</sup> In this table, I have sought where feasible to indicate the relative importance of an element by indicating the number of observed occurrences. Where actual numbers are impractical, I have used a plus sign (+) to show that the element is present, and a blank for no known occurrences. A question mark (?) indicates there is a possibility the trait is present but that data are lacking, because excavation has not been completed or because the site has been disturbed by cultivation or looted by vandals.

<sup>2</sup> Numbered in thousands.

## CULTURAL RELATIONSHIPS

The problem of prehistoric burial sites containing shell-disk beads to the near exclusion of other artifacts has been noted by various investigators in Nebraska (Strong, 1935, pp. 116-122, and Wedel, 1935, pp. 174-179). Other ossuaries of a somewhat similar nature contain mixed human bones reinterred with offerings. These, which have been assigned to the Upper Republican complex, contain only limited numbers of finished shell-disk beads and pottery representing Upper Republican types. There can be little doubt that these assignments on the basis of pottery and accompanying artifacts are valid, although it is evident that single flesh burials were also made by some of the Upper Republican groups (Kivett, 1949, p. 282).

In table 2 the artifact types and other data revealed by our investigations at site 14PH4 have been listed and compared with data available from several burial sites in the immediate area. Data for the majority of these sites have been provided by A. T. Hill, who carried on investigations in them intermittently over a period of many years. Several of the sites have not been fully excavated or were disturbed prior to Mr. Hill's work so that certain information may be lacking. At least six other burial sites, which have yielded shell beads and blanks, are known in Adams, Franklin, Harlan, and Webster Counties. For these, however, the data are still less complete.

It has been pointed out (Wedel, 1935, p. 204) that shell beads are rare or absent in ossuaries in which pottery occurs and that pottery is rare or absent in ossuaries in which shell beads are common or abundant. It is evident, however, that such ossuaries are not attributable to a single complex, but rather to at least two distinct complexes. The Graham (25HN5) and Alma (25HN2) sites, which have been assigned to the Upper Republican aspect, are examples of those ossuaries in which pottery is rather common and shell beads relatively rare. The remainder of the sites listed in table 2 appear to be representative of the second type of burial, which is characterized by an abundance of shell work and by relatively few other artifacts. The latter type now appears to be attributable to a Woodland variant. Although pottery has not been commonly found in the shell-bead ossuaries, sherds do occur. Some pottery came from sites 14PH4, 25WT3, 25FR9, and 25HN4, all shell-bead ossuaries. Of the sites characterized by an abundance of shell-disk beads in various stages of completion, only 25WT3 yielded rim sherds (pl. 26, *b*). The sherds from these four sites, although limited in number, are distinct and readily distinguishable from wares of the Upper Republican aspect. They are characteristically thick; have over-all cord-roughening with the cord impressions vertical and parallel on the vessel; and are tempered with crushed calcite, with an occasional inclusion of hematite or fine sand. For convenience, I have designated this type of pottery Harlan Cord-Roughened. Superficially, it resembles the Valley Cord-Roughened type, which characterizes the Valley focus of the Woodland pattern (Hill and Kivett, 1941, pp. 173-181). It appears, however, to be somewhat less well made and to lack the various rim and lip decorations of the Valley Cord-Roughened type. It is now evident that the thick, cord-roughened ware found throughout the Central Plains area represents at least two distinct foci of the Woodland pattern. It seems likely that still other variants will be defined when adequate study is made. The need for specific designations for the Woodland variants has already been noted (Wedel, 1949, p. 338). Certain sherds from Ash Hollow Cave (Champe, 1946, pl. 8) have been tentatively assigned to the Valley focus (Hill and Kivett, 1941, pp. 224-227; Champe, 1946, pp. 112-113). Excavations at site 25HO23, in Hooker County, Nebr., during the summer of 1949 by the Nebraska State Historical Society revealed sherds which are very similar to those from Ash Hollow Cave. They lack rim decorations and certain other characteristics of the Valley I ware. It would appear that the Ash Hollow ware cannot be related directly to the pottery which is characteristic of the Valley focus but rather to an undefined variant which may precede the Valley I material in this area. Other sites in Hooker and Cherry Counties, Nebr., have yielded pottery of the Valley Cord-Roughened type.

The occurrence of a distinctive pottery tempered with crushed calcite in two occupational sites in Harlan County (25HN10, 25HN32), and in two village sites (25FT70, 25FT18) on Medicine Creek in Frontier County, Nebr. (Kivett, 1949, pp. 282-283), appears to justify the designation of the ware as a separate type. Similar pottery is also known from Davis Creek in Sherman County, Nebr., where it occurred in association with other pottery tempered with sand and pebbles (Hill and Kivett, 1941, pp. 219-222). These sand- and pebble-tempered sherds have many characteristics of the Valley Cord-Roughened type, including diagonal cord impressions. A single boat-stone was associated with this pottery at Davis Creek. The calcite-tempered ware has been noted from one site in the proposed Amherst Reservoir, Buffalo County, Nebr. Strong (1935, p. 215) describes sherds from the Sandhill region of west-central Nebraska which strongly suggest the Harlan Cord-Roughened type. It is described as "a very heavy ware, ranging from one-quarter to three-eighths of an inch in thickness and of a uniform grayish-brown color. Both surfaces and cross sections of these sherds show numerous holes, apparently where some sort of vegetable tempering has been burned out, and in this sense it is 'hole-tempered.'" In addition, the pottery contains much very fine white sand which probably served for tempering.

Sherds tempered with calcite, when found on the surface or when immersed in a dilute solution of acid, appear to fit the ware described. This pottery, which was described by Strong (1935, p. 125) as Dismal River type A, is no longer believed to be assignable to the Dismal River aspect but rather to a variant of the Woodland pattern.

Calcite-tempered pottery, as noted, has been found on a site in the proposed Amherst Reservoir area, Buffalo County, Nebr. In the same area, as well as in Harlan County and in the Davis Creek Valley, there are other sites which thus far have yielded only Valley Cord-Roughened grit- or sand-tempered ware with decorations on the rims commonly consisting of cord-wrapped-stick or rod impressions and punctates which have produced interior or exterior nodes.

An examination of the collections at the Nebraska State Historical Society reveals two restored vessels and the restored conoidal base of a third vessel which are of the Harlan Cord-Roughened type. These are particularly important in indicating the shape and size for vessels of this type.

The first of these, which has been previously reported as Woodland-like but not assigned to a particular focus, came from site 25FR8, previously known as Red Cloud 3, in Franklin County, Nebr. (Wedel, 1935, pp. 188-189; Hill and Kivett, 1941, pp. 222-224). The vessel, the sherds of which were found scattered over the floor of an Upper Republican house, has a conoidal base and a height of 40.5 cm. (pl. 27).

The interior diameter at the mouth, as reconstructed, is 20.9 cm. and the maximum diameter, which is 10.2 cm. below the lip, is 30.6 cm. The lip is smoothed but undecorated and is slightly rounded and everted. The thickness of the walls varies from 0.9 to 1.8 cm., with the thicker portion near the base. The paste is light gray to buff and is coarsely tempered with crushed calcite, which projects through the inner surface. The exterior is cord roughened; the impressions, 3 to 5 per cm., are vertical and parallel. The only decoration is a small trailed impression resembling a turkey track on the exterior of the vessel approximately halfway down the body.

The conoidal base and the second restored vessel of the Harlan Cord-Roughened type are reported to have been found in a drainage ditch in Richardson County, Nebr., at a depth of 9 feet (Wedel, 1935, pp. 188-189; Hill and Kivett, 1941, pp. 222-224). The restored vessel is very similar to the one from 25FR8 and suggests a remarkable uniformity for this pottery type. The ware in general suggests a much less complex pottery tradition than that represented by the Valley Cord-Roughened type.

At one site, 25SM2, in the Davis Creek Valley, sherds of both Harlan Cord-Roughened and Valley Cord-Roughened types were excavated from a single burial pit (Hill and Kivett, 1941, pp. 219-222). No sherds of the Harlan Cord-Roughened type, however, were recovered from 25VY1, the site at which the Valley Cord-Roughened type was first defined. Certain sherds, from 25VY1 do, however, suggest a basic similarity to the Harlan Cord-Roughened ware (Hill and Kivett, 1941, pl. 10, 1).

Sherds of the Valley Cord-Roughened type have been found with sherds of the Missouri Bluffs Woodland type (Keyes, 1949, p. 97) by the Nebraska State Historical Society in a series of sites on Loseke Creek in Platte County, Nebr. Pottery of the latter type has been illustrated from the Eagle Creek site<sup>6</sup> of northeastern Nebraska (Hill and Kivett, 1941, pp. 234-235), but has not been described. As noted elsewhere in this report, certain traits of the Keith focus are also reported from the Younkin mound in Geary County, Kans. (Schultz and Spaulding, 1948, pp. 306-313). Spaulding has suggested that a considerable part of a large cord-marked jar lacking any sort of decoration from the Younkin mound appears to resemble closely a vessel from the 25VY1 site (Spaulding, 1949, p. 107). This sherd and many of the other artifacts from the same site may bear a closer resemblance to certain artifacts of the Keith focus than to artifacts of the Valley focus.

It is evident that the Harlan Cord-Roughened ware and the artifacts accompanying it are sufficiently divergent to warrant the assign-

<sup>6</sup> This site was excavated by the Laboratory of Anthropology, University of Nebraska.

ment of the material to a separate focus, the Keith. Temporal differences seem to be indicated, although direct stratigraphic evidence for the sequence of the three previously designated Woodland foci—Keith, Valley, and Sterns Creek—has not been found.

Present evidence indicates that the makers of Harlan Cord-Roughened pottery are responsible for certain ossuaries in which shell beads in various stages of completion occur in relatively large numbers. Among such sites may be mentioned 14PH4 (Woodruff), 25HN1 (Marshall), 25WT3 (Guide Rock), 25HN2 (Orleans), 25HN4 (Flag Creek), 25WT4 (Robb), 25FR9 (Holdrege 5), and 25FR2 (Dunn). Other groups, including the Upper Republican peoples, make far more limited use of finished shell beads as grave goods.

Unfortunately, little is known regarding burial customs associated with other Woodland variants, such as the Valley and Sterns Creek foci. A single occupational site and a group of nearby burial pits in Platte County, Nebr., have been linked tentatively, on the basis of a few sherds with the burials, which were identical with those in the habitation level (Hill and Kivett, 1941, p. 214). This ware is grit-tempered and of the Valley Cord-Roughened type. There were no shell beads with the burials, which consisted of disarticulated bones. Although it is likely that other Woodland groups practiced ossuary burial, it is significant that only sherds of the Harlan Cord-Roughened type have thus far been found in the shell-bead ossuaries.

Schultz and Spaulding have reported a Hopewellian burial site from the lower Republican Valley in Geary County, Kans. (Schultz and Spaulding, 1948, pp. 306-313). Although certain of the artifacts recovered from this burial have definite Hopewellian affinities, others are comparable to those from the Keith focus. These include small stemmed points often with serrated edges, curved shell pendants which are suggestive of the crescentic specimens from site 14PH4, shell-disk beads, conch columella beads, and incised bird bone beads. The single vessel of Woodland type from the Younkin site is also suggestive of the Harlan Cord-Roughened ware, since it has vertical exterior cord marks and some cord impressions on the interior. The occurrence of both primary and secondary human burials, with some of the bones scorched or calcined, is common to the Geary County burial and the shell-bead ossuaries of Nebraska and northern Kansas. On the other hand, the available evidence for the Younkin site does not indicate that the bones were fired in situ, while the burning in the shell-bead ossuaries was, for the most part, in situ. The inclusion of various small animal bones in the deposit appears to be a shared trait. The mound and stones used in the case of the Geary County burial is unlike the pit basin type constructed by the people responsible for the shell-bead ossuaries.

Thus far, no Hopewellian pottery traits or other traits such as platform pipes have been reported from components of the Keith focus. Certain other traits, such as the long bone pins, may be, as suggested by Schultz and Spaulding (1948, p. 312), assignable to an Archaic horizon. Work in additional components of the Keith focus may, however, supply some of these traits, such as the bone pins, and suggest that, if Archaic in origin, they may have been transmitted to the Western Hopewellian complex by way of Central Plains Woodland variants or variant, such as the Keith focus. Recent excavation by the Nebraska State Historical Society of a series of burials on Queen Hill (site 25CC55), Cass County, Nebr., has revealed a bone artifact very similar to the pins from the Younkin Mound (Schultz and Spaulding, 1948, pl. 30; 1). This pin was associated with a multiple flesh burial containing three individuals. At the present time the burials cannot be culturally identified.

Certain inferences may now be drawn from the chart comparing ten burial sites in the Republican drainage of south-central Nebraska and north-central Kansas. It has been satisfactorily demonstrated by Strong (1935) that two of these sites, the Graham and Alma Ossuaries, are attributable to the Upper Republican aspect. Later investigations and study have served to substantiate this classification. Only two of the other sites have been previously described. The first of these, the Marshall Ossuary (25HN1), has been described by Strong but has not been classified. The second, Holdrege 5 (25FR9), was described by Wedel and tentatively assigned to the Lost Creek focus of the Upper Republican aspect. On the basis of present evidence, it now appears that all of the sites listed, with the exception of the Graham and Alma Ossuaries, are assignable to a Woodland complex. As a result of the excavation of two sites of this complex and less extensive investigations at five other similar sites, it further appears that a separate focus is represented. This has been designated the Keith focus of the Orleans aspect, of an unnamed western phase, of the Woodland pattern. The Valley focus is also tentatively assigned to the Orleans aspect.

There are, from a study of both the villages and burial pattern, certain traits which now appear diagnostic for the Keith focus (Kivett, 1949, pp. 282-284). These include the abundant use as grave furnishings of ornaments fashioned from both fresh-water and marine shells, with a large number of blanks and unfinished shell-disk beads; triangular pendants; crescent pendants; right-angle-perforated beads; small chipped celts; small to large stemmed and barbed projectile points, often serrated; incised tubular bone beads; perforated canine teeth (pl. 26, a, 2); unperforated rodent teeth; and pottery of the Harlan Cord-Roughened type. Drilled and undrilled shell-bead

blanks appear to be particularly helpful in distinguishing the Woodland ossuaries from those assignable to the Upper Republican aspect.

There are some basic similarities which may indicate a general relationship between certain of the Upper Republican and the Woodland burials. The deposition of some primary as well as secondary burials in a basin and the occurrence of finished shell-disk beads, ornaments fashioned from conch shell, olivella beads, gastropod beads, retouched flake knives or scrapers, end scrapers, shaft wrenches fashioned from deer-leg bones, undecorated tubular bone beads, and hammerstones are traits which appear to be shared by both complexes.

Identification of the shell from the Woodruff Ossuary indicates that the source of nonlocal material was largely to the southeast via the Mississippi drainage. A single worked specimen of marine shell from a component of the Keith focus (25FT18) in Frontier County, Nebr., has, however, been identified as *Agaronia testacea* (Lamarck) from the Gulf of California or western Mexico.<sup>7</sup> Whether this indicates direct trade relations with that area or indirect trade by way of the Mississippi drainage is not known. The latter route, however, would seem more likely.

Certain shell was altered so extensively during its manufacture into artifacts that, although it suggested a marine origin, specific identifications were not possible. It is evident, however, that marine shell of southeastern origin was in use by people both of the Keith focus of the Woodland pattern and of the Lost Creek focus of the Upper Republican aspect.

*Identified Shells,<sup>1</sup> 14PH4*

	<i>Number of specimens</i>
<i>Unworked specimens:</i>	
<i>Quadrula quadrula</i> (Rafinesque)-----	7
<i>Lampsilis ventricosa occidens</i> (Lea)-----	7
<i>Obovaria olivaria</i> (Rafinesque)-----	1
<i>Lasmigona complanata</i> (Barnes)-----	2
<i>Worked specimens:</i>	
<i>Lampsilis ventricosa occidens</i> (Lea) (?)-----	7
<i>Olivella</i> sp. (probably <i>nivea</i> Gmelin) (range south Florida to Texas, México, and West Indies)-----	1
Heavy-shelled species of Unionid (fresh-water mussel) from the Mississippi River drainage; <sup>2</sup> fragment of shell-----	1
<i>Busycon contrarium</i> (Conrad) <i>columella</i> (from Gulf of Mexico)-----	1

<sup>1</sup> Identifications by Dr. Harald A. Rehder and Dr. J. P. E. Morrison, Division of Mollusks, U. S. National Museum, Smithsonian Institution.

<sup>2</sup> Probably not from shell taken from river or stream near the site.

Excavations at village sites of the Keith focus have revealed them to be small, with remains of not more than four to six structures (Kivett, 1949, pp. 282-283). Present information suggests such sites are somewhat smaller than the 25VY1 site of the Valley focus. It is estimated

<sup>7</sup> Identified letter of March 24, 1949, Harald A. Rehder, Curator, Division of Mollusks, U. S. National Museum, Smithsonian Institution.

that remains of at least 61 individuals were deposited in the Woodruff Ossuary; the Guide Rock, Orleans, and other burial sites may have been even larger. It seems likely that such burial grounds were utilized by the occupants of more than one village in the area, in view of the considerable time and effort which must have been required for the manufacture of the abundant grave goods.

Thus far, intensive excavations at two occupational sites have failed to reveal evidence of horticulture, and subsistence appears to have been based largely on hunting and gathering. Although a majority of the sites located thus far are burials, it seems likely that an examination of suitable areas in the vicinities of them will reveal numerous small village sites. Thus far, most of these have been situated on low inconspicuous knolls and terraces along the smaller tributary streams.

As a working hypothesis, based largely on typology, a tentative chronological sequence for certain Woodland variants in the Central Plains may be suggested. The Keith focus probably represents one of the earliest Woodland variants in this area. Materials from site 25HO23, previously noted, may fall into the same general time period. The presence of certain traits of the Keith focus in the collection from the Younkin Mound (Schultz and Spaulding, 1948) suggest some contact between the people of the Keith focus and those of the Central Plains Hopewellian manifestation. The Valley I type of material may represent a Hopewellian influence on a simple Woodland complex such as the Keith focus. This would suggest that the Valley focus is, in general, later than the Keith focus and perhaps roughly contemporaneous with the Kansas City Hopewellian complex (Wedel, 1943).

Certain characteristics of the Valley Cord-Roughened ware which occur on sherds from Loseke Creek and Eagle Creek suggest that this undefined variant may have been influenced by, and be in general, later in time than the Valley focus. Although the Sterns Creek focus has not been fully defined, it may prove to be more closely related to the Loseke Creek and Eagle Creek sites than to the Woodruff Ossuary or 25VY1 sites.

Relationships to such Middle Ceramic groups as the Upper Republican aspect have not been clearly demonstrated. The ossuary burial characteristic of certain of the Woodland variants and the Lost Creek focus of the Upper Republican aspect may be a significant factor in this connection when these Woodland variants are adequately defined.

#### SKELETAL REMAINS OF THE WOODRUFF OSSUARY (14PH4)<sup>8</sup>

Some skeletal remains of not less than 61 individuals were recovered from the Woodruff Ossuary. This count is based on a consideration

<sup>8</sup> Compiled from a study by Robert B. Cumming, Jr., River Basin Surveys, Smithsonian Institution.

of the mandibles in the collection. The more numerous of the other bones counted gave figures far below that of the mandibles, e. g., right patellae 31, right calcanei 36, right tali 34, atlases 29, and axes 21. Despite the large number of mandibles, there was a remarkable scarcity of other cranial bones. The distribution of age groups as estimated from 56 mandibles is as follows:

Age group:	<i>Number of occurrences</i>	<i>Percent</i>
Infant X-2½ years-----	11	21
Child 2½-6 years-----	13	23
Child 7-12 years-----	1	1
Adult 25-55 years-----	22	39
Old adult 56-76 years-----	9	16

The estimation of age for the first groups is based on tooth eruption; that of the last two groups on general appearance and tooth wear.

An attempt to sex 26 adult mandibles, without further supporting evidence, gives the following results: 21 (81 percent) male, 1 (4 percent) female, and 4 (15 percent) probably female. Twenty-one adult innominate bones, representing at least 19 and probably 21 individuals, were examined. None of the bones could be paired on the basis of provenience and only two pairs seemed even probable, as judged from appearance and size. Of the unpaired innominates 10 are male and 7 female. Both of the two possible pairs are female; hence the percentage of females is 47 percent if the innominates are considered singly, 52 percent if two pairs are actually represented.

Of 16 adult femora, there are no definite pairs on the basis of provenience; however, upon inspection 3 pairs seem probable, 1 male and 2 female. The ratio of the sexes, if judged from individual femora, is 8 to 8; if three pairs are considered, the proportion is six females to seven males. Although a large percentage (81 percent) of the mandibles appeared to be male, the sex ratio as judged from innominate bones and femora suggest that male and female burials may have been approximately equal in number, with no evidence of a particular selection of individuals for burial in the ossuary.

An approximation of stature, calculated with the aid of the Manouvrier tables and based on the bicondylar length measurements of five male and five female femora, considered as unpaired, indicates a stature for the males of about 165.2 cm. (5 feet 5 inches) with a range of 162.7 to 169.9 cm., and for the females 157.7 cm. (5 feet 2 inches) with a range of 155.4 to 161.2 cm.

Observations of the dentition of the ossuary population were made on 28 adult mandibles, 15 complete and 13 with one side missing. Through postmortem loss, an average of 33 percent of the teeth are missing from the complete mandibles and 83 percent from the half-mandibles. Twelve of the mandibles (43 percent) have teeth containing caries, a total of 17 cavities being found in all the teeth

examined. No caries appear in 26 mandibles, representing ages of 1 to 20 years. Of the 17 cavities, 12 are apical, 3 gingival, and 2 interdental.

A total of 18 abscesses occur in 10 (36 percent) of the 28 adult mandibles. No abscesses occur in adolescent mandibles. Most of the teeth show much wear, attrition being pronounced or very pronounced in 82 percent of the adult mandibles. This extreme tooth wear, which is noticeable in early adulthood, appears to be the immediate cause of the abscesses. Evidence of a slight degree of crowding of the teeth occurs in 36 percent of the 28 mandibles. Five cases of an impacted third molar occur. In three of the five cases the third molar is very small.

Evidences of pathological conditions are not numerous, although examination of 538 vertebrae revealed three cases of fused vertebrae, one lumbar and two thoracic, indications of spondylitis deformans or arthritis. There are several cases of marked lipping in lumbar vertebrae. One lumbar vertebra shows a considerably enlarged left superior articular process, another a thickened and shortened right transverse process, and one cervical vertebra an enlarged left superior and inferior articular process. The one complete adult cranium (pl. 28; 4) contains a supernumerary incisor imbedded just below and at right angles to the left incisors of the maxilla.

In summary, the skeletal materials from the Woodruff Ossuary represent one of the few collections from the Central Plains prior to the historic period which has been culturally identified. The remains appear to represent all age groups from infants to very old adults. With the exception of one individual all of the burials were secondary. Among the adults approximately as many females as males are represented. From observations based on a limited series these "Shell Bead People" appear to have been moderate in size and lack, in general the robust characteristics of the historic Sioux and Pawnee. Pathological conditions, as indicated by skeletal evidence, were not numerous, but evidence of arthritis may be present, and because of a rapid degree of tooth wear, cavities and abscesses in adulthood were relatively common.

No direct anthropometric comparisons are possible at the present time between these people of the Early Ceramic period and those of the Middle Ceramic such as the Upper Republican and Nebraska Culture groups. Limited skeletal collections for certain of the Upper Republican groups as well as for some of the other complexes are available but have not yet been studied. Limited skeletal collections which are available from other Woodland variants in the area would also provide some data.

Cranial measurements have been taken of the one complete adult skull (Feature 16, specimen No. 14PH4-1436), and are tabulated be-

low. The cranium, which appears to be male, is deformed by a slight degree of flattening of the central portion of the occipital region and a marked asymmetry of the right occipital and right parietal. The maximum length measurement is slightly affected and the maximum breadth measurement affected to a greater degree. Views of the cranium are shown in plate 28.

All measurements were taken in accordance with the directions of Martin (1928) unless otherwise indicated.

*Cranial measurements, specimen 14PH4-1436*

Calvarium:	mm.	Calvarium—Continued	mm.
Maximum length.....	165	Nasal breadth.....	23
Maximum breadth.....	138	Maxillo-alveolar length.....	52
Basion-bregma height.....	138	Maxillo-alveolar width.....	61
Thickness left parietal.....	7	Mandible:	
Minimum frontal diameter <sup>1</sup> .....	90	Height of symphysis.....	38
Ophryonic horizontal circumference.....	483	Total mandibular length <sup>4</sup> .....	109
Sagittal (nasion-opisthion) arc.....	336	Height of body.....	30
Frontal (nasion-bregma) arc.....	120	Thickness of body <sup>5</sup> .....	14
Parietal (bregma-lambda) arc.....	122	Bigonial width.....	93
Occipital (lambda-opisthion) arc.....	94	Bicondylar width.....	114
Transverse arc <sup>2</sup> .....	313	Height of ramus.....	60
Gnathion-nasion height <sup>3</sup> .....	130	Maximum width, ascending ramus, left <sup>6</sup> .....	39
Upper alveolar point-nasion height.....	79	Minimum width, ascending ramus, left.....	28
Bizygomatic maximum.....	132	Mandibular angle.....	125°
Endobasion-nasion diameter.....	104	Indices:	
Endobasion-prealveolar point diameter.....	94	Cranial index.....	83.64
Orbital height, right.....	38	Height-length index.....	83.64
Orbital height, left.....	38	Cranial module.....	147.0
Orbital breadth from dacryon, right.....	41	Gnathic index.....	90.38
Orbital breadth from dacryon, left.....	39	Zygo-frontal index.....	68.18
Nasal height.....	56	Fronto-gonial index.....	103.33
		Zygo-gonial index.....	70.45
		Facial index.....	98.48
		Upper facial index.....	59.85
		Orbital index, right.....	92.68
		Orbital index, left.....	97.44
		Nasal index.....	41.07
		Maxillo-alveolar index.....	117.31
		Mandibular index.....	95.61

<sup>1</sup> Measured at 3 points 1 cm. above the temporoparietal suture and averaged.

<sup>2</sup> Measurement taken in accordance with Morant (1923), measurement Q<sup>1</sup>.

<sup>3</sup> No allowance made for tooth wear.

<sup>4</sup> Single measurement taken with goniometer.

<sup>5</sup> Measurement taken in accordance with Hrdlička (1947).

<sup>6</sup> Measurement taken across top of condyles.

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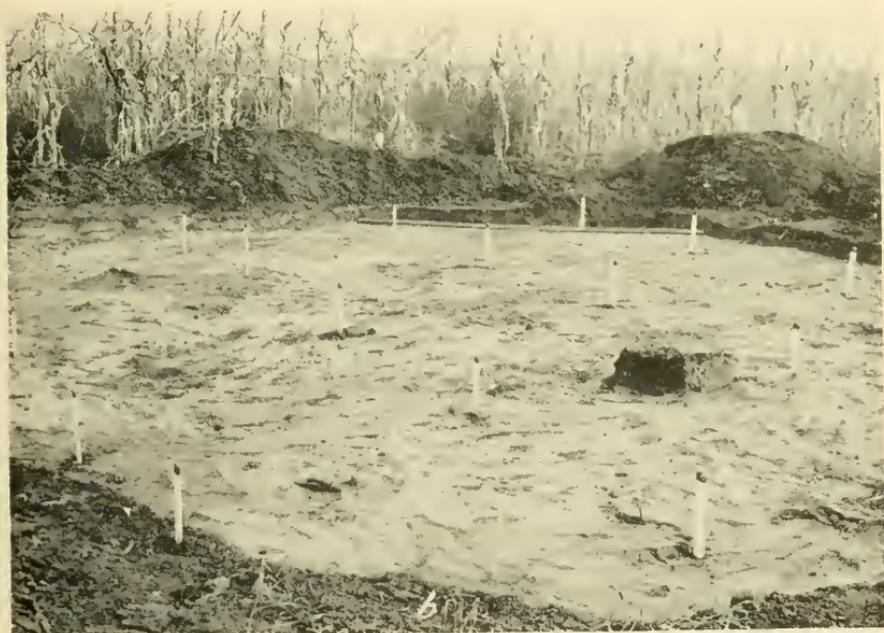
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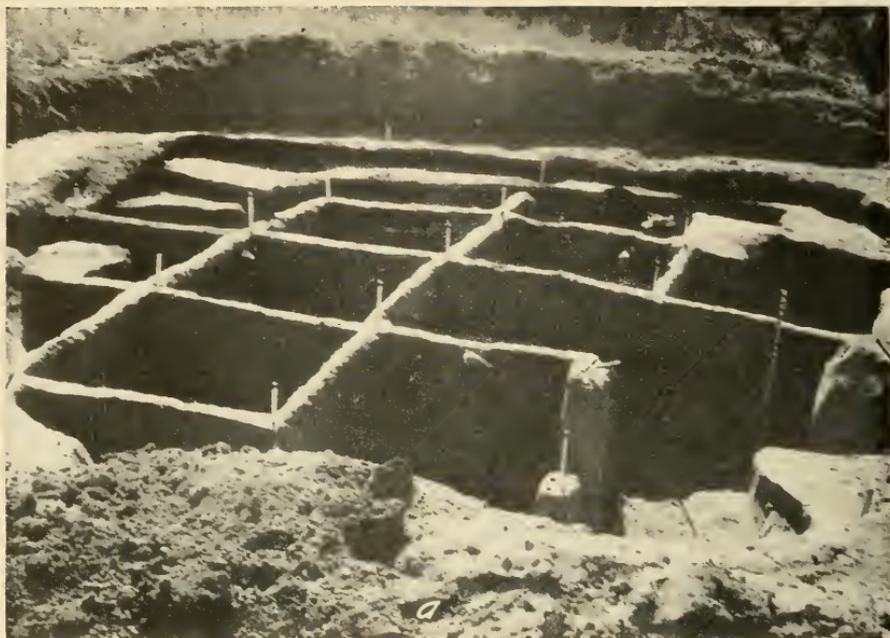
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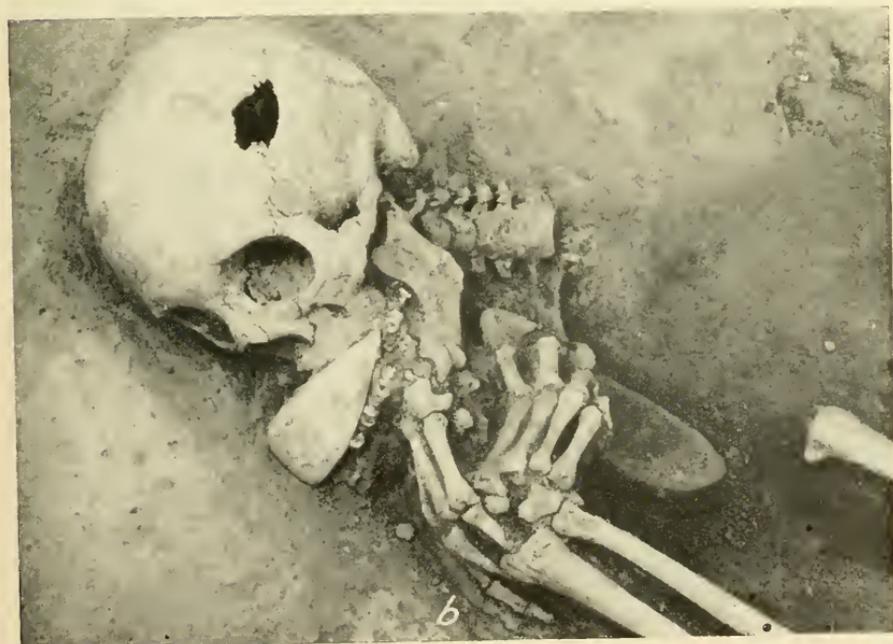
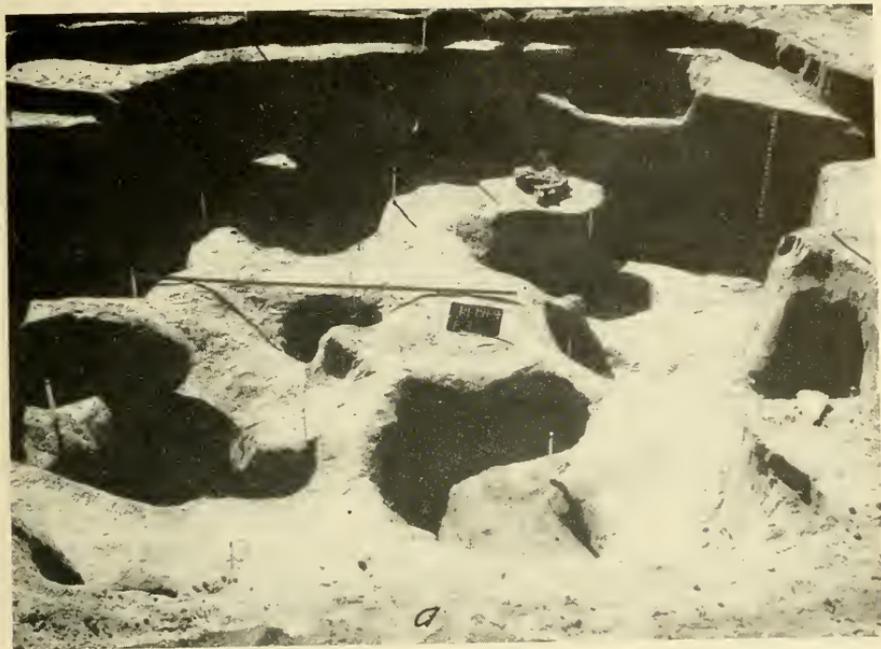




*a.* View to southwest toward Woodruff Ossuary, site 14PH4. Trees border the course of Prairie Dog Creek. *b.* Looking northeast across burial pit, site 14PH4, after the removal of plowed soil. Stakes mark 5-foot sections.



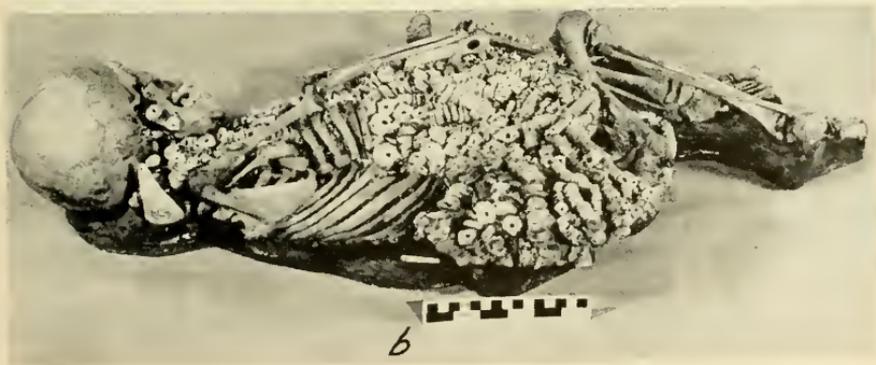
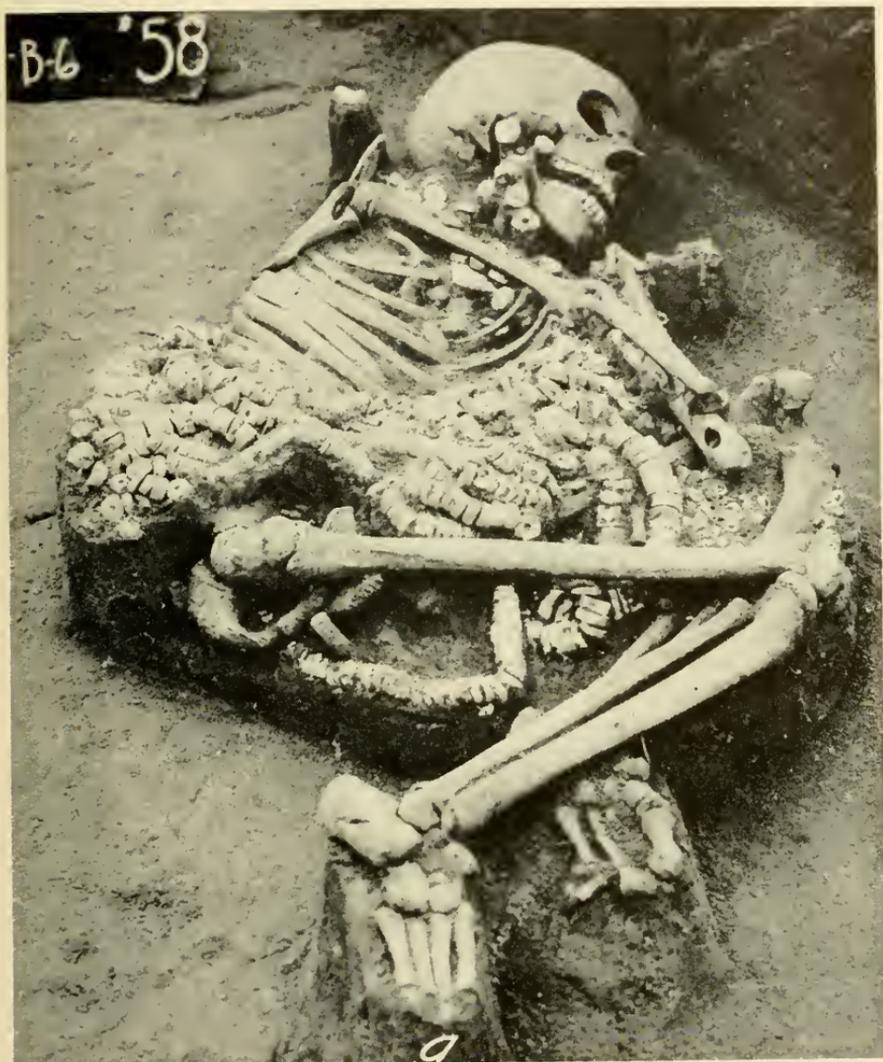
*a*, Looking southeast across burial pit, site 14PH4, showing section walls. *b*, Discoloration which marked feature 1, a pit, at depth of 12 inches, site 14PH4. Arrow points to magnetic north.



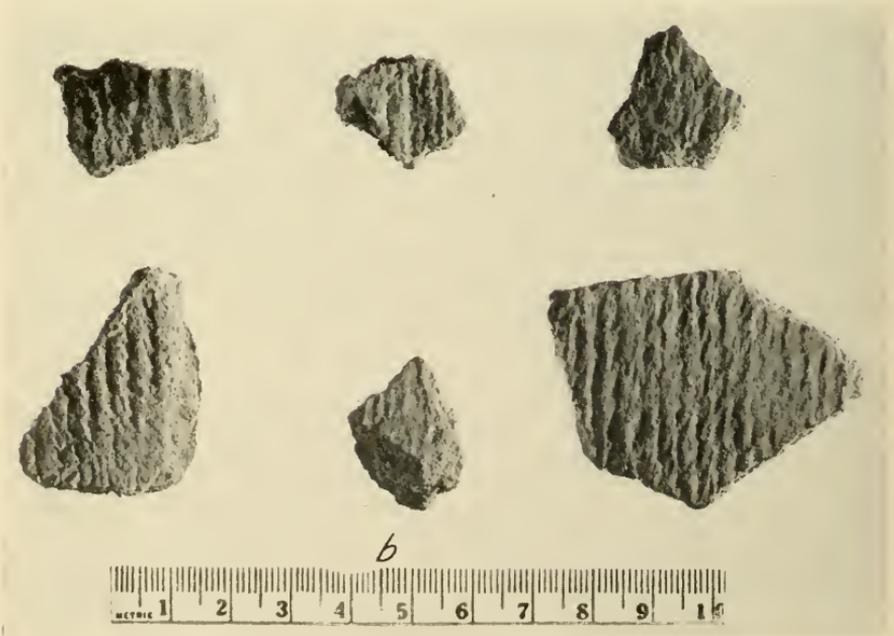
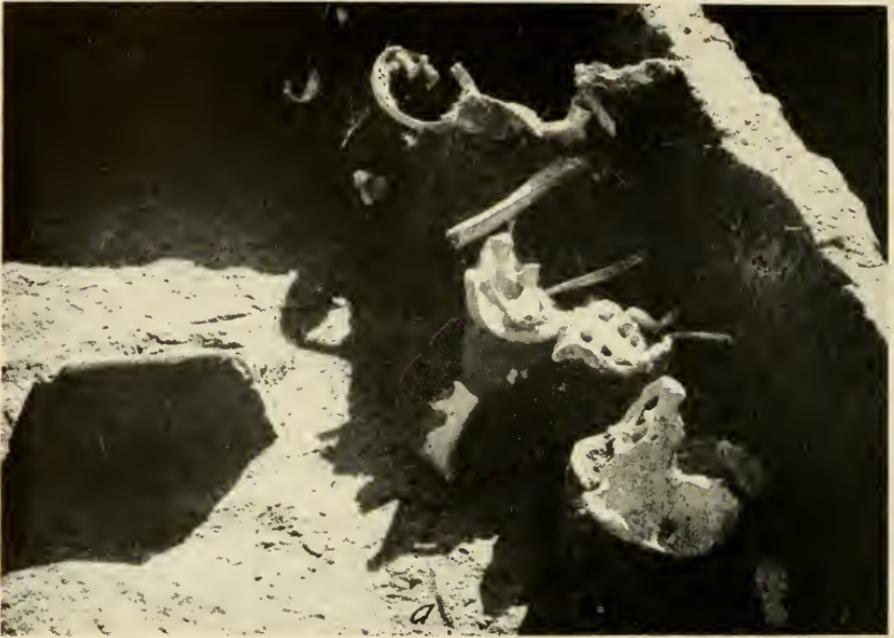
*a*, Looking south across burial pit at site 14PH4 after removal of all disturbed soil. Feature 21, the single flesh burial, remains in situ. *b*, Feature 16, site 14PH4, a partially articulated adult skeleton. Note shell ornaments near mouth of skull.



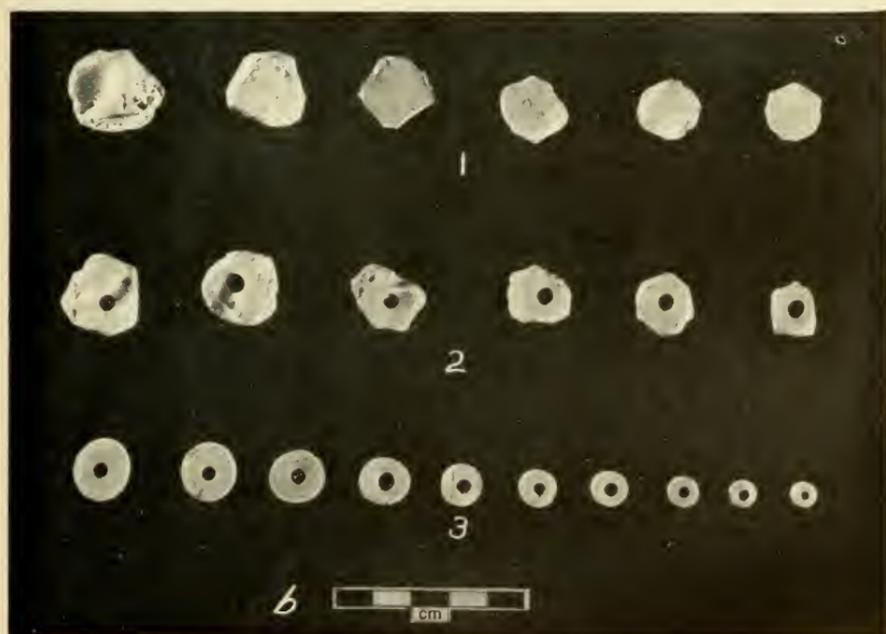
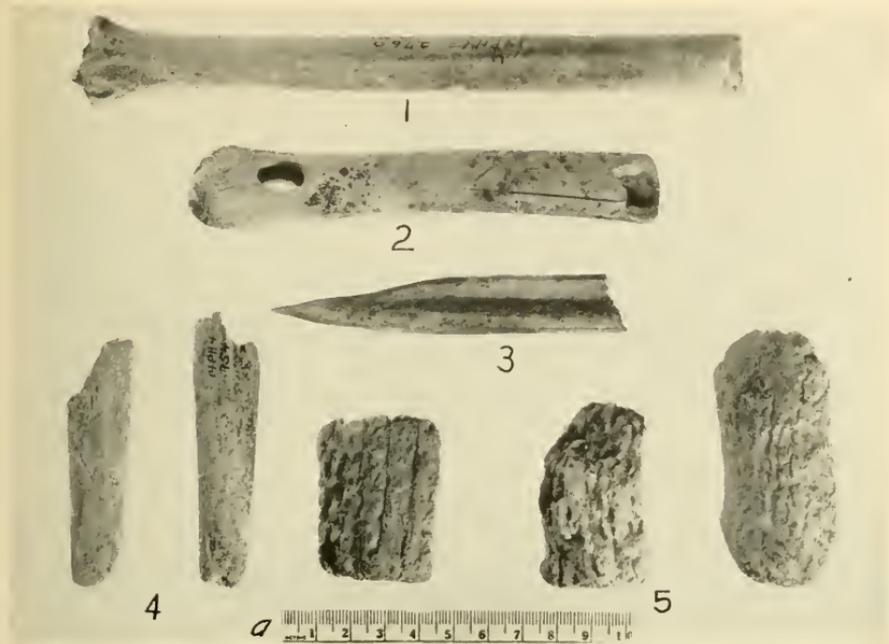
*a*, Feature 8, site 14PH4, an area of scattered human bones showing some articulation. Arrow points to magnetic north. Note alinement of beads. *b*, Feature 9, site 14PH4, a pit filled with disarticulated human bones. Arrow points to magnetic north.



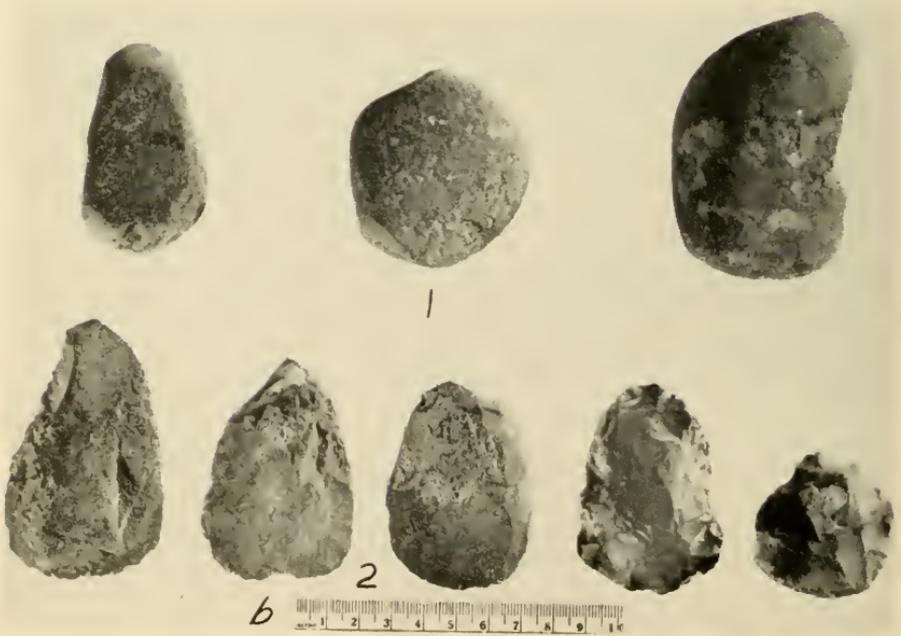
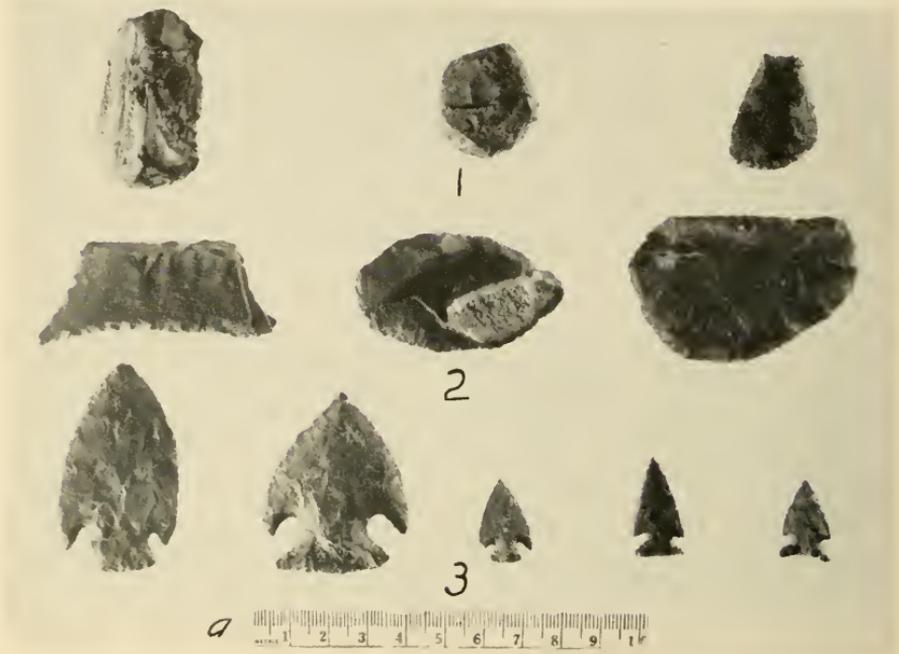
*a*, Feature 21, site 14PH4, looking south. *b*, Feature 21, site 14PH4, after removal to the laboratory in a plaster cast. Note triangular shell pendant near back of skull. Scale is metric and English.



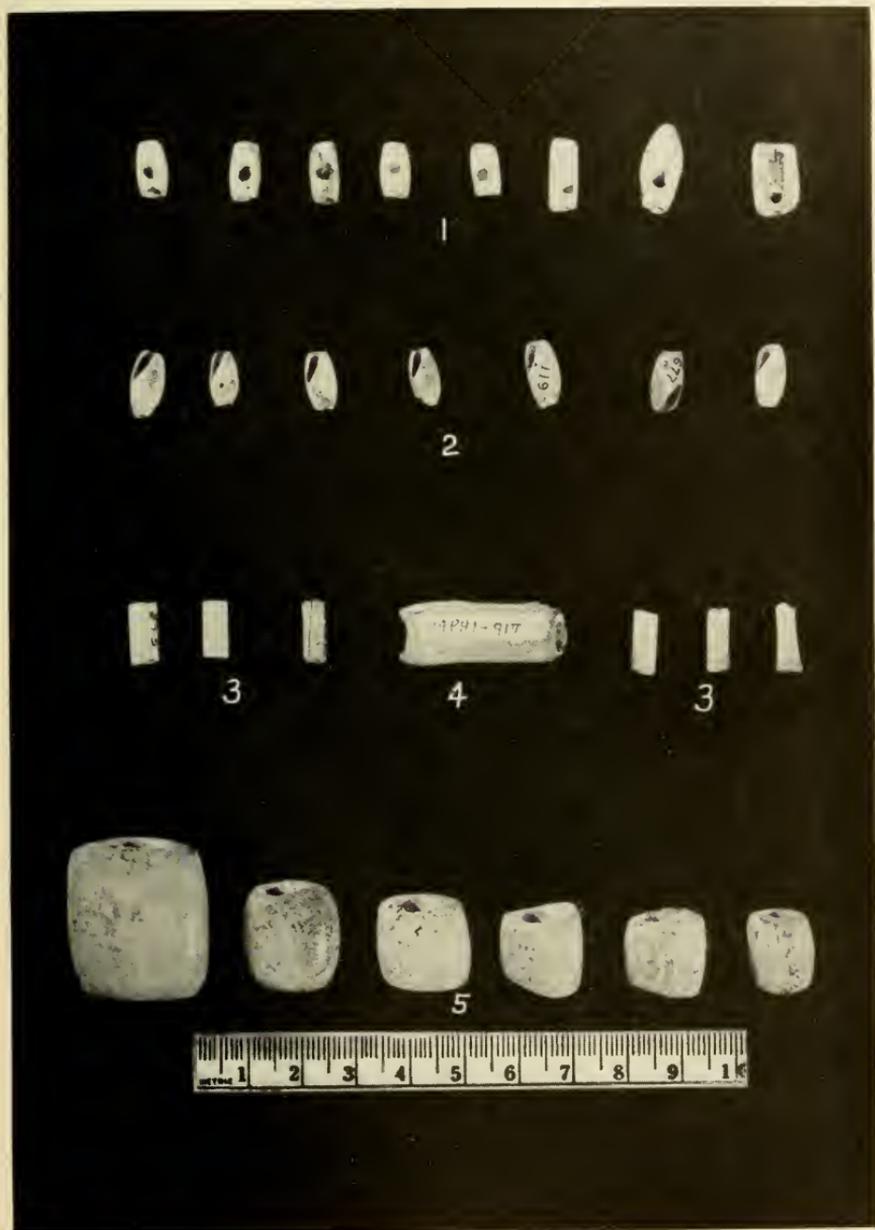
*a*, View in east area of burial pit, site 14PH4, showing typical disarticulated condition of bones. *b*, Sherds from burial pit, site 14PH4. Scale is metric.



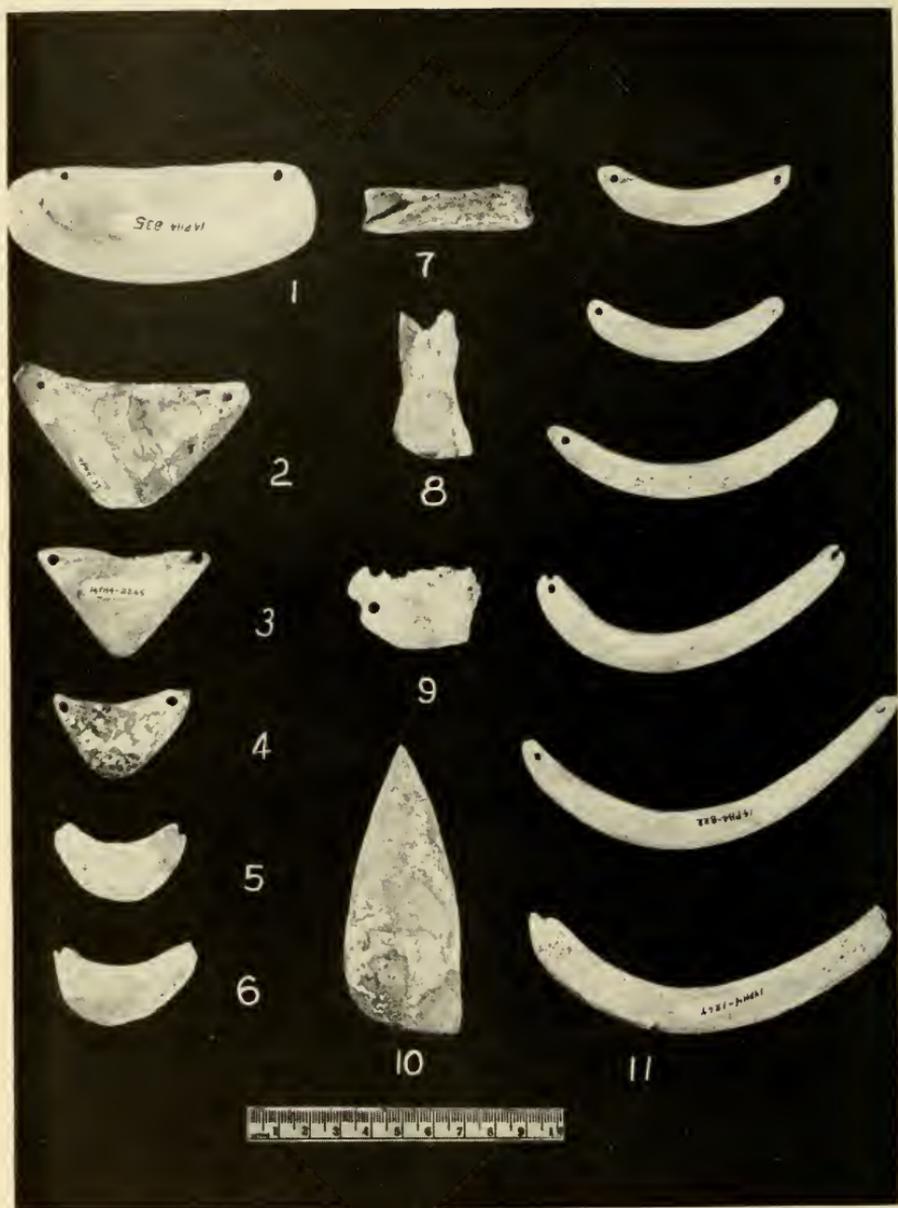
*a*, Bone and antler artifacts from site 14PH4. Scale is metric. *b*, Stages in manufacture of shell disk beads, site 14PH4. 1 Unperforated blanks; 2, drilled or partially drilled blanks; 3, finished beads, showing range in size. Scale is metric.



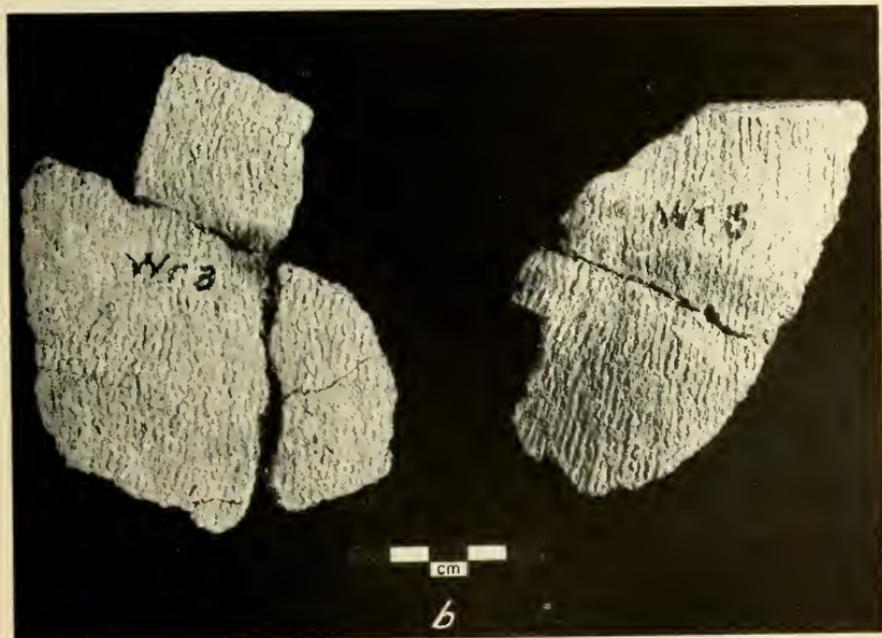
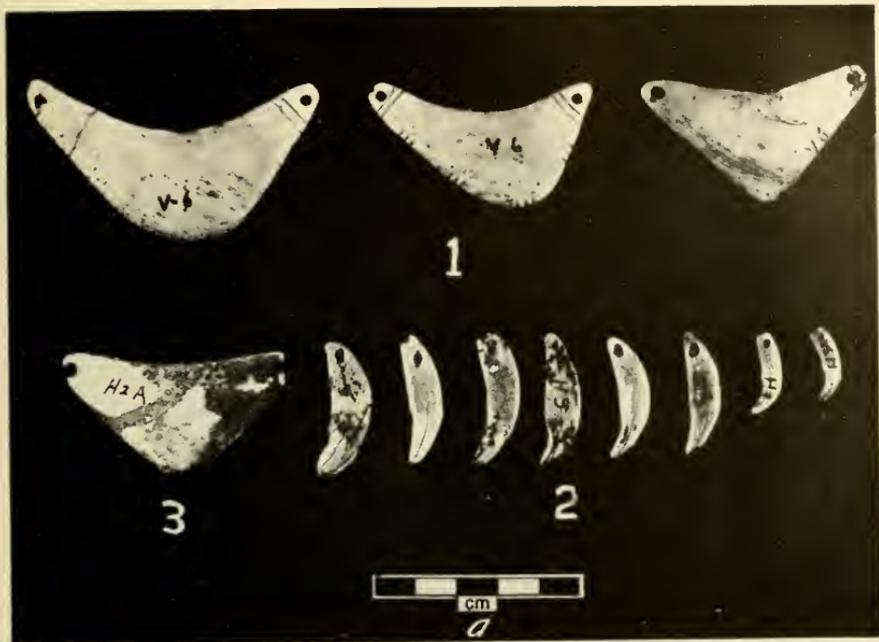
*a*, Chipped-stone artifacts from site 14PH4. Scale is metric. *b*, Stone artifacts from site 14PH4. 1, Hammerstones; 2, chipped-stone celts. Scale is metric.



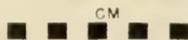
Artifacts from site 14PH4. 1 2 5, made of shells; 3, 4, of bone. Scale is metric.



Marine and fresh-water shell ornaments, site 14PH4. Scale is metric.



*a*, Artifacts from various sites. *1*, Triangular shell pendants from Robb Ossuary, site 25WT4; *2*, perforated canine teeth from Guide Rock Ossuary, site 25WT3; *3*, Guide Rock Ossuary. *b*, Sherds from Guide Rock Ossuary, site 25WT3. *Left*, Body sherd. *Right*, Rim sherd. Scale is metric.



Restored vessel of the Harlan Cord Roughened type from site 25FR8. Scale is metric.



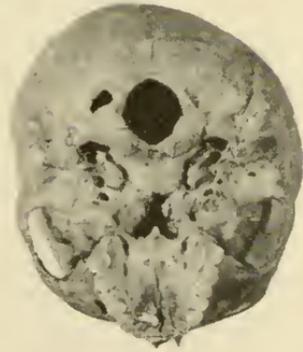
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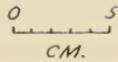
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4



Four views of male skull (14PH4-1436) from Woodruff Ossuary.