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ARCHEOLOGICAL INVESTIGATIONS AT THE HOSTERMAN SITE (39PO7) IN THE OAHE RESERVOIR AREA, POTTER COUNTY, SOUTH DAKOTA, 1956 1

By CARL F. MILLER

INTRODUCTION

The Hosterman site, named for John B. Hosterman, owner of the property, is located in sec. 36, T. 119 N., R. 79 W., Potter County, S. Dak., on a high bluff on the east bank overlooking the Missouri River about 2½ miles north of Whitlocks Crossing. It is on the western margins of the Coteau du Missouri, "that part of the Missouri Plateau section of the Great Plains province which lies east of the Missouri River." The name of the Coteau dates back to the days of the French fur traders. The bluff slopes gently toward the Missouri River, then pitches steeply into the river valley about a mile from the present stream. The former stockaded village overlooked the gently sloping plain with a broad view of the valley and the high tableland extending to the east, north, and south. The elevation of the site, 50 or more feet above the flood plain, was advantageous in the defense of the village from attack from the west because of the sharp rise of the bluff on that side.

The village site was first surveyed by Dorothy E. Fraser on August 7, 1949. She described it as

residing on a high bench 75 feet above river bottom on the north side of a small creek and now a half mile or more from the present stream bed. It is a beautiful specimen of what appears to be a really old site. River probably swept in at the foot of bluff at time of occupation. Owner extremely interested and cooperative. It was he who directed attention to this site, hitherto unknown. [3]

Paul L. Cooper revisited the site in September 1949, and he noted that there were

12-15 depressions within (the) ditch which extends from river terrace border to tributary gully at south of site. Area within ditch ca. 320' by 290' (paced).

¹ Submitted February 1960.

²An excellent study of the Pleistocene geology of eastern South Dakota, including data on the physiographic environment, climate, soils, and biogeography, was issued by the U.S. Geological Survey in 1955. (See Flint, 1955.)

³ Field notes in files of Missouri Basin Project.

House pits occur outside of the ditch to the east and northeast. Depressions rather shallow and poorly defined. Ditch is also relatively shallow throughout most of its length; varies from ca. 0.5' to ca. 2.5' in depth. [4]

Early in October 1951, Richard P. Wheeler revisited the site and put down a series of test holes within the palisaded area. He noted:

The total area (inside and outside the ditch) measures about 500' north-south and 400' east-west, and cover a little over 4½ acres. Elevation, 1,570' to 1,580'. Test pits produced evidence similar to that reported by Dorothy Fraser in 1949; a blanket of sterile silt underlain by two strata of occupation debris separated by a layer of sterile sand Windblown silt has all but obscured the house depressions and defense ditch (on the east side of the site): artifact material does not appear on the surface. A small amount of pothunting has occurred and the specimens found in an anthill in 1953 were discarded by relic hunters.[4]

I began a partial investigation of the site on June 23, 1956, at which time my crew consisted of: John Anderson, Lincoln, Nebr.; Norman Barka, Chicago, Ill.; Tyler Bastian, Stockton, Wis.; Gordon Dentry, Baltimore, Md.; Edwin Floyd, Canyon City, Colo.; Hugh Carl Jones, Provo, Utah; and Dale Osterholt, Platte, S. Dak. Mrs. Ruth Miller, my wife, acted as housekeeper and cook for the crew.

EXCAVATIONS

Prior to the beginning of the 1956 work, the major part of the site was covered with a heavy sod that had sealed in almost all of the cultural debris deposited by the former occupants, and the area to the north and east of the stockade trench was planted to watermelons. The area under cultivation showed islands of heavy cultural debris and shell material presumably marking refuse dump areas outside of dwellings. Shell deposits were heavier outside the stockaded area than inside. The surface inside of the stockade ditch was marked with a series of depressions of various shapes and sizes. The most prominent depressions were circular in outline and of various sizes, ranging from 20 to 40 feet across; the others were irregular in outline and of various depths, but none were very distinct or deep. Surrounding the main portion of the village were the remains of a stockade ditch in the form of a crescent, the open ends being to the west and southwest and terminating at the edge of the western bluff.

During excavation, it was found that the normal stratigraphy within the site consisted of a relatively distinct sod layer with its attendant root zone that extended to a depth of 0.5 foot. This zone was culturally sterile, and below it for another 1.0 to 2.0 feet was a zone of sterile windblown loess of silt and fine sand. Below the latter was the uppermost layer of cultural debris accumulated during

⁴ Field notes in files of Missouri Basin Project.



the occupation of the site. This layer was of uneven thickness and varied from 0.5 foot to 2.5 feet in thickness, depending upon the contour of the former surface and the presence of shallow pits, and below this were patches of a former humus zone that was not entirely destroyed by the former occupants of the site. Below this zone was another thin layer of cultural material that was rather spotty in deposition.

The area within the protective moat measured 269 feet from the inside, or eastern side, of the stockade trench to the brink of the bluff

on the west, and 340 feet north and south.

Before starting the excavation a north-south line, y coordinate, was established 9 degrees east of north, and an east-west line, x coordinate, was run at right angles to it, bisecting the north-south line at the 160-foot stake dividing the site into four quarters of almost equal size. The site was then staked off in 10-foot squares. Square designation was determined by the number of the stake in the upper right-hand corner of each square. Thus, square 170 is determined by having this number in the upper right-hand corner of the square.

The coordinate position of each archeological feature was obtained by scaling x and y coordinates of the approximate center of the site. Each feature was then plotted to scale on a coordinate base chart

according to the square in which it appeared.

An exploratory trench, 10 feet wide, was started at square 170 and extended for a distance of 100 feet so as to intercept four of the depressed areas in order to test their validity as house sites. At the same time other men were placed in squares 180 and 190 (fig. 25).

Along the east faces of squares 170, 180, and 190, we found the first indication of cultural material at a depth of 1.0 foot below the root system of the present sterile windblown grass-covered loess. Progressing westward this layer slowly decreased and the overburden of sterile material became noticeably greater. The upper portion of this cultural debris consisted mainly of small fragments of bone. Sherds were derived from the top 0.2 foot of this deposit whereas the number and size of the bone fragments increased as the distance downward was increased. Entire bones were found at the base of this level. Artifacts were few. A small unnotched isosceles triangular projectile point and a badly decayed bear's jaw were recovered from this bone layer.

The main purpose of cutting this exploratory trench across the area was to test the four depressions that were thought to be the remains of dwellings. None of them proved to be such. They were either cattle or bison wallows. The house structures uncovered were not manifested in any way by surface indications. Other areas tested where depressions occurred proved this contention.

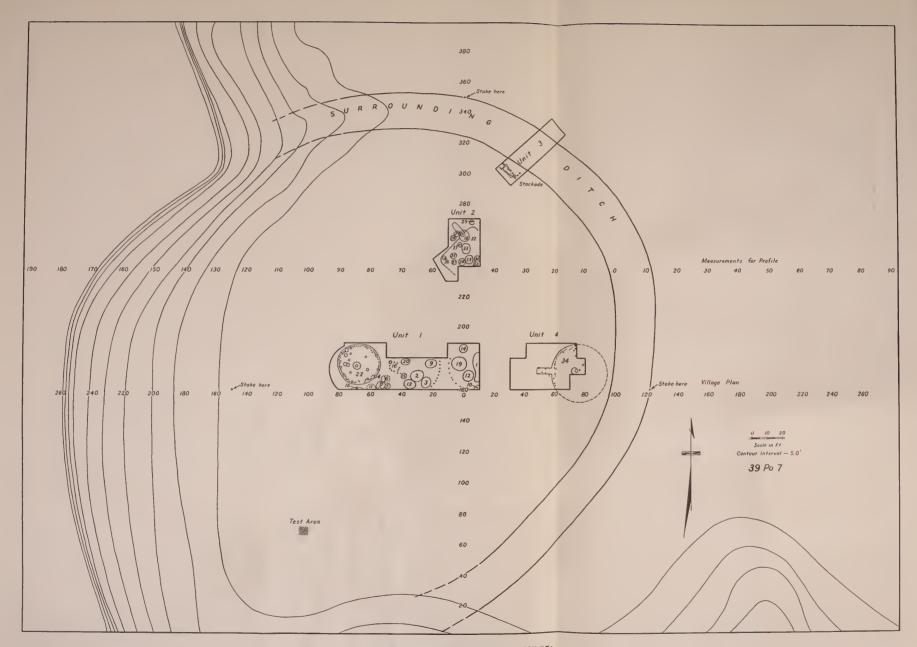


FIGURE 25.—The Hosterman site (39PO7).



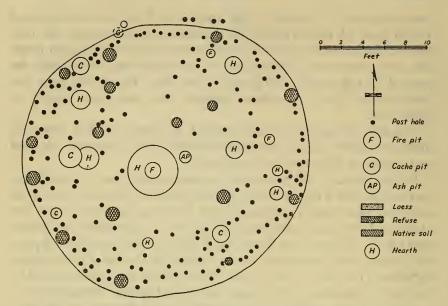


FIGURE 26.—Feature 22, Hosterman site.

Near the west end of the exploratory trench we located and completely uncovered the remains of a circular structure, Feature 22 (fig. 26). Once the house pit was outlined, all of the fill was passed through screens down to within 0.5 foot of the floor. This portion was carefully removed by trowels; the material was screened and placed in separate containers. Even with all this care we recovered very few artifacts from the zone.

After the floor had been cleared, the various features, such as postholes, cache pits, and firepits, were cleaned of their contents. Anything found within any of these features was kept separate from that found on the floor. Later the surrounding area was explored in order to locate the entranceway or any other feature that might have been associated with the structure. We not only failed to find any evidence of a passageway, but we found nothing that we could positively associate with the house structure.

Cache pits within the house floor ranged from small shallow depressions to fairly large bell-shaped pits of a size sufficient for an average-sized man to squeeze into easily. Most pits contained loose soil; some had an occasional artifact and the larger bell-shaped pit was completely filled with disarticulated bones and very little soil.

FORTIFICATION DITCH

The fortification ditch began to the northwest of the site and proceeded eastward along the north side, gently curving to the south. Along the east side it continued around to the south to a place where

it gradually blended into the steep sides of a gully, thus surrounding the major portion of the occupation area. On the surface it appeared as a shallow trench almost 20 feet wide and of various depths. The greater depths were found in the northern section; the eastern section displayed the shallowest.

Selecting a place where the ditch was the deepest, we cut a 10-foot trench not only to cross-section the ditch but to determine if any remains of a stockade still persisted. Six-inch levels were maintained at all times. The trench walls exposed four distinct humus zones; the uppermost averaged 0.4 foot in thickness and incorporated the grass roots of the present ground cover. Underlying this was a layer of sterile loess 1.2 feet in thickness. Beneath this was a second humus layer 0.5 foot in thickness. This in turn rested upon 1.6 feet of sterile loess, and beneath this was the third humus zone, which averaged 0.3 foot in thickness. Underneath was a very thin zone, 0.2 foot in thickness, of very fine silt, which rested upon a deposit of midden 0.4 foot in thickness. Beneath the midden layer was the earliest humus zone, which measured 0.3 foot in thickness. humus rested upon a 0.3 foot zone of sterile loess, which in turn covered 1.2 feet of laminated silts deposited in the original bottom of the ditch as constructed by the inhabitants of the site (fig. 27).

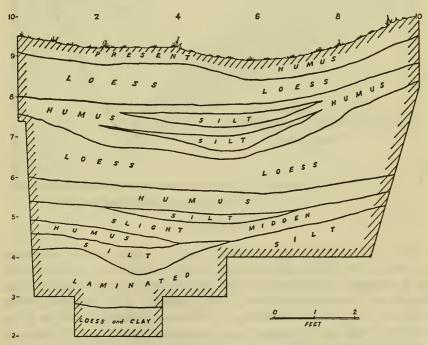


FIGURE 27.—Cross section of the fortification ditch, Hosterman site.

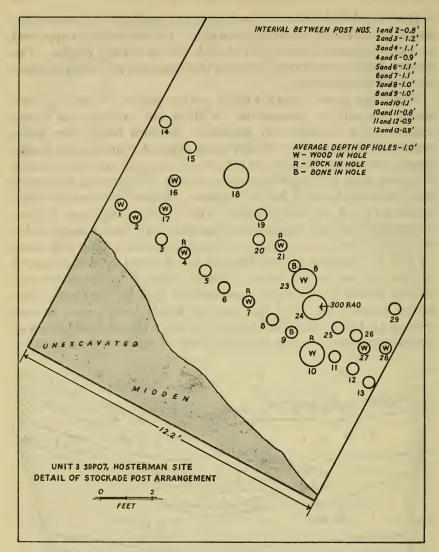


FIGURE 28.—Detail of stockade post arrangement, Hosterman site.

PALISADE

The stockade (fig. 28) appeared on the village side of the ditch alined in two rows; remnants of several of the original posts were still in place. Contact was made with the tops of the postholes at a depth of 2.5 feet beneath the present surface. The average interval between posts was about a foot. The average diameter of the holes was 0.8 foot, but the larger holes measured slightly over 2.0 feet in diameter. In a number were found sections of bones and several stones that were used to wedge the post firmly in place. Whether the

double stockade was erected at the same time or represented an interval of time could not be determined, for both lines of posts originated on the same level. It is suspected that the two structures were contemporaneous, since the site appeared to have been occupied for only a short time.

HOUSES

Houses were of two general shapes: round or circular and rectangular. Apparently the rectangular house, which was partially uncovered, was of an earlier period than the circular houses. One circular house was completely excavated, and only a part of another was exposed.

Circular structures, Features 22 and 34, are characterized by a circular pit that was excavated at various depths, depending upon the inclination of the builder, into the sterile native soil. We found no signs of any plaster being used on the walls of the pit, and the floor was firmed by trampling. There were four centrally placed roof supports set in a rough square surrounding the centrally placed firepit. Such pits were basin shaped. When these were uncovered we found them completely and firmly packed with a whitish ash that could have resulted from the burning of cottonwood or buffalo chips. Cottonwood, which does not burn with a high heat, was likely used, since not only the basin itself but the area around the basin was burned a brick red. Scattered over the floor between the central four supports and the edge of the floor were a number of smaller postholes and a number of pits, some of which were used as cache areas and others for midden disposal. Placement of the wall posts showed some variation, which also must have been true for the superstructure.

In Feature 22 there were 10 large peripheral posts incorporated within the wall that were more or less evenly spaced around the circumference of the structure. The intervals between these were filled with fairly evenly spaced smaller posts. Precedent indicates that the round houses of the Plains were entered by way of a roofed and walled entranceway constructed at right angles to the line of the two primary roof supports. Such a structure was not found connected with this house.

Postholes appeared as either soft spots or darkened circular areas in the house floor. Their diameters varied from 0.25 foot to 2.1 feet and in depth from 0.3 foot to 3.5 feet. In most cases the holes were filled in with a light, fluffy soil, and sometimes the butt end of the former posts still rested therein. In several of the larger postholes were sections of bison bones and ribs or waterworn cobbles that were inserted as wedges to stabilize the posts. Field examination of the wooden fragments indicated that most of the posts were of cotton-

wood; only an occasional piece of juniper was used. Probably the use of cottonwood was due to the fact that it grew readily at hand in the nearby bottom lands, whereas juniper had to be transported from a greater distance. The general practice probably was to choose the material closer at hand.

Within the floor area we found the same variation as to the placement of pits. In Feature 22 there were a number of pits. Some were undercut and bell shaped; others were straight sided, and still others were what we have called pocket caches, for they were small and shallow. All appeared to have been dug while the house was occupied, for they all originated at floor level. In Feature 34, which was only partially exposed, we found no floor pits outside the centrally placed firepit.

Lehmer (1954, p. 31) suggests that

other holes in the floor may have contained wooden mortars after the fashion of the historic Arikara and Mandan. These holes were cylindrical, somewhat larger than the largest postholes, and were always located more or less on a line between the firepit and the entrance. They were generally slightly offset toward the entrance from a line connecting the eastern pair of primary roof posts.

Of all the structures investigated, none was burned. It would appear that they were abandoned and allowed to decay gradually, leaving no tangible evidence as to the arrangement of the elements of their superstructure.

On the other hand, Feature 32 was characterized by a rectangular pit of considerable size with rounded corners and outlined with small individual posts more or less uniformly spaced. The west wall was completely excavated, and also parts of the north and south walls. Again, there was no evidence of the use of plaster on the walls of the pit. The floor of native material was firmly packed. Entrance into the structure was gained by a walled and roofed passageway from the west-northwest, overlooking the river and the bottom land. There was no evidence of any antechamber. Several hearth areas were uncovered within the area of the structure. No arrangement of central roof supports could be found. Whether all of these hearths were coeval with the structure could not be determined, for there was some indication that the whole area had been worked rather intensively by the Indians after all traces of the structure had disappeared. There were several large deep refuse and cache pits present in the area.

The wall posts, when first found, appeared as small soft circular spots along the periphery of the house floor. When cleaned of their contents they were found to be cylindrical with a rounded base averaging 0.3 foot in diameter and 0.9 foot in depth. A number of them did contain some midden material.

The arrangement of the posts inside the house and the entranceway would suggest that some sort of baffle or screen must have been put up to shield the occupants from the chilly north winds of winter. While working at the site we noticed that the prevailing winds were out of the north and south rather than from either the east or west. Whether there is a change during the winter months is not known, but there must be some correlation between the wind direction and the placement of the entranceways. Then, too, the Missouri River is to the west of the site. Perhaps these two factors may have determined the placement of entranceways.

Circular houses were characterized by being more or less round in outline and sunk into pits that now occur from 1.8 feet to 2.8 feet below the present ground level. There was no sign of plastering on any of the walls, and the floors were firmed simply by trampling the bottom of the pit. In cross-sectioning the floors we found that no surfacing material was brought in to cover the floors. Despite extensive search we failed to find the entranceways into the circular houses, especially in Feature 22. Houses in comparable sites normally have definite passageways leading into them. They were constructed at right angles to the line of wall posts and were walled and roofed with the posts set into well-defined holes. Entrance floors usually rose somewhat at the end away from the house.

There was some variation in the number of central roof supports. One of the circular houses had four, which appears to be the conventional number in the Plains, and another had five. There was also considerable variation in the construction of the superstructure of the individual house. The number and size of the poles that went into the superstructure could vary considerably in their placement.

The main firepits were always located at the center of the house floor and were basin shaped. The floor area around these fire basins nearly always was burned as much as the walls of the firepit. From this condition it would appear that no one ever took the time to clean out the pit once a fire was started. Ashes were allowed to accumulate, becoming firmly packed as time went on. As the basin became filled and fires kept burning over it, the heat of the fire spread over the floor area surrounding the pit, changing the physical structure of the clay floor. Such evidence throws insight into the character of the Indian housewife. She was either too busy with her other chores to take the time to carry out the ashes or it was customary to leave them.

Small hearth areas were found scattered around the perimeter of the floor, probably representing individual cooking fires that were built to supplement the heat given off by the central firepit. It would appear that each house furnished shelter for more than one family.

Floor pits were not excessively numerous. Some were bell-shaped, others were cylindrical, while the smaller examples were shallow basin-shaped pits probably dug to hide certain objects. All appear to have been constructed during the life of the house. Some were definite cache pits and others were midden disposal areas.

FEATURE 22

Shape: Circular in outline.

Dimensions: Diameter, 26.0 feet east-west; 27.0 feet north-south. Depth of pit from present surface, 3.0 feet.

Pit walls: Vertical unfaced midden and native soils.

Floor: Trampled bottom of the pit.

Roof supports: Five primary central posts arranged around the central fire basin. Other large posts were spaced at irregular intervals around the perimeter of the house floor and interspaced with a ring of smaller posts, some of which may have supported a sort of bench or platform as well as afforded storage racks.

Entranceway: No such feature could be determined. It was probably thought to have joined the structure from the west or northwest if such a feature ever existed.

Firepits: Large centrally located basin filled with compact whitish ash. Slightly to the east-northeast was a smaller firepit containing firmly packed whitish ash.

Hearths: Several were scattered around the perimeter of the floor.

Floor pits: Five such pits occupied positions within the floor of the structure.

Three were bell shaped and filled with some ash, midden material, and a few artifacts. One such pit was filled completely with the disarticulated bones of an antelope. The smaller cache pits contained a few projectile points or scrapers.

FEATURE 34

Shape: Circular in outline.

Dimensions: Diameter, ca. 40.0 feet east-west; 30.0 feet north-south. Depth of pit from present surface, 3.5 feet.

Pit walls: Unfaced refuse and native soil.

Floor: Trampled bottom of pit.

Roof supports: Four primary posts and a row of posts outlining the floor area.

Some of the smaller floor posts may have served as supports for benches or platforms as well as storage racks.

Entrance passageway: Opening to the west. There were some well-defined postholes on each side of the entranceway and this sloped slightly upward.

Floor pits: One vertical-sided pit just to the north of the entranceway that might have contained a wooden mortar. To the north of this was a small cache pit slightly bell shaped in cross section. To the east of the mortar pit was a small basin-shaped pit containing a few sherds.

Firepit: Centrally located basin filled with compact whitish ash that was superimposed upon an earlier hearth area.

Associations: None.

Comments: This structure was found to the east of a surface depression and showed no relationship to the depression.

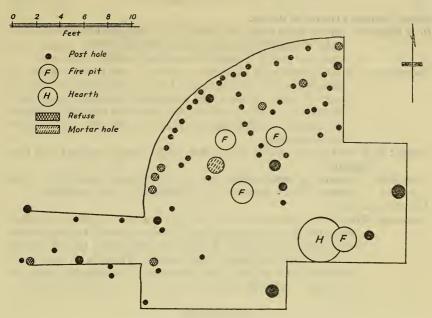


FIGURE 29.—Feature 34, Hosterman site.

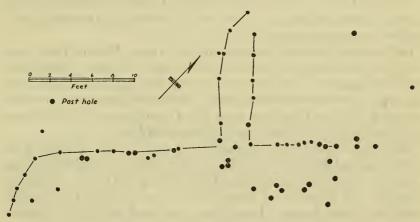


FIGURE 30.—Feature 32, Hosterman site.

FEATURE 32

Shape: Rectangular with rounded corners.

Dimensions: 32.0 feet by ? feet. Depth of pit from present surface, 2.0 feet to 2.3 feet.

Pit walls: Unfaced refuse and native soil.

Postholes: Holes indicate wall posts were rather small, averaging between 0.25 foot to 0.3 foot in diameter. These were very definite in outline but rather shallow, which would seem to indicate that posts leaned against some sort of support and were not firmly planted into the ground.

661-932--64---12

Floor: Trampled bottom of the pit.

Roof supports: Several large posts were arranged in the walls which were probably crotched and upon which stringers were placed. No post was found to support the central portion of the roof.

Entranceway: A concentration of postholes occurred in the vicinity of the inside entrance to the house, a fact which may indicate that some sort of screen or baffle was constructed here as a windbreak.

There was an absence of any step down into the house from the entranceway, which opened to the northwest with a slight curve at the opening.

Firepit: It is not certain that the hearth uncovered actually belonged with this structure.

Floor pits: A number of large refuse and cache pits were found within the confines of the structure; they appeared to be secondary.

Associations: None.

Comments: The fill was practically sterile within the structure. About 0.15 foot above the floor there occurred a change in color and texture of soil. It appeared to be of humic origin. A few bits of midden were scattered throughout this deposit. Whenever a large cache or midden pit was found there occurred a corresponding break in this stratum, indicating a secondary origin for these features.

CACHE PITS

In general, cache pits were of two general shapes: bell shaped with narrow mouths and flaring out toward the bottom, and comparatively shallow saucer-shaped ones.

Bell-shaped pits varied considerably as to size. Most of these were fairly large and deep but there were a few that were much smaller and relatively shallow. The latter occurred mostly inside structures and the larger ones were scattered throughout the village area and outside of houses. Pits of this shape were found to originate at depths ranging from 2.0 feet to 2.6 feet from the present surface.

On the other hand, saucer-shaped pits showed greater variation as to overall size and depth. Pits of this shape originated at greater depths, from the present surface, ranging from 3.2 feet to 4.5 feet. Some apparently were borrow pits, where the soil was obtained to cover the outsides of their houses. Later these were used as midden disposal areas.

Whether these points of origin designated their relative age within the site is suspected as an index but when the contents of both types were compared there was practically very little difference in the general overall contents. The bell-shaped pits were always richer in cultural remains, whereas the saucer-shaped pits were more or less on the lean side. From all appearances the earlier ceramic forms would seem to be confined to the saucer-shaped pits.

Plotting the depths of the origins of both types of pits on a chart shows, more clearly, the placement and separation of the types as to depths (fig. 31).

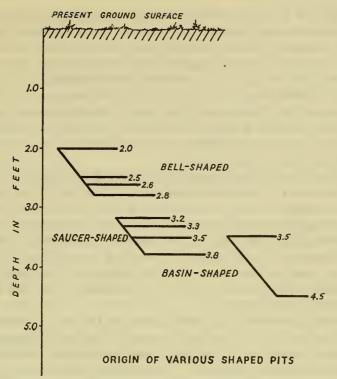


FIGURE 31.—Origin of various shaped pits, Hosterman site.

SLAUGHTERING OR BUTCHERING AREAS

Four unique features, 12, 13, 14, and 19, distinctive for the Hosterman site, were uncovered. These consisted of large basin-shaped pits with parts of articulated bison remains resting within. Not all portions were articulated. The appearance of the remains would suggest either slaughtering or butchering areas; possibly both functions were represented.

Being basin shaped, the top of Feature 12 was first picked up at a depth of 3.5 feet from the present surface. Three-tenths of a foot deeper the outline of the pit was distinct. At this depth it measured 8.0 feet in maximum length and 7.0 feet in maximum width. Later the base of the pit was found to be comparatively flat and at a depth of 6.7 feet from the present surface. Inside were not only the articulated sections of vertebrae, and individual bones, but the skulls of two bisons. From the arrangement of the bones, it was surmised that this was a slaughtering or butchering area inside the village proper and that animals were brought in, butchered, and the unwanted sections discarded.

The larger and heavier of the two skulls, apparently that of a bull, with complete mandibles still in proper articulative position, had both horns missing. These apparently were severed from the skull by means of heavy blows with a stone maul or some similar object. The fact that the lower jaws were complete and still in proper place would exclude the idea that the tongue, a prized delicacy, was removed by the people of the Hosterman village site. The other, a badly decayed light skull of either a female or a calf, still retained both of its horns. From the general appearances, it likewise had not been mutilated to secure the brains, tongue, or muzzle.

The presence of these two comparatively whole skulls, the articulated sections of vertebrae, scapula, as well as individual bones, all within a small confined and constructed area, attest to the fact that these animals were transported into the village from some unknown distance and dressed there. Since there were no artifacts within the pit or closely associated with these remains, we could not determine whether these animals were killed by means of bows and arrows, spears, bison kills, or were drowned in the nearby river and dragged to the village to be butchered.

Feature 13 resembled Feature 12 in that the basic characteristics were the same: the comparatively round, shallow, basin-shaped pit that contained not only individual bones but whole sections of animals still in articulative condition. This specially constructed pit originated at a depth of 4.5 feet from the present surface, measured 7.8 feet in maximum length, 6.4 feet in maximum width, with a depth of 2.9 feet. Resting therein were the articulative hindquarters of a single bison together with its caudal vertebrae. The impression was that the flesh of this particular animal was mostly wasted, for most choice cuts are derived from this part of the animal. There is no telling whether the Hostermanites cut away the heavy flesh from the bones, took the kidneys and kidney fat, and left the undisturbed bones to be covered over with clean wind-blown material as we found them.

Feature 14 has been labeled as "slaughtering area number 3," in that it, too, conformed to the generalized pattern established by both Features 12 and 13. Like the others, the pit was found at a depth of 4.5 feet from the present surface; it was saucer shaped; it measured 6.8 feet in maximum length, 4.8 feet in maximum width, and had a vertical depth of 1.2 feet. Resting therein were sections of vertebral columns, all articulated, and portions of leg bones. Like the former areas this feature was barren of any midden material. Clean, windblown sand surrounded the bones. This was the smallest of the slaughtering areas.

Feature 19, the largest of the slaughtering areas, had its origin 4.5 feet below the present ground surface. It measured 10.6 feet in maximum length, 10.0 feet in maximum width, and had a vertical

depth of 2.5 feet. This pit, like Feature 12, contained the skulls of two adult animals, together with individual bones, articulated sections of vertebral columns, and other portions all in proper alinement. Horn cores were intact and the muzzle portions were not complete, a fact which may indicate that portions of the nasal cartilages and upper lips were removed. White (1954, p. 167) surmised that these portions were probably considered a delicacy similar to those of the moose, which the northern Indians converted into a rich stew. From the appearance of the skulls these portions were removed while in the butchering area.

Caudal vertebrae of one individual were in place, indicating that the

tail was not always removed along with the hide.

Superimposed above this feature were a number of random post molds. A sterile layer of loess and sand, 1.3 feet in thickness, separated the two features. None of the postholes were deep enough to penetrate into the mouth of the slaughtering area. There is a definite time differential between the two.

All four of the butchering areas had their origin at a greater depth than any of the other features located. This would indicate that they represented the primary occupancy of the site. Whether this was the nucleus out of which the village was established or was just a hunting campsite could not be determined, since only a very small portion of the site was investigated through excavation. I lean toward the theory that these were probably the remains of an early hunting camp near a place that bison frequented, since there were no cultural remains found in direct association with these features.

MIDDEN PITS

After a time lapse and at a higher level in the site, we found that the midden pits, which were probably early borrow pits, tended to be saucer shaped and fairly shallow, with the exception of Features 10 and 20. Feature 10 had a vertical depth of 4.1 feet; Feature 20 had a vertical depth of 5.3 feet. Other saucer-shaped pits were: Features 2, 3, 15, 16, 23, 24, 27, 33, and 35. Feature 35 was the shallowest of the series, being only 0.3 foot in depth, and Feature 16 was the deepest, being 2.2 feet in depth. Some were circular in outline, another was quasi-rectangular with rounded base, and one had an irregular outline with walls sloping in toward the center. All contained some midden mixed with loess. Depths from the present surface ranged from 3.2 feet to 3.8 feet (see chart of depths for the various types of pits (fig. 31)).

Deviating from the norm were Features 10 and 12. Instead, their contents appeared to have been richly mixed with humus and very loosely inserted into the pits. In other features the pit fill leaned

toward the compact and had to be troweled out. In Features 10 and 12 the fill could be lifted out by the unaided hand.

The rest of the pits originated between 2.0 feet and 2.8 feet. These were bell shaped and probably were initially intended for storage purposes. When no longer needed or used for storage, they were converted into midden disposal areas. Their overall sizes varied. Some contained more midden material than others, but in general they followed a pattern. (See table 1.)

Table 1.—Pit measurements (feet) and general shapes

Feature No.	Depth from surface	Maxlmum length of base	Minimum length of base	Depth of feature	General shape
11	2.2.5 6 8 2 2 2 2 2 2 3 3 3 5 5 5 8 5 5 5 8 5 5 5 5 8 5 5 5 5	4. 0 7. 6 8. 0 3. 0 7. 5 9. 4 5. 8 4. 6 8. 2 12. 3 3. 0 7. 0 8. 8 8. 8 9. 8 10. 6	4.0 7.1 7.6 2.4 7.3 9.1 4.3 5.5 3.0 2.2 5.0 2.8 3.0 7.1 9.0 2.6 6.8 6.4 4.8	2.5 5.3 7.4.8 5.3.7 1.3 9.85 1.1 2.2 4.1 1.3 5.3 5.3 2.0 9.2.9	Bell shape. Saucer shape. Bell shape. Vertical wall. Bell shape. Do. Do. Saucer shape. Do. Do. Do. Do. Do. Do. Do. Do. Do. Bell shape. Saucer shape. Do. Do. Do. Do. Do. Do. Do. Do. Do. Do

ARTIFACT MATERIAL

POTTERY

During the course of the excavations at the Hosterman site numerous fragments of pottery, of various sizes, were found. They occurred most abundantly in cache pits, in some quantity in the shallow pits under house floors, in postholes, and in small isolated midden heaps. Only a few were recovered while we were sectioning the fortification ditch that surrounded the site proper. Pottery was practically absent from the surface, since the cultural deposit was rather deeply buried. Occasionally, small bits were found around a few of the gopher holes or where some pot hunter had dug in the past.

Practically all of the pottery remains were those from vessels. They exhibited a paste made by mixing the natural local clays with a tempering material of crushed igneous rock; the resulting paste is quite uniform insofar as hardness, color, and firing practices are concerned. Color ranges from buffs and tans through browns to various shades of grays to soot black. Fire clouds are fairly common. Texture is me-

dium to coarse, and there is a common tendency to develop internal cleavage planes parallel to the vessel walls that is mainly due to the method of manufacture. All vessels were either modeled or made by using the paddle and anvil method. Insofar as we can determine, all of the vessels were basically jar shaped, globular in outline with vertical or S-shaped necks, and medium to large in size. Vertical necks are medium to high; some with slightly everted rims. There are various modifications in the S-shaped variety. Vertical types predominated over the S-shaped variety. A few miniature and unusual forms are present but they constitute only a fractional part of the ceramic complex. Handles, although of various shapes, are not numerous.

Most of the sherds—since this is a study based solely on sherds rather than on whole vessels—have smoothed exterior surfaces, but there is strong evidence that a grooved or thong-wrapped paddle was used during the last stages of manufacture and later this exterior surface treatment was partially or entirely smoothed over. The paddle striations covering the major part of the exterior surface are vertical or nearly so. Once the exterior surface has been smoothed it may be given a number of different treatments. Necks may be vertically brushed and the upper parts incised; the shoulders may be incised, covered with the original simple stamp, brushed, or even smoothed over and left plain. Lips, upper rims, and shoulders were the favorite portions of vessels to be treated. They may be incised, punctated, impressed, pinched, or left plain.

As in other archeological areas of the United States, entirely too much stress has been placed on the ceramics in the Plains. In truth, this trait was only one of the many that made up the economy of these people; however, there are many other traits, though of less permanence, that were of greater importance to the makers and users of these forms. Only because of its permanence and durability does pottery overshadow, in quantity, the rest of the cultural remains. Then, too, it does reflect considerable responsiveness to cultural changes, through time and space, in the kinds of decoration used, the shapes of the vessels themselves, methods of manufacture, and other features.

Wheeler's (1954, pp. 3-4) definitions for morphological parts of the vessel have been standardized as follows: "The lip is the juncture of the exterior and interior surfaces of the rim; the rim is the section between the orifice and the neck; the neck is the point of maximum constriction, or the point of marked change in trend or direction of the vessel; the shoulder area is the space between the neck and the point of maximum diameter of the vessel." (See fig. 32.)

Before going into the morphological details of the pottery remains, I must say that I am in close agreement with Lehmer (1951) and

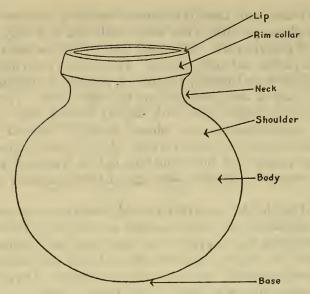


FIGURE 32.—Landmarks on pottery vessel, Hosterman site.

Smith (1951) in regard to the methodology used in typing Plains pottery, so ideas similar to theirs need not be repeated here. Like Smith, I, too, was confronted with the problem of associating not only the exterior surface treatment with rim decoration but with lip decoration and treatment as well.

The Hosterman site pottery description is based on a total of 75,814 body sherds, 3,155 rim sherds, and 5 possibly restorable vessels that were never restored.

The pottery was first washed in the field laboratory at Lincoln, Nebr., and the rim sherds were sorted and cataloged. The body sherds were not cataloged individually, as were the rim sherds, but were grouped according to the square, depth, and feature from which they were derived. In making the ceramic analysis, the body sherds were first studied en masse in order to acquire a reasonable working knowledge of the exterior surface treatments so as to avoid making certain snap judgments based upon misconceptions as to what should be found. Once the body sherds were studied and analyzed they were resacked according to the lot bags.

CLASSIFICATION OF BODY SHERDS AS TO EXTERIOR TREATMENT

All of the body sherds were classified, according to the exterior surface treatment, into eight main categories: plain, 42.16 percent; simple-stamped, 40.09 percent; incised, 13.96 percent; brushed, 2.19 percent; curvilinear-stamped, 0.84 percent; cord-impressed, 0.22 percent; mat-impressed, 0.18 percent; fabric-impressed, 0.12 percent.

The minor types were: painted, 0.06 percent; punctated, 0.05 percent; pinched ridged, 0.01 percent; fingernail pinched, 0.01 percent; and corncob-impressed, 0.01 percent.

Out of the various types present there are four main wares: plain, simple-stamped, incised, and brushed. Percentages of these were plotted, according to our arbitrary levels within the site, on a common graph to determine their trends. This superimposition of wares reveals that the plain, simple-stamped, and incised follow almost identical advancements and declines throughout their existence, but brushed described a different curve for the first five levels within the site. On the next to the top level (sixth from the bottom) all were in fair agreement, proceeding along similar curves up to the time that the site was abandoned. Brushed had advanced steadily, even though it had a late start, and had gained prominence over the other three, percentagewise, before the sixth level was reached. All of this is shown on the graph (fig. 33).

Table 2.—Composite data on body sherds, Hosterman site (39PO7)

Exterior treatment	Body sherds at indicated level (feet)								
	0.0-1.0	1.0-1.5	1.5-2.0	2.0-2.5	2.5-3.0	3.0-3.5	3.5-4.0	4.0-4.5	Total
Incised	113 293	506 1, 987	229 871	408 1, 110	261 378	51 201	3	8	
Brushed	14	104	46	27	36	201			
Simple stamped	166	1, 033	829	1, 225	387	59	10	16	
Number	586	3, 630	1. 975	2,770	1,062	311	13	24	10, 351
Percent	5.6	35.0	19.0	26.8	10.3	3.0	0.1	0.2	100
Plain:									
Number	293	1, 987	871	1, 110	378	201			4, 840
Percent	6. 1	41.1	18.0	22, 9	7.8	4.1			100
Brushed:									
Number	14	104	46	27	36				227
Percent	6.1	48.8	20.3	11.9	15.9				100
Incised: Number	113	506	229	408	261	51	3	8	1, 649
Percent	6.9	30.8	18.1	24, 7	15.8	3.0	0.2	0,5	100
Simple stamped:	0.0	00.0	10.1	21.	10.0	0.0	0.2	0.0	100
Number	166	1,033	829	1, 225	387	59	10	16	3, 72
Percent	4.7	27.7	22.3	32.9	10.3	1.5	0.2	0.4	100

While examining and studying the body sherds, it was determined that manufacture was by modeling rather than by using the coil system. A microscopical examination of the paste was made at the same time but we could not differentiate the physical characteristics. Once these were determined and described, we felt that there would be no need to repeat them for each of the wares.

COMMON TRAITS OF WARES

PASTE:

Method of manufacture: Probably made by lump modeling using a paddle and anvil instead of coiling.

Temper: Grit tempered, ranging from particles that are barely visible up to those around 3 mm. in diameter; probably crushed granite. Sometimes

ARBITRARY LEVELS USED IN THE EXCAVATION OF THE HOSTERMAN SITE

07-00	10-1.5	1.5-2.0	2.0-2.5	2.5-3.0	3.0-3.5	3.5-4.0	4.0-4.5	4.5-5.0
			_			A'IN		
			-		BR	USHEL)	
			-		- SIM	APLE -	STAM	PED
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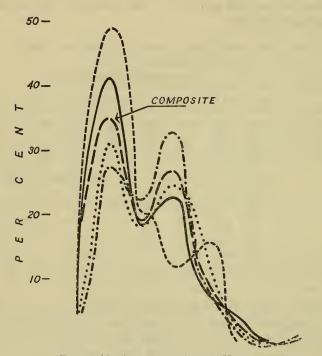


FIGURE 33.—Pottery trend within Hosterman site.

the larger particles protrude on the surface; this occurs mostly on the interior surfaces where the vessels have been roughly smoothed or brushed. Freshly broken edges have a granular appearance, depending somewhat on the quantity and the aplastic coarseness.

Texture: Medium to coarse and at times flaky.

Cohesive tendency: There is a tendency for the walls to split into unequal sections owing to the method of manufacture.

Structure: Tendency toward lamination. Easily splits parallel to the surface, and edges are crumbly.

Color: Color varies from a light tan, buff, and gray, and often a sooty black. Fire clouds are common on the lighter colored sherds. Cross section may be the same as the surface or it may have a darker center. Surface finish: In most cases the paddle was used on the exterior surface during manufacture. It was wrapped with some sort of vegetal fiber or gut or was roughly carved. The overall design of parallel grooves was repeated, the application of the paddle imparting grooves and lands. Grooves measure roughly 3 mm. in width by 15 or more mm. in length. The lands are round to round pointed and the grooves are U-shaped in cross section and somewhat rounded in general shape. Usually the stamping is vertical to the lip but there are rare cases when the stamping occurs on a slight diagonal to the The initial stamped design apparently covered the complete exterior surface of the vessel but this was either completely eradicated through subsequent smoothing or partially obliterated by brushing. Interior surfaces may be roughly smoothed or brushed. Occasionally one appears to have been semiburnished by having been rubbed with a pebble or some other hard substance. When brushing occurred interiorly it was always applied horizontally to the main axis of the vessel and parallel to the lip. Decoration varies with the component types. Decoration of lips is frequent. Decoration on shoulders consists of series of parallel lines arranged in opposition to each other, in contiguous plats forming a broad continuous band around the vessel. Bases were untreated except for the initial surface treatment.

DETAILED STUDY OF BODY SHERDS

During the process of manufacture some sort of paddle was applied to the outside of the vessel. It was either carved with a series of shallow parallel ridges or wrapped with narrow strips of leather, the results of which show up as a series of shallow parallel lands and troughs that cover practically the entire outside of the vessel. Usually these impressions run vertically, but over the base of the vessel they may overlap and crisscross. Such treatment has been described as "simple-stamping." Wares impressed with a carved paddle had more regular impressions and show a uniformity of depth, whereas the leather wrappings were not as regularly placed and there was some variation in the overall depth and width of the impressions.

Plain wares are those whose exterior surfaces were smoothed over completely so as to eradicate any previous surface treatment. Some were subsequently rubbed, sometimes with a small stone, or a similar object, to impart a pseudopolish or burnish. Vessels treated in this way were much smoother than those that were simply smoothed by hand.

Decorations of incised elements were confined to various portions of the vessel: the lip, rim, or shoulder area. They were confined to zones around these areas. Decorations that had repetitious elements within the zone have been called "line block" in this report. There is wide variation as to the method of rendition, the width of the elements themselves, and the placement of the designs. Some decorations

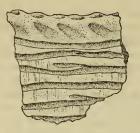


FIGURE 34.—Horizontal parallel incised rim sherd.

show that a very sharply pointed instrument was used, resulting in a very narrow line of moderate depth. Others, of a trailing nature, were made by using a wide blunt-bladed implement, resulting in a wide, coarse, shallow, troughlike line showing a poor sense of symmetry and touch. The design was not only carelessly drawn but it was not always complete (fig. 34). This kind has been called *Nordvold Horizontal Incised*. These are the extremes; there are some that range in between.

Brushing was confined mostly to the exterior neck and upper shoulder areas. It was also associated with various other exterior surface treatments. Some brushing, in which parallel strokes were used, occurred in the upper portion of throat areas, but this was not a prevalent practice. The areas that were brushed carried a series of sharply defined parallel vertical or horizontal scratches either at right angle to the lip or parallel to the lip and appeared to be the result of using a bundle of coarse grass or small twigs.

Several sherds were noticed bearing red pigment mostly on the interior. These showed that some sort of slurry made of powdered ocher was applied. None of the vessels appeared to have been fired after this application of the pigment, which, at the present time, could easily be brushed off onto the finger as it was rubbed across the surface. This color can truly be called a "fugitive red" even though some of the pigment had worked its way into the natural pores of the vessel walls and in so doing had given the surface a faint pinkish or reddish hue. This trait was checked under a microscope a number of times and it was seen that the porosity of the vessel walls was just a "natural" for absorbing this material.

Whenever cord impressions occurred, they were confined to the rim, the lip, or to the upper portions of the shoulder area. Cord impressions on the lip were rare, but they were numerous enough so that various types of treatment could be determined. They occurred either as a series of parallel impressions running straight across the lip, or at a diagonal, or as a series of parallel impressions covering most of the lip as they encircled the vessel. Practically all of the cord was

of the right-hand twist. Diameters varied somewhat, even on the same vessel; but on the average it measured around 1 mm.

In the group of body sherds there were several whose exterior surfaces were extra rough. When a positive impression was made of this treatment, with the aid of plastic clay, it was found that some sort of coarse fabric had been used. This fabric was not applied flat but was apparently wadded up and then applied, hence the term "fabric-impressed." On a few sherds we found that a coarse mat impression covered very limited portions of the exterior surface. These sherds were small and we could not determine how extensively this technique had been used.

We noted that in several instances corncobs had been used to roughen the exterior surfaces of vessels. This practice was apparently not common, for we found only a limited number of sherds treated in this fashion.

Among the rare forms were a small number of plain sherds that were from scattered positions within the site. They were of a curious green color, more of a bile green, on the exterior, which seemed to go through the entire thickness of the wall. They were made of a hard and homogeneous paste, and their exteriors were very carefully smoothed. The thickness of each is uniform, ranging from 1.5 mm. to 3.0 mm. We could not determine their source or where they would fit into the general picture.

LIP TREATMENT

Lips were of many forms: they were simple-rounded, flattened, rounded and flattened, inward beveled, outward beveled, reinforced and beveled, reinforced and rounded, and even folded (see lip profiles, figs. 35 and 36).

Lips had been given several types of treatments. They were smoothed or left plain; ticked or "tooled" in various ways with different size sticks or other tools or ticked by having sections of cords impressed across them; incised by having herringbone designs drawn across them; punctated in various manners; indented by pinching the unfired clay into undulations or indentations; impressed with a number of twisted cord elements running parallel with the lip; given a wavy effect by pressure of the finger on either side of the lip; or given the stab-and-drag treatment with a rounded, pointed, or squared pointed implement resulting in a line of shallow punctations.

Lips that were punctated, in some instances in the literature were referred to as "tool impressed," impressed with a rounded, squared, or pyramidal pointed stick; the size and the shape of the impression depending on the actual outline of the tool and the amount of pressure used to bring about this effect. Some impressions were narrow, others

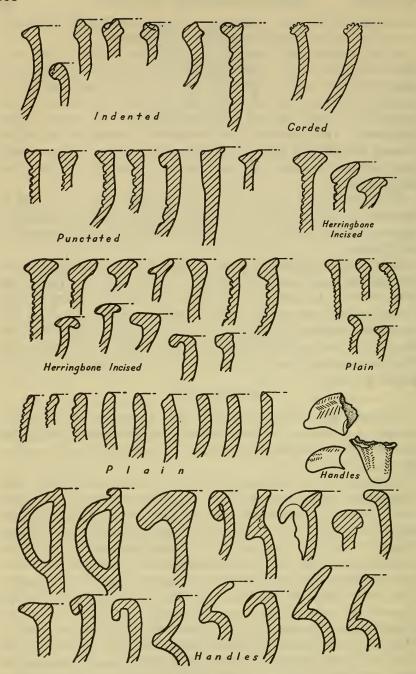


FIGURE 35.—Vertical rim profiles, Hosterman site.

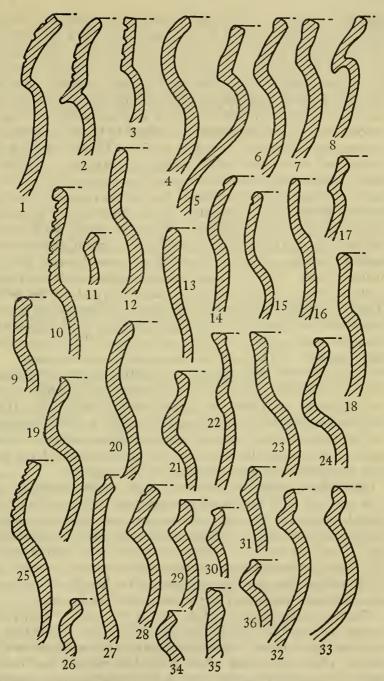


FIGURE 36.—S-shaped rim profiles, Hosterman site.

were placed squarely across the lip, and others were at a diagonal; some impressions appeared to have been made by a single unit and others appeared to have been made by a double unit. Whether a stick or a sliver of bone was actually used to bring about this effect could not be ascertained. Cord elements of various diameters were used in this same manner with the impressions running either parallel with the lip, at right angles to it, or at a diagonal across the lip. Lip punctations varied exceedingly from small to large: those that were comma-shaped, teardrop, or oval in outline. There were a few whose punctations were tantalizingly irregular both as to outline and depth. From plaster casts taken to secure a positive of the element used, it appears that bits of rough textiles were pressed into the pliable lip, creating these irregular, uneven, and unequal indentations.

Then, too, there were impressions that were usually made by applying the tip or one side of a blunt implement. Some impressions were shallow, circular, and saucer shaped in outline and spaced fairly close to one another. In a few instances a squared or very roughly pointed implement was used in place of the rounded-tip tool, but the technique of rendition and the results were the same. Whenever the side of the implement was used, the resulting impressions were elongated and trough-shaped in that both ends were open. They were either at right angles to the sides of the lip or drawn at a diagonal.

This leads to the next technique in that these same two implements, but of smaller sizes, were used in a "stab-and-drag" technique in which the implement was thrust or pushed into the moist clay. Without withdrawing the tool it was dragged or pulled a short distance; this was then repeated over and over again, resulting in a line of interconnected impressions. In so doing, the terminal part of the former

drag was pushed in, somewhat marring the sharpness.

Herringbone designs on lips were of the widest variation. Some were rendered with very finely pointed tools and carefully drawn or incised, whereas at the other extreme are those whose elements were drawn with a very blunt instrument, at times deeply inserted into the lip. Usually those of the thin line elements were regular and carefully drawn, whereas the coarser the rendition the more careless it was. If, by chance, the vessel should have had a handle or handles, this same treatment was usually carried over onto these features.

Finger indentations of the lips were of two kinds. They could be pressed in from the sides to give the rim a sort of undulating effect or pressed down directly upon the lip to give it a scalloped or a wavy vertical effect. In some, where the latter method was used, the intervals were fairly regular, while in others the intervals were irregular and the amount of pressure used varied from point of contact to point of contact; in other words, the "trough" varied in depth and was

not at all consistent. This same scalloped effect was brought about by pressing some rodlike tool onto the plastic lip. The intervals between pressure points were never uniform. Whenever pressure was brought to bear vertically upon the lip it caused a certain amount of thickening to that feature. Whenever pressure was applied at right angles to the lip the areas affected were thinned so that the intervening portion of the lip was thicker than the area worked on (fig. 40, a-d).

Type name: "Le Beau Finger Indented" (pl. 19, A, h). Type material: 142 sherds.

Form:

Rims: Vertical to gently flaring.

Lips: Lips were rounded in preparation to being treated with the finger.

After this the lips were broadened in the area by the downward pressure, bringing about a certain amount of thickening. Whenever finger pressure was applied alternately to the interior and exterior a wavy effect was created and the thickness of the walls was reduced. Thickness: Vessel walls varied from 3 to 5 mm. in thickness.

Vessel form: Probably globular in shape, rounded shoulders, and straight to slightly flaring neck.

Decoration:

Variant A: Like the type description of Hurt's (1957 a, p. 39) these rims were indented by applying the finger from the interior and exterior in an alternating pattern giving a wavy effect.

Variant B: In this case the pressure was brought directly downward from the top of the lip giving a scalloped effect. The difference between pressure points may vary. Some may be a continuous group; others were spaced with an alternate plain area. In every case the lips were rounded.

STRATIGRAPHIC POSITION: Hurt has found that this type of pottery was associated with the Le Beau Focus at the Swan Creek site (39WW7) and that percentagewise there was a tendency to increase with time.

Ticked lines across the lips, frequently referred to in the Plains literature as "tool impressed," have the widest variation as to width, length, and the amount of pressure used to bring about this effect. On some of the specimens the lines were very thin, short, and exceedingly shallow. On others the lines were long enough to reach completely across the lip and were both wide and deep. Still others were made at an angle.

Inside measurements of the orifices of jars showed that there was not a great variation. Openings ranged from 10.3 cm. to 21.7 cm. (See Appendix 4.)

RIM FORMS AND THEIR TREATMENT

Rims of the *plain*, *incised*, *brushed*, and *cord-marked* wares were separated. It was found that all shared common basic characteristics in temper, method of manufacture, texture, hardness, color, surface finish, and general vessel form. All types are primarily groups of similar rim forms decorated in more or less the same general way.

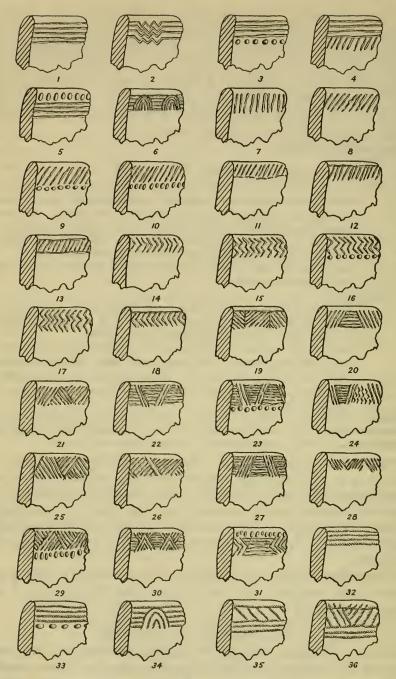


FIGURE 37.—S-shaped rim decorations.

Rims are of two main shapes, depending upon the configuration of the neck: vertical and S-shaped. Vertical rims ranged from short to tall and a few had the tendency to flare slightly at the top. There are several minor rim types present, but these are of limited number. After the rims were separated according to the two rim forms, they were next separated according to lip treatment, for I found this combination to be most diagnostic and one that was fairly sensitive.

Each rim type was further subdivided according to the final exterior surface treatment of the rim. These include such treatments as: incised with a series of horizontal parallel lines; plain after smoothing; incised with a series of either short vertical and/or diagonal lines; herringbone incised; a zone of either conjoining parallel lines or chevrons arranged as a band around the tip of the neck or rim, called line block; cord-impressed; simple-stamped; and brushed. In separating the rim sherds into the various types it was necessary to take into consideration three main factors: (1) the general configuration of the rim, (2) the treatment of the lip area, and (3) the final exterior surface treatment of the rim or neck area.

After all separation and counts had been made and tallied, it was found that 1,592 were vertical rims, 1,039 were S-shaped, and 524 were too fragmentary or incomplete to make positive classification possible.

There are four types of vertical necks: (1) those that are almost vertical with just the slightest degree of outward flaring near the top (pl. 15, A, a); (2) those that are almost vertical with the exception of being slightly barrel shaped (pl. 19, B, e, fig. 38); (3) those that have vertical necks surmounted with a certain amount of rim thickening (pl. 15, B, a); and (4) those that were short and flared outwardly at the top (pl. 16, B, a).

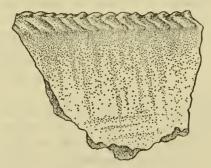


FIGURE 38.—Barrel-shaped rim, simple stamped rim sherd.

S-shaped rims were curved, flattened, or short with an acute angle. In either type the zone of decoration was confined mostly to the upper portion of the figure "S" (pls. 17 and 18; fig. 36).

Type name: Hosterman S-shaped rims (resembling typical Le Beau series). Type material: 1,039 rims or 32.9 percent of all rims.

Exterior surface treatments:

- (1) Horizontal parallel line incised—372 rims, 35.8 percent (pl. 17, B; fig. 37, 1-6).
- (2) Line block—277 rims, 26.7 percent (fig. 37, 19-31).
- (3) Plain-138 rims, 13.8 percent.
- (4) Herringbone incised—124 rims, 11.9 percent (pl. 15, B, a; fig. 37, 14-18).
- (5) Vertical and/or diagonal line incised—66 rims, 6.4 percent (fig. 37, 7-13).
- (6) Cord-impressed—62 rims, 5.9 percent (pl. 20, A, a-d; fig. 37, 32-36).

PASTE:

All, with the exception of a very few, showed the general traits listed and described for the Hosterman pottery.

FORMS

Rims: There was quite a variation in the S-shaped and so-called collared rims.

Lips: Since this was one of the variables, considerable variation was noted:

- (1) Ticked or tooled lips—546 lips, 52.6 percent of all lips.
- (2) Plain-309 lips, 28.8 percent.
- (3) Herringbone incised—138 lips, 13.3 percent.
- (4) Punctated-45 lips, 4.3 percent.
- (5) Finger indented-1 lip.

Vessel form: Globular bodies with constricted necks with rather high rims. In some the curve is pronounced; in others the upper portion of the curve tends to be flattened somewhat.

STRATIGRAPHIO POSITION: S-shaped rims were found in all levels of occupation at the Hosterman site and fragments of these same vessels were widely scattered.

Table 3.—Types and numbers of S-shaped rim sherds, Hosterman site (39P07)

	Llp treatment					Total	
S-shaped rims	Plain	Ticked	Herring- bone incised	Punc- tated	Finger indented	Number in group	Percent- age
Exterior surface treatment: Parallel-horizontal line incised Plain Vertical and/or diagonal line incised Herringbone incised Line block Cord-impressed	80 27 52 30 77 43	252 32 7 58 180 17	33 57 31 16 1	7 21 7 5 4 1	1	372 138 66 124 277 62	35. 8 13. 3 6. 4 11. 9 26. 7 5. 9
Total	309	546	138	45	1	1, 039	100.0

Incised S-shaped rims: 839 rims or 80.8 percent of rims. Form:

Rims: Varied in height and in curvature. Some were rounded, others were flattened, still others had a distinct ridge or collared effect (fig. 35).

Lips: Several lip treatments were represented in this group:

- 1. Plain and rounded-239 lips, 28.5 percent of lips.
- 2. Ticked or tooled-497 lips, 59.2 percent of lips.
- 3. Herringbone incised—80 lips, 9.5 percent of lips.
- 4. Punctated—23 lips, 2.8 percent of lips.

Decoration: A zone of incised decoration was confined to the upper portion of the S-shaped rims, excluding lip treatment. Design techniques consisted of incising, including broad trailing, sometimes combined with punctations (fig. 39, a, b, c). There is a wide latitude in the design form from the simplest, which is a series of horizontal parallel lines crudely drawn across the upper portion of the neck. In certain vessels these lines were interspersed with an equal number of herringbone elements, or were bordered either at the top or bottom with punctations, or short diagonal lines. Then, there were rows of vertical or diagonal incised lines with their combinations; herringbone designs; opposed diagonals; lineated bands framed by diagonals; broad incised diagonals; broad-trailed diagonals; and curvilinear "rainbows" on a lineate field.

PLAIN S-SHAPED RIMS: 138 rims; 13.2 percent of rims.

FORM:

Rims: Same as for incised.

Lips: Same as for incised with the addition of finger indented—1.

DECORATION: Surface has been smoothed after being paddled. No decoration applied.

Cord-impressed S-shaped rims: 62 rims, 6.0 percent of rims.

FORM:

Rims: Same as for incised.

Lips: The four basic lip treatments still apply with the exception that four additional sherds were present whose lips were crossed with cord impressions.

Decoration: Type A (Le Beau Horizontal Cord Impressed) has a series of horizontal cord impressions running parallel in the series starting just below the outer edge of the lip and continued down over the major part of the upper curve of the S-shaped rim. Type B (Rygh Rainbow Corded) has its series of horizontal parallel impressions interrupted by the insertion of a rainbow element made by impressing short segments of cords in this fashion to create this effect.

CORD-IMPRESSED S-SHAPED RIMS: 62 rims, 6.0 percent of rims. These resemble the Le Beau Horizontal Corded of Hurt's (1957 b, p. 41, fig. 21, 5) type description and a few are identical with the Rygh Rainbow Corded (ibid., p. 42, fig. 21, 1). Both of these types are well described and illustrated by Hurt so there will be no need to repeat these here.

Rim decoration (fig. 37, 7–12), on vertical necked vessels with rounded lips, resembles the "unnamed" ware of Hewes (1949, pp. 59–60, pl. VI, a, b) of the Heart Butte Campsite, 32GT1, North Dakota. As indicated by Hewes this ware resembles one from the Burgois or Double Ditch site on the Missouri River, North Dakota (Will and Spinden, 1906, fig. 40, a) and from sites in the Upper Missouri Valley, North Dakota (Will and Hecker, 1944, pl. 6) all of which date in the late 17th and early 18th centuries.

Rim decoration (fig. 37, 32 and 33), which is cord impressed on S-shaped rims with rounded lips, resembles part of the "unnamed" ware

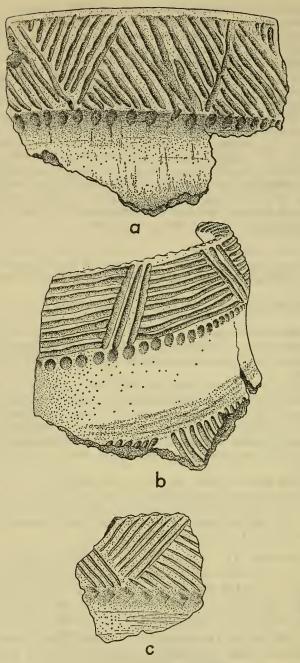


FIGURE 39.—Line-block zonal decorations.

of Hewes (1949, p. 60, pl. VI, c) from the Heart Butte Campsite, North Dakota, 32GT1, which is similar to "pottery in many Upper Missouri River village sites of the Mandan-Hidatsa culture, specifically Sperry, Larson, Fort Lincoln, 32SI4 near Fort Yates, Hagen site (Mulloy, 1942). Pottery of this general type covers a wide area in the North Plains and probably several centuries of time." (Ibid., pp. 59-61.)

Rim decoration (fig. 37, 35 and 36) on S-shaped rims resembles a ware illustrated by Hewes (1949, pl. VI, d, q) with the exception that the pottery from the Heart Butte Rockshelter, 32GT5, North Dakota, is cord-impressed and the sherds from the Hosterman site, 39PO7, are for the most part incised (fig. 40, h, i). There is a certain amount of this same cord-impressed ware at the Hosterman site, but it is not abundant (pl. 20).

Rim decoration (fig. 37, 34) resembles Hurt's (1957 b, fig. 25, 2a, 2b) Le Beau Cord-wrapped rod designs as well as Rygh Rainbow corded. The difference between the Le Beau Cord-wrapped rod and the Hosterman cord-impressed is only in the element used. Those from Le Beau used cord-wrapped rods, and those from the Hosterman used sections of cords (fig. 40, k). The placement of the elements on S-shaped rims of the Hosterman site and Rygh Rainbow Corded is identical. Whether there is a time differential is not known at the present time, but it is suspected that the treatment of the Hosterman group precedes that of the Le Beau and the Rygh forms.

Type NAME: Hosterman Vertical rims (fig. 35).

Type material: 1,592 rims; 50.5 percent of rims.

Exterior surface treatments:

- 1. Plain—579 rims, 36.4 percent of rims.
- 2. Horizontal parallel incised lines-397 rims, 24.9 percent of rims.
- 3. Brushed—245 rims, 15.4 percent of rims.
- 4. Simple-stamped—232 rims, 14.6 percent of rims.
- 5. Line block incised—53 rims, 3.3 percent of rims.
- 6. Herringbone incised—42 rims, 2.6 percent of rims.
- 7. Cord-impressed—27 rims, 1.7 percent of rims.
- 8. Vertical and/or diagonal lined incised—17 rims, 1.1 percent of rims. Paste: All showed the general traits described for the Hosterman pottery. Form:

Rims: There was some variation in the overall height and some that had a slight tendency to be everted at the very top, but on the whole they are fairly uniform.

Lips: Since this is one of the variables in determining types we found that there is quite a range in lip treatment, thus:

- 1. Herringbone incised—494 lips, 31.0 percent of lips.
- 2. Ticked or tooled-462 lips, 29.0 percent of lips.
- 3. Punctated—394 lips, 24.8 percent of lips.
- 4. Finger indented—142 lips, 8.9 percent of lips.
- 5. Plain—96 lips, 6.0 percent of lips.
- 6. Cord-impressed—4 lips, 0.3 percent of lips.

Vessel form: Globular-bodied vessels with vertical necks.

Stratigraphic position: Vertical-necked vessels were found in all levels of occupation within the areas explored at the Hosterman site, and often fragments of the same vessel would appear widely scattered.

Table 4.—Types and numbers of vertical rim sherds (Hosterman site, 39PO7)

Vertical rims		Lip treatment				
		Ticked	Herring- bone incised	Punc- tated	Finger indented	Cord- impressed
Exterior surface treatment: Parallei-horizontai iine incised Plain Vertical and/or diagonal line incised Herringbone incised	17 27 3 6	79 165 13 21	255 150	45 162 1	75	1
Line block. Cord impressed. Simple stamped. Brushed	8 14 6 15	39 66 79	2 9 43 20	4 3 93 86	24 43	1
Total	96	462	491	394	142	4

If we group all the recognizable rim sherds on the basis of exterior surface treatment, irrespective of whether they are vertical or S-shaped in form, as apparently has been the practice in the past, we get the following:

Horizontal parallel incised lines—769 rims, 29.2 percent.

Plain-717 rims, 27.3 percent.

Incised line block of triangles, etc.—330 rims, 12.5 percent.

Brushed-245 rims, 9.3 percent.

Simple-stamped—232 rims, 8.8 percent.

Herringbone incised-166 rims, 6.3 percent.

Cord-impressed-89 rims, 3.4 percent.

Vertical and/or diagonal line incised—83 rims, 3.2 percent.

This grouping at best reduces the bulk to eight wares. It is not only misleading but is all too inclusive. For example, if we choose to place all cord-impressed into a single category we have lumped two distinct wares—the Le Beau Horizontal Corded and the Rygh Rainbow Corded—as a single ware.

As to the exterior surface treatment of the rims themselves, some retained the marks of the paddle used during the formative stage of manufacture, better known as simple stamping. These marks formed a permanent exterior surface and as such can be considered a form of decoration. In others the simple-stamped effect was either completely dissipated or partially obliterated, resulting in a smoothed plain surface. The process did not stop there, for this plain surface acted as the background upon which various linear geometric designs were incised and—in a few instances—impressed. The simplest form of incised design consisted of a series of encircling horizontal parallel lines starting just below the juncture of the neck and exterior margin of the lip and extending downward sometimes for a short distance and sometimes covering the major part of the neck of the vessel (fig. 40, e).

Similar treatment occurred on Wheeler Horizontal Incised from the Scalp Creek site and the La Roche site (Hurt, 1952, p. 13; fig. 14, 1-3), and Nordvold Horizontal Incised (Wilmeth, 1958, fig. 17).

A variation of this design was brought about by breaking the lines and filling in the gaps with interconnecting herringbone designs,

thus:



The intervals between the lines varied considerably on some specimens and on others were very carefully drawn. Those that were carelessly drawn had the lines wandering either upward or downward or even inserted small segments that started anywhere and ended nowhere.

Other variations of the horizontal parallel line patterns consist of the series of parallel lines delimited by a row of short diagonal dashes, delimited by a row of punctates, surmounted by a row of punctates, or separated by concentric rainbow designs.

Next in simplicity are those vessels decorated by drawing a row of diagonal or vertical lines starting just below the juncture of the rim and the outer edge of the lip and carrying them down a short distance on the rim (fig. 40, *l-n*). Variations of this motif consist of an encircling incised line above the series of lines, an encircling incised line below the series of lines, a row of punctates delimiting the lines at their base, or a series of horizontal dashes just below the base of the lines.

Those incised with herringbone designs may have one or more lines of this design used as the decorative motif. Variations consist of a single horizontal incised line drawn above the herringbone design and separating it from the top of the rim area; delimited by a row of vertical punctates at the base, or delimited by a row of round or oval punctates at the base.

The most complex are those decorated with linear geometric designs. These consist of a series of interlocking triangles filled with horizontal lines, diagonal lines, and herringbone designs. These interlocking triangles may be separated from one another by one to six parallel lines. Then, too, a row of punctates can appear at the top or the bottom of the zone of interlocking triangles. In this paper whenever any reference is made to this type of decoration the term "line block" will be used.

Vertical brushing covers not only the rim and neck sections of a great many vessels but is also found on the upper portions of the shoulder area. Some of the Talking Crow Brushed types described

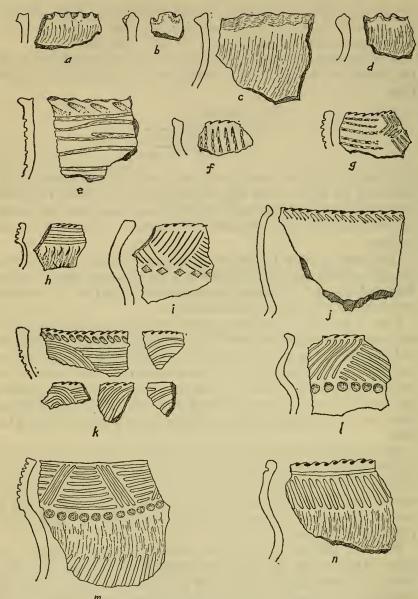


FIGURE 40.—Rim treatment and decorative zones.

by Carlyle S. Smith (Smith, 1951, pp. 34-37) are almost identical with some of those found at the Hosterman site. The majority do not fit into this category.

TICKED LINE, INCISE - Type "A":

This type consists of a series of horizontal parallel lines which start just below the lip and cover the entire neck area. Necks are vertical

to slightly flaring or excurvate. Lines are not carefully drawn or joined and many are just short segments; some join while others start and stop without any unity with the rest of the group (fig. 40, e). On the whole it portrays a lack of fineness of design and a distinct indication of a lackadaisical inclination toward the satisfaction of creating something that has been carefully done. Lines are drawn either with sharply pointed tools, a form of incising, or with dull, flat-bladed tools, a form of trailing. Some of the lines are drawn as close together as 2 mm.; others as far apart as 6 mm.

On the whole, the surface of the neck was smoothed before the lines were incised upon it, but there are any number that show that the surface was first brushed and then the incised or trailed lines were drawn upon this rough surface. Several appear with wavy lines because the surface was poorly prepared rather than because of the shakiness of the potter herself.

Perhaps this group can be divided into two subgroups: A1 and A2.

 A_1 has a row of diagonal incisions directly beneath the lip and above the series of horizontally drawn lines.



A₂ has a row of punctations below the series of horizontal parallel lines to set the lines apart from the shoulder area.



Wall thickness varies from slightly under 4 mm. to 8 mm. Color variation still persists. Soot incrustations are still present. Interiors are smoothed without any evidence of brushing.

Ticked line, incised—Type "B":

The same holds true for type "B" with the exception that there are no subtypes.

Color, soot incrustation, brushing on exterior, wavy lines, the way the lines were incised or trailed, distance apart, type of tool used, and general appearances are all alike.

Ticked Line, incised—Type "C":

The same holds true for type "C."

Plain lip, vertical neck that is covered with a series of horizontal parallel lines. All the characteristics as described for the *ticked lip group* apply here. There is one exception. Two specimens have their lines drawn rather deeply penetrating about half the thickness of the wall itself.

Punctated.—All of the characteristics common to the others are present here. The only difference is in the treatment of the lip itself. In this case the lip is punctated. Punctations appear to have been made by:

- (1) Fabric impressions
- (2) Round blunt tipped tool
- (3) Comma-shaped tool
- (4) Teardrop-shaped tool
- (5) Small grass stem
- (6) Pyramidal-tipped tool

SHOULDER TREATMENT

Shoulders of the various vessels were either simple-stamped (figs. 41-43) plain-smoothed, or incised (figs. 44, 45), and from the presence of a few black-on-gray painted sherds, it would appear that the shoulders were occasionally painted with crude geometric designs.

Parts of three medium-sized simple-stamped vessels are unique in that all of the shoulder areas have been punctated with a series of large punctates, ca. 12 mm. in diameter. The punctates on two of the vessels are spaced about equally apart and appear on the upper part of the shoulder. All are fairly deep. Consequently, nodes appear on the interiors of the vessels. The punctates on the third vessel have been arranged in groups of vertical series, two rows to a series and four or more punctates to a row. The punctates start just at the base of the neck constriction or the top of the shoulder and run downward midway onto the body of the vessel (see pl. 20, B, b). The punctates are not placed in a straight line and appear to have been made by tapping the vessel quite firmly, while it was still plastic, with the tip of the finger or some implement of comparable size.

Shoulder incising appears to be quite popular at the Hosterman site. It consists of various combinations of line-filled triangles (fig. 46), triangles filled with zigzags, or crude herringbone designs. None can be said to be very carefully drawn. Apparently, the potters were not after carefully executed work but rather the effect of the design

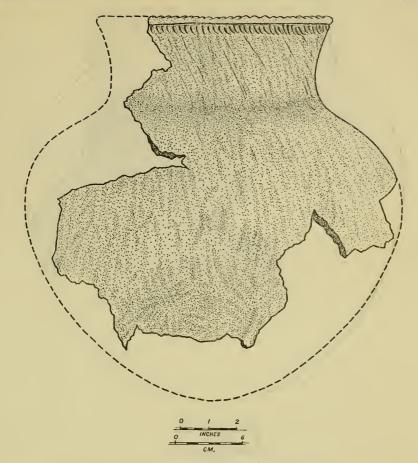


FIGURE 41.—Restoration of vertical rimmed, simple-stamped vessel.

itself, otherwise, it seems, they would have been more careful in drawing the lines of the design (figs. 45 and 46).

HANDLES

Handles on Hosterman vessels are not common (pls. 16, A, a; 17, B; 18, A; 19, A, a). In the main they are of two varieties: strap (19 specimens) and horizontal lug (16 specimens). Strap handles, as a rule, are either welded at the lip or are tonguelike elongations of the lip that curve downward a short distance to be welded or riveted to the body of the vessel. On the other hand, there are rare instances when the strap handle may originate just a short distance below the lip, on the upper portion of the rim, and follow the same pattern as the others in their basal attachment to the walls of the vessel. Most of the strap handles project horizontally before curving downward to make their

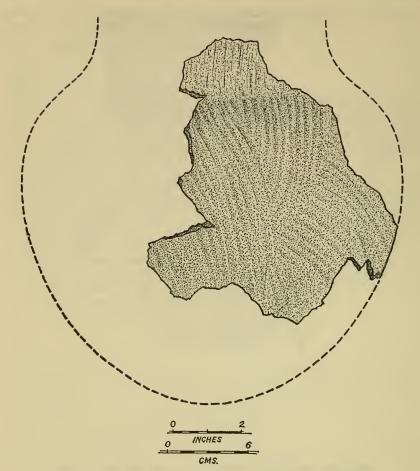


FIGURE 42.—Shoulder decoration on large jar sherd, Hosterman site.

juncture. Usually the upper section of all strap handles is much wider at the top than at the bottom, giving the handles a triangular appearance. In cross section most are oval near the base, others are flat, while a few are concavo-convex. Handles of this type may appear as pairs, opposite each other on opposite sides of the vessel, or they may be separated by small lugs appearing in the opposite quadrants.

The same design used on the adjoining lip decorates most strap handles, being simply carried over onto the handle. The design may be herringbone incised (16 specimens), horizontal cord impressed (1 specimen), horizontal line incised (1 specimen), or horizontal stab and drag (1 specimen) (fig. 47). None were left undecorated.

Lug handles are somewhat variable as to shape, size, and placement. Practically all are tonguelike projections off the lip or side of the vessel. Others may appear lower down on the neck or at the

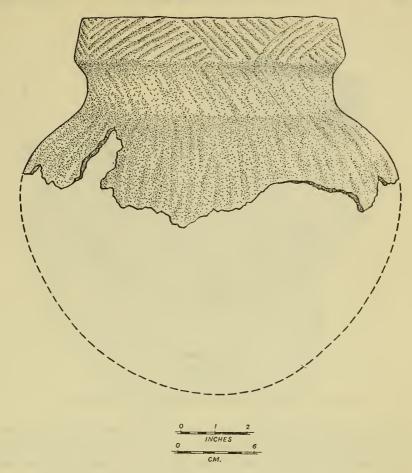


FIGURE 43.—Rim and shoulder area of S-shaped rimmed vessel.

bottom of S-shaped rims. Mostly they are just paired horizontal projections extending a short distance out from the exterior surface of the vessel. Almost all appear to have been fashioned at the same time the vessel was finished off; only a very few appear to have been welded onto the vessel afterward. They are roughly triangular in shape. One rare case is that of an S-shaped rim upon which are five luglike projections on the upper part of the "S" that are but slight downward elongations. Each projection is separated by an equal number of cord-impressed rainbow designs that also appear on the lugs (pl. 19, B, a). These are spaced equidistant around the rim of the vessel. These projections vary in the distance they protrude and whether they droop, sag, or extend straight out from the sides of the vessel. As on the strap handles the incised herringbone design is carried over onto the tops of most of them. Width and length may

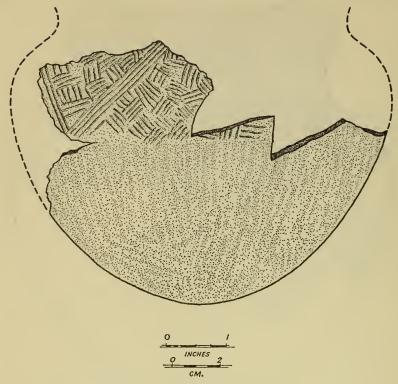


FIGURE 44.—Line-block design on shoulder area, Hosterman site.

vary as to the width and distance they may protrude. Luglike projections may vary from 2 to 4 or more to a vessel. They appear to be evenly spaced around the vessel from what we can determine from the sherds.

One lug handle, on specimen No. 3372/16, is unique in that it became limp shortly after it was fashioned onto the vessel and dropped down onto the neck of the vessel forming a very tenuous joint with it. It appears to have been unintentional but whether it was or not it would appear to function as an evolutionary trend in explaining the formation of a type of strap handle from the lug type.

VESSEL SHAPES

Vessel shapes appear to lean to globular with vertical and slightly everted necks, rounded shoulders and bases, with the shoulders decorated with incised motifs and the necks covered with a series of incised horizontal parallel lines. This type of vessel shape is rather widespread for it also occurs at the Swan Creek site (39WW7), Steamboat Creek site (39PO1), and the Four Bears site (39DW1),

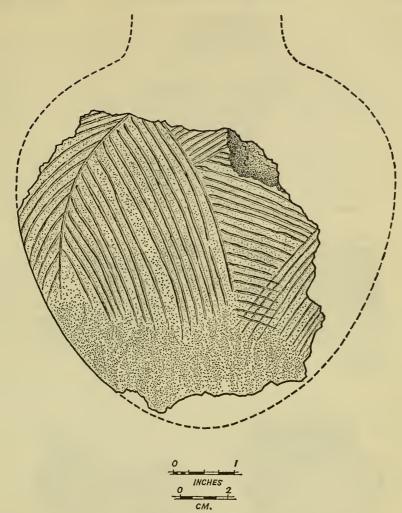


FIGURE 45.—Line-block design on shoulder area, Hosterman site.

all of which are neighboring villages. This does not in any way suggest a contemporaneity but only an indication of the relative occurrence of similar vessel shapes with similar exterior surface treatments within a temporal and spatial relationship of a very small area.

A large number of vessels had a heavy incrustation of soot which had adhered to the outside of them, filling in all depressions made by the various design elements, blotting out all indications that the vessel was decorated in any manner. This heavy soot incrustation may be and could be due to the tendency of the potters of the Plains, as pointed out by Will (1906), and others, to coat the outside of vessels heavily with grease prior to firing. The intense heat used

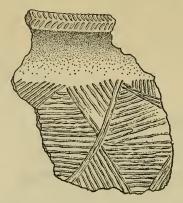


FIGURE 46.—Line diamond design on shoulder area, Hosterman site.

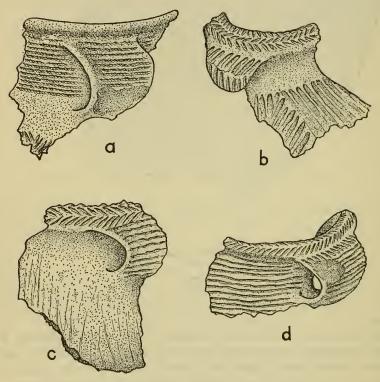


FIGURE 47.—Handle types showing points of origin.

would change the hydrocarbon into pure carbon consolidating it into a firm mass surrounding the exterior of the vessel.

PAINTED POTTERY

Three small potsherds found in the large mass of body sherds had fragmentary designs in black painted on their exteriors. Since none

of these sherds were very large, it was impossible to determine the complete design of the original. The basic surface finish of each differed somewhat. Two of them had their exteriors smoothed before the paint was applied and the third one still retained the initial simple-stamped treatment over which the paint was applied. The very presence of even this small number of painted sherds would render this site unique since painted designs on the exteriors of vessels are rare rather than commonplace.

The use of a red pigment on the interiors and some exteriors has been reported from other sites. This trait appears to be common enough in the Plains. Even so, it is not too prevalent here at the Hosterman site; so this, too, can be classed as a rarity.

MINIATURE VESSELS

Several fragmentary vessels in the form of jars were found in various areas in the site. Four basic forms are represented. All have two traits in common: rounded bases and globular bodies.

The smallest of the six miniature vessels, field cat. No. 3428, has the following measurements based on possible reconstruction: diameter of the mouth, 35 mm.; diameter of the neck, 30 mm; diameter of the body, 43 mm.; and height, 45 mm. The neck is slightly constricted and above the constriction is a small rim section (see outline drawings of these vessels, fig. 48).

The second vessel, field cat. No. 742, is slightly larger, and resembles the first with the exception that it is squattier. It has the following measurements: diameter of mouth, 36 mm.; diameter of neck, 32 mm.; diameter of body, 61 mm.; and height, 50 mm.

The next vessel, which also has a constricted neck, is larger and the constriction is not as abrupt; field cat. No. 290/60. It has the following measurements: diameter of mouth, 46 mm.; diameter of neck, 40 mm.; diameter of body, 59 mm.; and height, 50 mm.

The next larger vessel, field cat. No. 290/56, has a unique shape in that the constriction is about midway down from the lip and nearly separates the vessels into two equal parts. Whether the base is subconoidal as represented or more rounded appears to be questionable. Its measurements are as follows: diameter of mouth, 63 mm.; diameter of neck constriction, 57 mm.; diameter of body, 68 mm.; and estimated height, 63 mm.

Next to the largest vessel is a globular vessel, field cat. No. 3206/1, with a slightly constricted short neck. It measures 61 mm. across the mouth, 61 mm. just above the shoulders, 84 mm. in body diameter, and 84 mm. in height.

The last and largest of the series, field cat. No. 290/116, is a variation in shape of the vessel just described. The mouth of the vessel

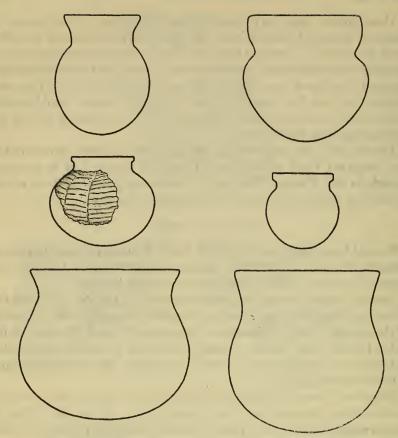


FIGURE 48.—Various miniature vessel types, Hosterman site.

measures 85 mm. in diameter, 83 mm. across the slightly constricted neck, 97 mm. in body diameter, and 95 mm. in height.

Four of the vessels have smoothed exteriors. Specimen No. 742 has a series of radiating lines starting at the top of the shoulder and running down almost to the base. Between these radiating lines are series of horizontal parallel lines spaced so as to fill in the intervals. Specimen No. 290/116 has the rim and the upper portions of the neck covered over with corncorb impressions that are quite distinct. Apparently the entire exterior of the vessel was treated with a corncob and later most of the impressions were obliterated. Small patches retain these impressions. The interior of the vessel has a smoothed surface but is rather uneven as to thickness. The vessel tends to be lopsided. Table 5 gives the measurements of all the miniature vessels.

EXOTIC VESSEL OF POSSIBLE CADDOAN EXTRACTION

One very noticeable miniature vessel, field cat. No. 1347, possesses two mouths or spouts (pl. 21). It was found in a cache pit, Feature 9,

Table 5.—Measurements of miniature vessels

Field specimen No.	Diameter of mouth	Diameter of neck	Diameter of body	Height
3428	mm. 35 36 46 63 61 85	mm. 30 32 40 57 61 83	mm. 43 61 59 68 84 97	mm. 45 50 71 63 84

at a depth of 5.8 feet from the present surface. This is a most unusual find because its form is one seldom found in the Upper Plains. Its surface color is mottled in that it runs from a tan to gray and black with fire clouds very much in evidence. When the vessel was complete it was oval in outline and rather squatty in height. The spouts, or mouths, are atop two short vertical necks that are not decorated. Between the spouts and covering on the shoulders a crude herringbone design was cut only moderately deep into the clay. Over the rest of the body appears a series of vertical and diagonal incised parallel lines, some of which crisscross. The lips of the two spouts are crudely punctated. Walls at the top are rather thin, 3.0 mm., and the basal portion is fairly thick, 8.0 mm. (fig. 49).

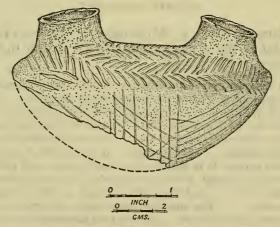


FIGURE 49.—Two-spouted vessel, Hosterman site, showing decorative design.

CLAY DAWDLES

Throughout the site and in some of the midden pits were several objects of clay that appear to have been leisurely and probably unintentionally fashioned into vaguely recognizable or unrecognizable objects. Some resemble minature clay vessels or toys; others are in the form of spheres or marbles, known during my early years as "Dough babies"; still others are nondescript in form. All have been fired to

insure permanency. It is probable that such objects were made while members of the community were seated around campfires on some cold winter night and, to pass the time away, took up clumps of moist clay that were handy and unconsciously molded these objects into shape. When the interest in the object no longer existed it was cast into the open fire and soon forgotten by the maker. Later, when the fire area was cleared away, these objects were tossed into a midden pit along with the ashes or scattered onto midden piles within the confines of the village area.

Furthermore, a lump of compacted ashy clay was found in Feature 2 at a depth of between 1.0 foot and 2.0 feet. It is roughly triangular in outline and has a maximum length of 4.7 cm., a breadth of 3.8 cm., and a maximum thickness of 2.4 cm. Near the apex of the piece there is a truncated conical hole that is widest at its point of entry (1.9 cm.) and tapers down to a diameter of 1.0 cm., continuing through the clay object. Under microscopic examination there are no vertical striations inside the bore, a fact indicating that the object was never used as a form of abrader. The physical composition of the object is rather soft; a fine powder comes off on the finger when rubbed across the surface. The purpose and use of these objects is problematical.

GENERAL STATEMENT

I found Strong's (1940, p. 364) summary of Mandan pottery noteworthy in that he found many traits that are similar to those of the Hosterman series. He stated:

The pottery is rather granular and appears to have been made by the paddleand-anvil method, no evidences of coiling being observed. . . . is tempered with medium to fine grit obtained from granitic rocks broken down in the fires. Colors are predominantly dark but run from almost black, through browns and gray, to very rare buff or even orange tones. The surfaces are often superficially blackened with grease. . . . Red hematite in a powdery form occurs inside some sherds but appears to be accidental, probably as a result of use in mixing paint. The surface of most pottery is marked by vertical grooves and ridges, apparently the result of paddling with grooved or thong-wrapped paddles [simple stamping]. . . . The shoulders and necks of vessels show vertical scratches as though grass-rubbed. All have been smoothed down, and the small vessels often have a plain surface. . . . Rims and necks that are S-shaped are most common [which is not true of the Hosterman site, as shown earlier], flaring profiles with lips somewhat thickened next [which are a minority form at the Hosterman site], and intermediate forms [7 percent]. Castellations, lugs, spouts, and strap handles are rare. . . . The S-shaped rims are usually decorated with horizontal or diagonal twisted single-cord impressions, closely spaced. A curvilinear design suggesting a rainbow is very common. . . . Incised designs are common on the shoulders of vessels, usually consisting of opposed diagonals. About one-fourth of the rims are plain, and finger-pinched rims are common.

On the other hand, Cooper (1949, p. 303) noted that the pottery remains from a number of sites between Pierre and the mouth of the

Cheyenne River were apparently identifiable with Arikara ceramics as described by Strong (1940, pp. 368-369, 381). The Hosterman site, situated about 40 miles upstream from the mouth of the Cheyenne River, could fall well within the sphere of the Arikara settlement pattern and hence one would expect to find to a certain extent comparable pottery forms and types of this group at the site. There is close resemblance between the two.

ARTIFACTS OTHER THAN POTTERY CHIPPED-STONE ARTIFACTS

PROJECTILE POINTS

Six hundred fifty-nine projectile points, either whole or fragmentary, were recovered. Several varieties of stones were used in their manufacture: quartzite, chalcedony, and chert. Two specimens were made of obsidian. Nearly all are thin, and a number show a primary scar on one face, whereas most were made by secondary chipping of a small detached flake. The final shaping of the edges was accomplished by flaking from both sides. Two hundred sixty-nine were sufficiently complete to allow for classification. Flaking is neat and rather delicate in most specimens, and since it proceeded from both sides the resulting point is very symmetrical and slightly lenticular in cross section.

Most of the stone used in the manufacture of projectile points occurs in the vicinity of the Hosterman site, in the riverbed or on the terraces around the site. Some, like obsidian, had to be brought into the area from other vicinities.

The arrow points of the Hosterman site are small, light, and pressure flaked. Four basic styles are represented as well as the inevitable scattering of deviants.

Group 1 (pl. 22, A); 62 specimens.—Triangular in shape with straight or slightly convex edges; sides are slightly longer than the base; straight bases as a rule, but there are some slightly concave or convex bases that occur rarely.

Length: Mean of 14 mm., ranges from 13 mm. to 19 mm. Width: Mean of 13 mm., ranges from 9 mm. to 18 mm.

Thickness: Mean of 3 mm., ranges from 2 mm. to 4 mm.

GROUP 2 (pl. 22, B); 112 specimens.—Isosceles triangular in shape with straight or slightly concave edges; straight or concave bases. Maximum width at base.

Length: Mean of 25 mm., ranges from 20 mm. to 29 mm. Width: Mean of 14 mm., ranges from 11 mm. to 17 mm. Thickness: Mean of 3 mm., ranges from 2 mm. to 6 mm.

GROUP 3 (pl. 23 A); 21 specimens.—Triangular with straight or convex edges, straight or convex bases. Maximum width at base.

Length: Mean of 34 mm., ranges from 24 mm. to 43 mm. Width: Mean of 24 mm., ranges from 19 mm. to 29 mm. Thickness: Mean of 7 mm., ranges from 5 mm. to 9 mm.

GROUP 4 (pl. 23, B); 66 specimens.—Side-notched, straight-sided triangular, maximum width at base, straight base, slightly concave or convex bases occur rarely. The notches are at right angles to the long axis and are often very narrow or shallow.

Length: Mean of 38 mm., ranges from 18 mm. to 58 mm. Width: Mean of 17 mm., ranges from 12 mm. to 22 mm. Thickness: Mean of 4 mm., ranges from 2 mm. to 6 mm.

MISCELLANEOUS (pl. 23, B); 8 specimens.—These eight specimens were complete and none of them fit into the four basic groups. One small point is stemmed; another is corner notched; several have expanded bases; and the remainder are side-notched but of a different pattern than those of group 4.

MICROBLADES

Microblades (pl. 24) are made of small thin flakes of chalcedony, quartzite, chert, jasper, and obsidian. Unlike the microblades from the areas to the Far North, the blades from the Hosterman site were not struck from specially prepared cores, for not one really good core was found throughout our excavations. Out of the aggregate we separated two groups. Group I are much longer, ranging in length from 25 mm. to 57 mm. Group II are much finer and shorter and range in length from 18 mm. to 38 mm. Both groups are very finely retouched along the edges. Evidently, such small blades must have been inserted into handles of wood, for we found no bone handles that would fit such small flake blades. They were probably used as knives or sickles.

Two of the lots are bifaced in that they were retouched on both faces. Whether these are a form of drill, punch, or perforator of some type cannot be determined.

Others are forms of side scrapers or knives since one or both edges have been very carefully retouched and the very small thin flaking scars indicate that work was performed on these small thin flakes to convert them into workable tools. The initial flakes were not struck from specially prepared cores, for none were found within the area investigated. Apparently, the workmen were skillful chippers, for they were capable of striking off thin flakes from any one core without too much trouble. Not only were they capable of securing thin flakes but they were qualified in casting off flakes of sufficient lengths that could be converted into workable functional tools. If the bulbar end, or the dorsal or underside surface, is placed downward and toward the workers and the worked edge is noted, it will be found that only 30 percent of these small tools were retouched in the left edge.

Many of the flakes, both large and small, show signs of use about one or more edges as though they had been picked up from the scrap heap and used temporarily for scraping or cutting. Once the job was completed or they were too dull to be of further use they were thrown away.

SCRAPERS

Scrapers, since they occur over long periods of time, are much too ubiquitous to be considered as good horizon markers as they first appear in Early Man sites, continuing through the Archaic and into pottery-making horizons. They have become so well adapted that they have continued to be manufactured over long periods of time; thus, their usefulness as "index fossils" has been destroyed.

Scrapers are flake tools. They vary both as to size and form. They are characterized by a plane or slightly curved undersurface (ventral face) surmounted by a dorsal keel or flatness displaying one or more abruptly retouched edges. The working edge is somewhat convex, except in the case of a very thin variety. The convexity is clearly the essential feature. Maximum thickness is not confined to any particular portion of the scraper. They are unifaced and ovate, elliptical, lunate, triangular, subtriangular, trapeziform, circular, or irregular in outline.

The very presence of scrapers portends certain technical knowledge of the preparation of pelts into leather goods for the manufacture of clothing, etc.

I believe Stewart's (1946, p. 45) definition of a scraper is an excellent one. He describes it as:

A primitive thing called a scraper is crude and not at all eloquent until you realize that it points to much else. It means not only a scraper, but a thing to be scraped, most likely a hide; therefore it means a growing ability to kill, to take the hide and cure it. That is just the beginning, for a scraper also shows a knowledge of how to scrape, and a desire for scraping, and enough leisure (beyond the struggle to get food) to allow time for scraping. All this means self restraint and thought for the future, and it implies a certain confidence in the ways of life, because no one would be liable to go to all the trouble of scraping if he did not have the reasonable hope of enjoying the results of his work.

Scrapers can roughly be divided into two classes: end and side scrapers. End scrapers have the working edge or edges on the ends of flakes and are roughly convex, and where there is a central keel it frequently rises up fanwise to meet it. Sometimes much fluting occurs along the side of the flake to trim it into the desired form. End scrapers can be subdivided into: keeled, circular, large and small teardrop, small planoconvex, large and small flake, flat thumbnail, beveled, triangular, subtriangular, peaked planoconvex, and scraper-graver combination. Side scrapers are subdivided into: large flake single edged, large flake triple edged, large planoconvex triple edged, double edged, prismatic flake, thin pointed double edged, and combination side scraper—spokeshave.

Practically all of the scrapers have been neatly made. The majority of the end scrapers occur on especially prepared flakes. The bulb of percussion of the ventral surface indicates that flakes were utilized and purposefully struck off in the manufacture of scrapers. The scraper end, opposite the bulb end, is neatly trimmed and one or more sides are retouched forming a tool with either a rounded, straight, or ogival double working surface. As a rule, retouching occurs on all edges, but it can occur on only one edge. Scrapers are characterized by retouching along one or more edges of the dorsal surface, and the ventral surface is unworked and is either flat or concave as the result of the initial flaking in which the piece was cast off from a core.

MacNeish (1954, p. 246), while observing Slave practices, found that end scrapers were used primarily in fleshing and scraping the skins of the animals they killed. On the other hand, side scrapers could also function equally as well as skinning knives and were used in separating the skin from the animal and in the preliminary removal of muscle tissue from the skin. Both functions appear plausible from the form of the many scrapers recovered from the Hosterman site.

The total collection of scrapers from the Hosterman site includes 777 specimens. Materials used in the manufacture of scrapers appear to represent the entire range of silicious minerals present at the site or in the immediate vicinity of it. They are described as chalcedonies, quartzites, jaspers, cherts, and flints. By far the more common are the chalcedonies.

As described many times, the basic scraper form is the result of striking a core a blow aimed slightly inward so as to produce a short flake. In a number of instances it breaks with a hinged fracture. The flake when viewed from the side is usually considerably thicker at the end opposite to the striking platform and the bulb of percussion. In some there is a pronounced downward curve near the thicker end. When viewed from the top, many are trapezoidal or pointed oval in outline with the greatest breadth at or near the thickened end.

"As is true at so many of the later Plains sites, end scrapers made on flakes are a common type of chipped stone artifact. . . . The only retouching considered to be indispensable was that on the broader end, that produced a more or less straight or smoothly curved working edge and a steep face that intersects the flake scar at an angle approaching 90 degrees. Retouching on the sides was presumably intended to produce the proper shape only; it may be absent if the flake already had a suitable form, or it may be present on only one side. Very thick flakes sometimes show a steep and bold retouch with flake scars from both sides meeting in or near the center to form a longitudinal keel.

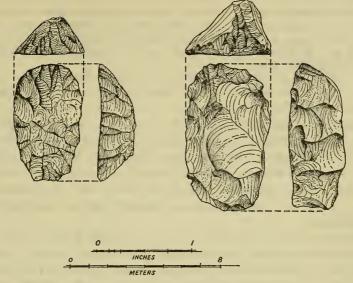


FIGURE 50.—Keeled scraper types.

In others the back was simply left in its original form, often showing longitudinal facets where previous flakes had been struck off the core. It would appear that the makers were not overly concerned with the method by which the result was obtained so long as a serviceable implement resulted" (Spaulding, 1956, pp. 43–44). Nor were they concerned as to the final shape taken by the implement whether it was trianguloid, rhomboidal, or rectangular. There is quite a range in size as to length, width, and thickness.

Lehmer (1954, pp. 57-58), in studying the Dodd site, separated the end scrapers into five distinct groups depending somewhat upon their outline and method of chipping to determine the shape. These same forms, as well as others, occur at the Hosterman site in quantity.

Keeled end scrapers (fig. 50).—Scrapers of this class were made from flakes having flat to concave ventral surfaces and a single ridged dorsal surface. The working edge has been rounded and steeply retouched. Sides taper somewhat to a blunt squared end. Scrapers of this type have been subdivided into type 1 and type 2 (pl. 25).

Type 1 keeled end scrapers.—This type of scraper, represented by 75 specimens, has all sides retouched with the small fluted scars meeting at a central ridge or keel. Overall length varies from 20 mm. to 37 mm.; overall width from 15 mm. to 27 mm.; and overall thickness from 7 mm. to 12 mm. Mean readings would be lengths, 25 mm.; widths, 22 mm.; and thickness, 9 mm.

The retouching along the sides rises up fanwise to a single rounded keel on the dorsal surface varying the thickness of the specimen so that no two are exactly of a uniform thickness. The presence of this type of chipping indicates that the person creating such an artifact was most capable in his ability to cast off these long thin chips uniformly and regularly. Type 2 keeled end scrapers.—This type of scraper, represented by 57 specimens, differs from Type 1 by having a natural triangular keel without being shaped by retouching. The keel is sharp and well defined. Overall lengths vary from 21 mm. to 40 mm.; widths from 17 mm. to 27 mm.; and thickness from 6 mm. to 12 mm. Mean readings would be lengths, 29 mm.; widths, 21 mm.; and thickness, 8 mm.

In outline, these scrapers are roughly triangular with slightly excurvate edges. Type 1 has its dorsal surface retouched all over rising to a rounded keellike prominence.

Small round scrapers (pl. 25, A, p-z).—Twenty-one scrapers have been placed into this category. They are not absolutely round, but tend to be somewhat oval in outline. They vary in maximum length from 19 mm. to 28 mm., in maximum width from 18 mm. to 25 mm., and in maximum thickness from 7 mm. to 10 mm. Scrapers of this form are not too plentiful and are, perhaps, the end result of many retouchings.

Large and small teardrop end scrapers (pl. 25, B, a-d).—Teardrop end scrapers are ovoid in outline and planoconvex in form. All are flake tools. Large teardrop scrapers range in length from 37 mm. to 51 mm., in width from 21 mm. to 30 mm., and in thickness from 6 mm. to 11 mm. Small teardrop scrapers range in length from 23 mm. to 33 mm., in width from 16 mm. to 19 mm., and in thickness from 5 mm. to 8 mm. The ventral sides are always concave while the dorsal surfaces have the edges retouched gradually sloping to a flat keel. The lateral edges are slightly excurvate in outline. Each of these forms is represented by 6 specimens or 12 in all.

Small planoconvex end scrapers (pl. 25, B, e-m).—End scrapers of this type do not conform to any special group but are established solely upon form. Seven specimens have been assigned to this type. In length they vary from 23 mm. to 32 mm., in width from 16 mm. to 22 mm., and in thickness from 7 mm. to 10 mm. One scraper (field cat. No. 1387) has a distinct graver tip near the butt end of the tool.

Large flake end scrapers (pl. 25, B, n).—There are 20 specimens in this group. Flake end scrapers are mostly irregular fragments of flint with a flat ventral surface and retouching on one end. The rest of the artifact was never retouched. Their lengths range from 27 mm. to 56 mm., widths from 14 mm. to 29 mm., thickness from 2 mm. to 11 mm. One specimen (field cat. No. 3049) has a wide notch worked out near the base. The specimen measures 17 mm. across. Apparently this was used to smooth down wooden tools, such as arrow shafts, etc.

Small flake end scrapers (pl. 25, B, o-u).—There are 43 specimens in this group. These are much smaller flakes and, like the larger, are worked on only one end. The difference between the two is a matter of length. These scrapers vary in length from 17 mm. to 29 mm.,

in width from 13 mm. to 23 mm., and in thickness from 3 mm. to 10 mm. One specimen (field cat. No. 2407) has a burinlike base.

Flat end scrapers (pl. 26, A, a-f).—Thirty-three specimens are in this group. All were made of comparatively thin flakes. Measurements show that they vary in length from 15 mm. to 38 mm., in widths from 16 mm. to 30 mm., and in thickness from 4 mm. to 9 mm. The retouched surface may be straight or curved.

Thumbnail end scrapers (pl. 26, A, g-z).—Twenty-two specimens are in this group. Most are very small and very well made. They vary in outline from trianguloid to rectanguloid. In length they range from 14 mm. to 23 mm., in width from 12 mm. to 19 mm., and in thickness from 3 mm. to 7 mm. The average length runs from 17 mm. to 19 mm. The average widths can range between 14 mm. and 17 mm.; and the average thickness is about 5 mm.

Beveled retouched edge end scrapers (pl. 26, B, a-i).—There are two types of these scrapers: those that slope upward to the right and those that slope to the left. Nine specimens have retouched edges that slope to the left whereas only six slope to the right. Whether these are valid types can only be verified by examination of other nearby collections. Most of the ventral surfaces are flat, but there is an occasional one that is planoconvex in outline.

Those scrapers that slope upward to the right come very near to being uniform in length. Three are 25 mm. long; two are 24 mm. long; and only one is 21 mm. in length. Widths run about the same: three are 17 mm. in width; two are 18 mm. in width; and the third is 20 mm. in width. Thickness ranges from 4 mm. to 8 mm. Five are excurvate trianguloid in outline and the other is roughly rectangular.

The scrapers that slope upward and to the left are not quite as uniform as to size. They range in length from 23 mm. to 29 mm., in width from 15 mm. to 21 mm., and in thickness from 6 mm. to 9 mm.

Triangular end scrapers (pl. 26, B, j-r).—Nine specimens. These are excurvate edged triangles and are made from comparatively thin flakes. They range in length from 22 mm. to 29 mm., in width from 18 mm. to 25 mm., and in thickness from 4 mm. to 8 mm. Ventral surfaces are uniformly flat and the dorsal surfaces have retouching on all three sides rising to a rounded keellike prominence.

Slightly modified nodular end scrapers (pl. 27, A, a-l).—End scrapers of this type were made from pieces of jasper that still retained part of the natural unmodified outer surface of the rock. The shape of these flakes seemed immaterial to the one manufacturing end scrapers of this type. Some of the flakes are roughly rectangular in outline, others are triangular, and the rest are somewhat irregular in shape. From the table of measurements in Appendix 4 one will note that most of the flakes are about 6 mm. thick, but the range is from

4 mm. to 10 mm. Lengths of the flakes are very consistent, and the greatest variation occurs in the widths. Cutting ends have been

sharply retouched either in a slight arc or straight across.

Trapezoidal end scrapers (pl. 27, A, m, o).—Scrapers of this type, 15 specimens, are roughly four sided; two of which are parallel. Of the total number, 9 have all four edges retouched while the remaining 6 have retouching only along three sides. Cutting edges can range in shape from a pronounced arc to almost a straight line. Size is fairly uniform.

End scrapers with left carinate (type 3).—These 37 specimens are a form of keeled scraper in which the keel appears as a distinct flake scar ridge on the left side of the dorsal surface, creating the thickest part of the tool. All are medium sized and several of them have had the positive bulb of percussion chipped away to bring about a flatter ventral surface.

Contrariwise there are 32 other specimens, type 4, that possess a distinct ridge along the right side of each scraper. Whether these are distinct and purposeful tools cannot be determined, but there are far too many of them to be accounted as just accidental objects, or end

scrapers.

What was once a type 3 end scraper ended up by being an eccentric scraper; not only were the edges retouched but the working edges were retouched on the ventral surface, creating a very pronounced bevel. The cutting edge now resembles similar edges found on gouges or chisels. Whether this particular tool was intended to function as a gouge cannot be determined, but it is well suited for just this purpose (field specimen No. 1008).

End scraper-graver combination (pl. 27, A, p-v).—A few end scrapers had short graver tips at one or both sides of the working face. These were made by carefully chipping a small, fine, sharp point along one edge of the tool. The ventral face is flat, as was that of the scraper itself, and the edges are beveled and brought to a point. At the present time these points are not as sharp as they once were but have been rendered dull through apparent use. Evidently this trait is a carryover from an earlier cultural manifestation and was in its terminal phase at the Hosterman site, as represented by the small number of specimens.

Modified end scrapers—(two specimens).—These are slightly triangular in outline with a pronounced groove down the dorsal surface, creating a moderately high ridge on the left-hand side of the scraper and one less pronounced on the right-hand side. The two side edges have been carefully retouched, terminating in a rounded butt, and the scraping edge was given additional retouching to give the ventral surface a beveled inward curve while the dorsal surface was carefully

beveled to create a chisellike cutting edge. Perhaps artifacts of this type were used as a form of gouge.

Twenty-three fragments of end scrapers are too indefinite to be classified into the various types found at this site.

Side scrapers.—Side scrapers are flake tools. It appears that their essential characteristic is the presence of a scraping edge formed along one or more sides of a suitable flake as the result of secondary working or retouching. The ventral surface, or under face, is unworked as a rule. The scraping edge is produced by secondary flaking from the ventral surface upon one or more edges. They vary greatly in size and shape depending primarily upon the type of flake chosen to be converted into a side scraper.

It would seem that any suitable flake, regardless of size or shape, could have had its edges or edge trimmed for use as a scraper. The working edge is somewhat convex in outline. Several of these flakes are very thin, long, with parallel sides. Most of the Hosterman site side scrapers are made from some sort of chalcedony, quartzite, chert, or jasper. The trimmed edge, in most cases, was formed by pressure chipping in which small fine chips were cast off. On the other hand, a minority was just the opposite in that large rough flakes or chips were cast off with no care taken as to placement of the chips, resulting in large, thick, uneven edged flakes converted into side scrapers. Usually the larger scrapers were made of quartzite.

Side scrapers from the Hosterman site have been subdivided into the following types: Small flake side scrapers, 111 specimens; mediumsized flake side scrapers, 15 specimens; large flake side scrapers, 3 specimens; lunate side scrapers, 30 specimens; triple-edged side scrapers, 6 specimens; prismatic side scrapers, 12 specimens; double-edged side scrapers, 13 specimens; and combination side scraper-spokeshave; 15 specimens.

Small flake side scrapers.—These were made from the small ubiquitous flakes found scattered at knapping stations within the site or on various dump heaps. The side edge was, as a rule, very carefully chipped with very fine retouching, but there is an occasional specimen whose scraper edge was made by casting off much larger and heavier chips. Measuring along the scraper edge, the greatest and smallest lengths are 36 mm. and 16 mm., greatest widths of the flakes utilized ranged from 31 mm. to 15 mm., and the thickness varies from 2 mm. to 11 mm.

Large flake side scrapers (pl. 27, B, a-c).—Three have the following measurements:

Length	Width	Thickness
107 mm.	50 mm.	9 mm.
63	5 3	17
122	66	22

These measurements would indicate that any flake over 60 mm. in length converted into a side scraper would immediately be placed in the large-flake category.

Double-edged side scrapers (pl. 28, A, a).—Scrapers of this type have opposing sides retouched to scraper surfaces. Measurements show considerable variations: in length, 22 mm. to 67 mm.; in width, 14 mm. to 41 mm.; and in thickness, 4 mm. to 10 mm. Five of the specimens have a carinated dorsal surface, and the remainder have a fluted dorsal surface.

Triple-edged side scrapers (pl. 28, A, b).—Scrapers of this type have two sides and the adjoining end of a flake converted into scraping surfaces. The adjoining end can be convex or straight in outline. At the Hosterman site we have two subtypes depending solely upon size. Type 1 scrapers range in length from 67 mm. to 130 mm., in width from 30 mm. to 65 mm., and in thickness from 13 mm. to 16 mm. Type 2 scrapers range in length from 20 mm. to 28 mm., in width from 18 mm. to 29 mm., and in thickness from 4 mm. to 6 mm.

Prismatic flake end scrapers (pl. 28, A, d).—These tend to be triangular in cross section and have only one of the edges converted into scraping surfaces. They range in length from 22 mm. to 49 mm., in width from 10 mm. to 19 mm., and in thickness from 5 mm. to 11 mm.

Lunate side scrapers.—Lunate side scrapers have one convex edge that was retouched to a scraping edge. Most of the flakes when cast off had an edge roughly convex in outline and were converted into this type of scraper. Only the retouched edge was worked; the rest of the surface of the artifact was untouched. The size of the flake varies in length from 21 mm. to 61 mm., in width from 10 mm. to 44 mm., and in thickness from 4 mm. to 14 mm.

Side and concave scrapers (pl. 28, A, c).—Scrapers of this type are combinations of a side scraper and a spokeshave or a concave scraping surface. Most of these have only one concave surface, but one of these scrapers has two concave surfaces. These are carefully retouched so that they are not the result of a false blow or breakage. The flake may range in length from 27 mm. to 78 mm., in width from 18 mm. to 42 mm., and in thickness from 5 mm. to 14 mm.

Another form of side scraper is that which has two sides that join to form a dull point. Both of the sides are scraper surfaces. These have been called *pointed side scrapers* in that the two sides may vary in outline from straight to slightly convex. If the two sides are projected to a point, the angle formed may range from 13 degrees to 87 degrees. This diversity indicates that there is wide variance at which the two sides may join to form the blunt point. There is quite a latitude in the size of the flake utilized both as to length and thickness. The juncture of the two scraping surfaces may vary from a blunt tip to one that is somewhat squared (pl. 28, A, e-h).

Modified side scrapers (1 specimen).—This is a small chalcedony flake that had one of its edges carefully retouched. The opposing edge was not only chipped but rubbed to form a backing to the cutting surface (pl. 32, A, b). This is an unusual treatment and one not often encountered at this site.

OVOID BIFACES

Several small bifacially chipped stone implements (?) were separated out of the assemblage of stone artifacts. These are roughly oval shaped and resemble in a very general way the shape of a human patella or knee cap. In some instances the chipping has been carefully performed and on others the object has been shaped by means of percussion chipping. Materials were either chalcedony or quartzite (pl. 29 B).

Length: Mean of 34 mm., ranges from 23 mm. to 41 mm. Width: Mean of 25 mm., ranges from 15 mm. to 35 mm. Thickness: Mean of 9 mm., ranges from 6 mm. to 13 mm.

They are not numerous and occurred at various levels within the site. MacNeish (1958, p. 117) reports that "ovoid bifaces occur in all cultural phases," and, "They occur in all horizons so far found in eastern Manitoba and were very numerous at the Larter site."

BIFACE CHOPPERS

Choppers are not numerous. Two are roughly circular in outline; one is ovoid; and two are ovoid but notched as for hafting. All bear bifacial chipping and are shaped by means of percussion chipping. Several have some retouching and appeared to be battered, a condition that may have resulted from use.

Length: Mean of 98 mm., ranges from 72 mm. to 123 mm. Width: Mean of 77 mm., ranges from 63 mm. to 90 mm. Thickness: Mean of 29 mm., ranges from 21 mm. to 37 mm.

These occur in all levels from 1.0 foot to 6.0 feet and are by no means diagnostic of the cultures represented.

KNIVES

Stylized knives are characterized by the presence of a double-beveled working edge. Other artifacts have been classified as being knives or having served temporarily as knives. Ribbon flakes with or without retouched edges have also been classed as knives in accordance with traditional usage and probable function.

Nearly all of the knives from this site can be separated into five categories: (1) large four-edged roughly rectangular (pl. 29, A, b), (2) four-edged slim and with parallel sides and rounded ends (pl. 29, A, a), made from elongated vein chalcedony, (3) four-edged diamond shaped specimens (pl. 29, A, d, g, h), (4) bifaced blades of several

forms mostly leaf-shaped (pl. 29, A, f), and (5) ribbon flakes (pl. 32, A).

The four-edged roughly rectangular knives are made from elongated fragments of vein chalcedony. Most are fragmentary. One outstanding specimen (pl. 29, A, c) has a curved blade that is not rare but does occur less regularly than the straight-edged forms. The finished form was undoubtedly influenced by the peculiar nature of the material, for this vein chalcedony occurs as flat, thin slabs. A serviceable knife could easily be manufactured by simply selecting a fragment of the proper size and retouching the desired edges to form a cutting edge. Some knives have only one cutting edge along the long side of the artifact. Others not only have this one cutting edge but the opposing edge sharpened, while others have all four edges chipped to a double bevel. Those with only a single cutting edge may have been hafted, or, when large enough, held in the unaided hand and used without a handle.

Also present were several thin-bladed forms in which the chalcedony was chipped so that the original cortex no longer remained (pl. 29, A, e). Cutting edges are fairly sharp. Such artifacts when tapped with a slight blow emit a ring almost metallic in sound. Knives like this are much too thin and delicate to have been held in the unaided hand. They must have been hafted when originally used.

The four-edged diamond-shaped variety is present but in no great number. Not only are the cutting edges worked but so are the faces. A form of quartzite and some chalcedony were used in the manufacture of such knives. In cross section they are lenticular.

Bifaced forms are of several shapes but most of them are leaf-shaped.

Ribbon flake knives are well represented in the collection (pl. 32, A). Many show that they must have been struck from cores primarily as temporary knives. Not a great deal of work was ever expended on them. When they became too dull through use to function properly they were soon abandoned. The dulled edge or edges bear small nicks with very fine chips that were not the result of intentional chipping but were brought about by using the flake as a cutting edge.

Some of the ribbon flake knives were pressure chipped on only one edge; others were chipped on both of the long sides from both faces, resulting in a double beveled effect. Those with only a single chipped edge are hard to distinguish from side scrapers, for both were fashioned by pressure chipping. Ribbon flake knives were made from chalcedony, quartzite, jasper, and chert. Some of the smaller knives are in the range of microblades and probably were hafted so that several were used in a common artifact.

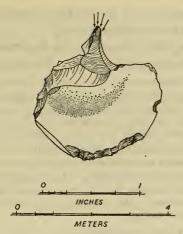


FIGURE 51.—Burin with arrows indicating position and direction of flaking.

BURINLIKE IMPLEMENTS

Burinlike implements have not been recognized as part of the usual cultural assemblage of the Plains. This does not exclude the fact that such implements were manufactured and used by the occupants of the Plains, for, in the past, they were mostly overlooked and very little attention has been given to other than well recognized artifacts of established categories.

More and more attention is being given to spalls and to the so-called broken artifact as well as to the castoff material resulting from the manufacture of stone artifacts. In this mass of material there have been found many heretofore unrecognized artifacts that have enriched the cultural picture of the Plains. True, the source of the various types of stone cannot always be traced since the Plains have been subjected to glacial action; neither can it be told just how far the material used in the manufacture of stone material was carried. Unless there are undisturbed deposits nearby or within reasonable distance of the sites under investigation, we cannot be certain that it is of local origin. Therefore, artifacts must be classified according to the type of stone from which they were made without any reference as to source.

This is true of an unusual chalcedony artifact recovered from Feature 3, a cache pit, at a depth of between 2.0 feet and 2.5 feet from the present surface. This is a combination tool, scraper—burin 5 (pl. 28, B, and fig. 51). One end has been shaped into a well-made end scraper and the opposite end has been altered into what has been classified as resembling a type of burin known as an angle burin with a

⁵ Both Drs. H. R. Collins and R. Solecki have examined this artifact and have classified it as a true burin.

truncate concave retouch, or as the European classifier would say, "burin sur troncature retouchée concave."

To be classed as a burin (or graver) it is necessary that the object should have at least one graver facet. Burkitt (1956, p. 63) says:

Let us consider what this means. When secondary work is done on a blade or flake as, for example, when an edge is to be trimmed, vertical blows are dealt on the edge, the flake or blade itself being held horizontally. This is invariably the case, as a moment's thought will show. In the case of a graver, however, a variable blow is dealt at the point of the blade or flake down the length of the implement which is itself held vertically. The resulting flake scar, which truncated the edge of the blade or flake, is known as the graver facet. Before accepting a graver as such, therefore, it is necessary to be sure that there is at least one graver facet present, the existence of which can be demonstrated or not according to the position on the suspected facet of the negative bulb or percussion and the surrounding rings.

According to the classifier, angle burins

... have trimming on the other side of the working edge to the graver facet. When the trimmed edge is at right angles or nearly so to the longer axis of the blade or flake, the term "transverse" is given. There its direction is inclined at an angle to this longer axis and the term "oblique" is applied. The trimmed edge itself in both cases may be straight or concave, and in the oblique variety also convex, but not of course in the transverse variety, as no working edge would result. If the student will draw for himself a transverse convex angle burin, he will at once see the truth of this statement. [Ibid, p. 65.]

STONE PERFORATORS OR GRAVERS

Perforators or gravers (pl. 31) were made by pressure chipping a flake on one end into (1) short needlelike tips by beveling the sides so that they met on the dorsal, or top, surface leaving the ventral, or undersurface untouched, i. e., they were retouched from one plane face only, and (2) larger and heavier tips were made by using this same pressure chipping method on larger and slightly heavier flakes. All graver tips are triangular in cross section. The smaller artifacts with graver tips varied in length from 18 mm. to 31 mm., in breadth from 15 mm. to 22 mm., in thickness from 3 mm. to 8 mm., and the tips themselves from 1 mm. to 4 mm. in length. The larger specimens varied in length from 26 mm. to 48 mm., in breadth from 13 mm. to 24 mm., and in thickness from 4 mm. to 15 mm. Both types are within the limits of those reported by Roberts (1935, pl. 13) from the Lindenmeier site in northern Colorado.

Most of the flakes were modified along the sides and some on the dorsal surface but the ventral surfaces were never intentionally altered or modified.

Small perforators or graver tips also occurred on other tools. All were formed by this same type of retouch from one plane face. One of the lamellar flake side scrapers had a well-preserved graver tip

worked at one corner of the blade (pl. 32, A, n). Several end scrapers show working corners, and all were definite graver tips. Others had this same feature, but on a slightly reduced measure. Whether the size was intentional or the result of prolonged use could not be determined. It appeared to be intentional, but we could not be sure of this. If it was intentional, then it could possibly represent a graver variant. These tips were all worked at the ends of the broadest beveled face of the scraper and their shaping was an integral part of the shaping of the scraper edge and was not a later modification or an unintentional feature. Most of these show, under magnification, that they had received considerable usage and were worn somewhat at the tip.

LAMELLAR FLAKE TOOLS

A class of tools utilizing thin lamellar flakes of chalcedony or chert was found at the Hosterman site. These were either small knives or side scrapers (pl. 32, A). Knives are represented by b, c, d, e, k, l, n, o, and q. Specimen b is unique in that it was pressure-chipped along three edges from both sides with the exception of the wider bottom or basal edge. Later the S-shaped edge was abraded so as to partially obliterate the scarified edge, enabling the artifact to be either hafted into some sort of slotlike aperture in a bone or wooden handle or to facilitate its use without the use of a handle.

Specimen c received a double beveled edge along three of its edges. Chipping was very carefully controlled and is very uniform in size.

Specimen n is a combination tool, a knife, scraper, and graver. All edges have been worked. At one corner is a small graver tip which under magnification displays much finer chipping, attesting to the fact that it was functional.

The best of the lamellar flake tools is represented by specimen d. This was struck from a core of quartzite and is roughly rectangular in outline. All edges have been carefully chipped creating a beveledged implement. Earlier flake scars are shown on the dorsal surface of the implement.

Specimen b (pl. 32, B) is the larger of these tool types and is probably a part of a much larger tool. The sides are roughly parallel and the long sides have been given a bevel sloping upward to the top or dorsal surface. The beveled edges are more prominent on this artifact than on others in the collection.

With the exception of specimen a they fall within a range whose lengths vary from 28 mm. to 49 mm., breadths from 13 mm. to 22 mm., and thicknesses from 2 mm. to 6 mm. Specimen a measures 56 mm. in length, 22 mm. in breadth, and 4 mm. in thickness.

Gravers, as a rule, consist of chance flakes modified in that the needlelike tips were formed on one side or an end. Any flake was

suitable provided it appealed to the worker. These could be chosen from the flaker's discard pile or at random from the surface of the site. The small tips did not occur just by chance but were purposefully made so that the under side is always flat and the two upper sides are beveled so as to bring the tip to a very fine point. Gravers can be distinguished from drills in that gravers are retouched on only two sides and drills have all sides retouched. On top of this a graver can have one or more such tips.

GROUND AND PECKED STONE TOOLS

Tools in this category were formed by grinding their surfaces or by pecking. The pecked stone tools include pebble hammerstones, full-grooved mauls, anvil stones, and paint grinders. Ground stone tools include slabs of stone with grooves worn into them, anvil stones, and some rubbing stones, besides a grooved ax.

Anvil stones.—These are irregular nodules of granite, quartzite, or other tough crystalline rock. Many of them have been subjected to much abrasion. They were found scattered throughout the site.

It has been suggested that anvil stones were used to pulverize dried meat, seeds, and berries by pounding rather than grinding and in so doing the anvil stone was "probably set in a sort of rawhide 'pannier' and the food substance placed on it to be crushed with a stone-headed pounder. This was the method followed by the Dakota, who in some instances at least used anvils almost identical to those of the Pawnee' (Wedel, 1936, p. 75). Since this site is neither Dakota nor Pawnee, it has been attributed to a pre-Arikara—Arikara group in whose cultural assemblage there is comparable agreement.

Rubbing stones.—These are usually flat, round stones, and range in size from small pebbles to those easily handled in the fist. They were used as a rule without any retouching and were probably used in rubbing down hides as several have acquired a rather high polish and are very soft and smooth to the touch. Several show very shallow parallel scratches resulting from use.

Pecking stones.—These are small pebbles of granite, quartzite, diorite, or some such hard stone. Usually, these are unaltered pebbles; some are round, others are natural elongated forms. Both forms show much battering or abrading. Similarly, others that are small, flat, and circular are worn about the edges.

Paint stones.—These paint stones are usually highly granular stones that were chosen because of this trait. Several show that they had been used to reduce lumps of hematite into powder by grinding. Specks of hematite have worked themselves well into the surface of these stones and cannot easily be rubbed off. Paint stones are not plentiful and are widely scattered in the site.

Grooved mauls.—These mauls are represented by two specimens. They are made of granite boulders, roughly shaped, smoothed, and grooved about the center for hafting. The smaller and squattier specimen is oval in cross section while the larger is somewhat trianguloid in cross section. In actual weight there is a very little difference. The smaller specimen weighs exactly 4 pounds 6 ounces and the larger one weighs 4 pounds 12 ounces. Neither is badly battered. Both show that they had received considerable usage, probably in the crushing of dried meat, nuts, or berries. Exterior surfaces are finely dimpled (pl. 30, B).

Grooved stone ax (pl. 30, B).—Only one stone ax was recovered and this is not a complete specimen, for the butt end is missing. Apparently this is an unusual type in that it has a groove completely encircling the implement separating the blade from the butt. During the life of the implement the butt section had been completely broken away and another groove was being pecked ahead of the older groove which was never finished, for the blade became broken and the tool discarded. The tool was well fashioned and finished. The blade is still fairly sharp. This particular ax was made of a greenish-colored diorite, a stone which does not occur locally. It must have been traded into this region from the general Southwest for it resembles those occurring in that region. In its present form it weighs 2 pounds 4 ounces. Both fragments were found in Feature 9, a cache pit, at a depth of between 7.0 and 7.5 feet.

Pumice abraders.—Pieces of waterworn pumice or naturally burned lignite of various shapes and sizes, some less than an inch across up to pieces as large as grapefruit or larger, were utilized as abraders. Several have faceted sides, others have narrow shallow grooves, and still others have wide and deep grooves. The shallower grooves were probably made from sharpening pointed bone and wooden implements while the wider and deeper grooves were probably used and made as arrowshaft straighteners and smoothers.

Sandstone abraders.—Bits of sandstone, of various degrees of coarseness, show one or more surface grooves resulting from the rubbing of honed implements across them. Some are irregular bits of sandstone and others appear to have been shaped into rough rectangular blocks and used as hones or specialized whetstones for sharpening bone awls or smoothing arrowshafts.

Arrowshaft straighteners.—Implements for this purpose were made of sandstone and display one or more grooves running the length of the implement. Usually they are rectangular in shape, but some are triangular in cross section. Whether these constitute distinct types or just individual likes as to shape must be taken into consideration. Some may have liked the rectangular form, others preferred the tri-

angular, while still others were not too discriminating and used whatever shape of sandstone came to hand. Probably too much stress has been brought to bear upon implement shape by both the professional archeologist and the amateur. They both fail to take into consideration that they are not only dealing with inanimate objects but with human personalities as well and it is the latter that are the real determining factor. Personal likes and dislikes play a distinct role in the implement form and use according to the type of material to be utilized.

Handstones.—Several roundish stones were recovered not only from cache pits but from the general site. These have been classified as handstones because they display a certain amount of wear. Five of these are outstanding in that they were pecked and then smoothed. They are roughly circular in shape and resemble, to a certain extent, stone balls. None of the edges have been battered even though they show considerable wear, which would appear to indicate that such pieces were never used as hammerstones but were probably used for pounding a resilient substance such as softening a dried up animal hide, dried beef during the manufacture of pemmican, or even soft berries. One specimen, in particular (field specimen No. 2014), appears to have had a fatty substance driven into the cortex of the stone giving it a distinct color and feel. Maximum lengths of these handstones range from 55 mm. to 81 mm. Minimum lengths range from 51 mm. to 75 mm. Maximum thickness varies from 34 mm. to 57 mm.

Another form of handstone is represented by a single specimen. It is disk shaped and almost circular in outline with opposing faces. One of its faces is almost flat and the other is a flattish dome with a shallow central pit sunk into it. The pitted face shows no evidence of having ever been used as a grinding tool. The pit probably served as a finger hold. Maximum and minimum lengths are 52 mm. and 50 mm. Maximum thickness is 34 mm.

Utilized pebbles.—Small river hardheads were among the stones present within the site. Most of them are oval in outline and somewhat flattish. In many cases the ends of the long axis had been pecked or show that they were utilized as either light hammerstones or used to peck away irregularities on the faces of other stones to be utilized as tools.

Then too, there are those that have one of their flat faces rubbed very smooth and somewhat polished. Such tools were probably used in the manufacture of pottery since they could have easily functioned as an anvil opposite the paddle used in shaping clay into vessels.

Others are egg shaped with a tendency towards flatness. Both of the flat faces bear a number of parallel scars at right angles to the main axis and cover an area roughly 27 mm. in diameter. These surfaces were smoothed prior to scarification. Their purpose and function are not known.

Practically all of the rock, of any size, found within the site was put to some use at one time. Not all are recognizable tools. Some of the larger fractured pieces may have served as a form of chopper; others are hammerstones, etc.

HEMATITE AND OTHER PAINT SUBSTANCES

During the partial exploration of the Hosterman site, several worked nodules of hematite were found with faceted faces. These must have been rubbed to reduce them to a powdered form to be used as a paint. Then, too, a couple of lumps of a whitish material were found along with a lump of a creamy whitish material and a lump of powdered red ocher. These substances were found mostly in midden pits, Features 9 and 22, as well as in small cache pits within the circular house pattern of Feature 22.

Since no paint brushes were found during this period it raises some doubt as to how this paint was applied. Various sherds had paint stains on their interior surfaces. That this red paint was put into these sherds as a container or as a crude sort of palette seems very likely but it cannot be proved that such was ever the case. Several of the bone implements bore reddish stains as though they had come in contact, at one time or another, with red paint.

Catlinite.—Four fragments of catlinite pipes were recovered from Features 10, 16, and 22. The largest of these four pieces is about half of a bulbous pipe bowl. The bowl rim has been brought to a sharp edge rounding somewhat as the wall proceeded downward. The basal section of this fragment is covered with numerous vertical parallel thin scratches and the major part of the exterior has been smoothed and polished. The smaller fragment of a pipe bowl appears to be tubular in form. It, too, is covered on the exterior with a number of scratches that form a rough hatchure. One of the broken edges had been reworked, and four shallow grooves partially cross the thickness of the wall. The lip of this particular pipe is flat and bevels slightly outward. The other smaller fragments are terminal sections of pipe stems. Some work was started to reshape the larger portion but this was never completed and the section was discarded.

A large section of rough cathenite was recovered that has one cut surface. Shallow scratches cover the surface of this piece. A number of its edges have been rubbed but still the piece does not conform to any known object. It is just one of those partially worked pieces which appear to clutter up the site without indicating their purpose.

A small well-rubbed piece of catlinite, 21 mm. in length, 9 mm. in width, and 8 mm. in thickness, was found at a depth of between 2.5

feet and 3.0 feet in the village midden. Whether catlinite was ever reduced to a powder and this product used as a body or facial paint or dust is not known to the writer but this piece resembles similar pieces of rubbed stone which were put to this use.

One other small flat nondescript piece of catlinite completes the

collection.

Belemnite.—Sections of belemnite, a conical fossil shell of an extinct cephalopod, were recovered from two of the cache pits, Features 9 and 13, and from various isolated midden areas within the site. The blunt spicule ends of two specimens were encircled as though some sort of attachment was added so that they could be suspended. Whether these were worn on the person or attached to some sort of garment could not be determined. Three other sections were unworked.

BONE ARTIFACTS

Several types of bone tools were found in considerable quantity at the Hosterman site. They were particularly abundant in cache pits, midden areas, and to some extent in house fills. Preservation was exceptionally good even though many were broken by the aborigines themselves during the period of occupation.

Normally, bones from bison, deer, and pronghorn were converted into major types of tools but the bones from other types of animals were converted into other types of tools whenever the need arose.

Cut animal bones.—Several of the articulative ends of deer, pronghorn, turkey, and other bird bones were found that were severed from their shafts. A V-shaped cut was made almost into the medullary canal, and with slight effort this section was separated from the shaft. These ends are the waste from the manufacture of tubes and beads (pl. 33, A).

The most outstanding bone tools are those manufactured from the scapulae of bison. In this group are scapula hoes, digging tools, knives, scrapers, hide scrapers, thong stretchers, and even sickles.

Scapula hoes.—This ubiquitous Plains implement was quite prevalent at the Hosterman site. Scapulae of bison were not greatly modified in the process of manufacturing these implements (pl. 33, B). The articulative ends remained unaltered, and there was no evidence that any hafting was ever attempted. The making of a hoe necessitated only the removal of the spine and the posterior border (postscapular process and acromian), from the exterior surface to about the level of the fossae, thus creating a more or less flat implement. Before the scapula could be put into use as a hoe the working edge (suprascapular border) must be trimmed and sharpened. On some the areas from which the postscapular process and acromian had been removed were left relatively rough. On others this was smoothed

down. Subsequent usage would eradicate any evidence of working on the suprascapular border, for it would quickly take on new character and the area would be given a high polish by soil abrasion, the blade would become beveled and in a number of instances deeply scored. From the evidence at hand, one might say that scapula hoes continued to be used until they became exhausted and quite short; they were then discarded as no longer serviceable.

The mortality rate was rather high among scapula hoes. When this occurred the thinner interior sections, as well as other sections of unworked scapulae, were converted into many other types of tools. Knives, hide scrapers, and possibly thong stretchers are among some that can be listed.

Scapula spines.—The spines were removed from the shoulder blade when the blade was converted into hoes, and the spines themselves converted into digging tools. The sharp picklike distal end readily lent itself to this purpose. Wear was never excessive on any of the Hosterman specimens and apparently they were only expedient tools and were quickly discarded (pl. 34, B, b).

Metcalf (1956, p. 306) considers implements such as these to be a "type of awl that has not been previously recorded from the Plains." The Dodd site gave up a number of tools made from these scapula spines. Those being reported from the Hosterman site were recovered from the diggings by pot hunters in a midden area prior to our work there.

Scapula knives.—Knives of various shapes and sizes were made from thin sections of bison scapula (pl. 35, A). Some are roughly oval in outline with one or more edges sharpened; others are rectanguloid shaped; still others are roughly diamond shaped. Practically all have acquired a very high polish even though there is considerable variation in the overall lengths. The shortest specimen measured 12.5 cm. in length; the longest measured 19.6 cm. in length. Most knives were made from the flat section between the acromian and postscapular process; others were derived from the postscapular section of the bones having one exposed edge of cancellous material opposite the working edge. Constricted sections may have served as handles. Their period of usefulness was evidently short, for many fragmentary knives were recovered from the site.

Scapula cleavers.—Several knifelike cleavers are in the collection (pl. 36, A). These were fashioned from bison scapulae by cutting lengthwise through the postscapular fossa so that a long comparatively thin blade was created. The back edge of the cleaver is considerably thicker and a portion of the acromian or postscapular process was left intentionally for the purpose of strengthening the implement. Like the knives, the tapered end served as a handle.

Among the fragmentary forms were those that were spatulate in outline and comparatively thin. These were made from the postscapular fossae sections with the sides ground to a thin beveled cutting edge and the ends neatly rounded.

Scapula scrapers.—These were made from fragments of the postscapula fossae sections. Most were worked from fragments into rectanguloid shapes. Those that were made from sections of the postscapular process and acromian were much thicker and required much more work to complete. Others were cut so that only a fractional

part of the scapula spine formed one edge (pl. 35, B).

Scapula hide scrapers.—Like other scapula scrapers, these were cut from sections of bison scapulae. Most of them are either from the posterior border and display scars where the ridge was left intact or partially obliterated or were cut so that only a fractional part of the scapula spine formed one edge. Basically, these tools are rectanguloid in shape with a constricted section forming a ready handle. The working portion of the blade has parallel sides and the cutting surface was given a pronounced bevel over the entire edge. They roughly resemble the blade in a modern carpenter's woodworking plane in shape (pl. 35, B). On the backs there appear series of shallow parallel scratches which have been acquired during the life of the implement. The specimen shown in plate 35, B, is 13.0 cm. in length, 6.4 cm. in width, and is the best of the type found at the Hosterman site.

Thong stretchers.—A single thong stretcher was found. This was made from a small thin section of a bison scapula (pl. 34, B, b), whose working edge was given a pronounced U-shaped notch. The edges and sides of the notch acquired a very high polish and the sides were well smoothed. The specimen shown here is 7.5 cm. in overall length and 4.1 cm. in greatest width. The notch itself measures 3.2 cm. across the opening, 0.7 cm. near the base, and is 1.2 cm. in depth.

Scapula sickle.—What appears to be a fragmentary scapula sickle was recovered from Feature 25, a midden pit. Metcalf (1956, fig. 103, b), features a complete sickle derived from the floor of a rectangular house at site 39LM3, Lyman County, S. Dak. This fragment appears to be a section of the handle with its adjoining notch where the blade joins the handle. From the base of the handle up through the notch this object displays considerable wear, accompanied by a high polish. It is 25.0 cm. long. Another formative sickle is illustrated in plate 34, B, a.

Flakers.—Four flakers were made from bison rib bones. The heads of the tools were rounded and the tips were brought to an abrupt dull point. These are distinctly triangular in cross section and one side appears to have been smoothed, for it has a smoother feel than does the opposite side. The cancellous tissue is still in evidence. Lengths of these four flakers are 72 mm., 64 mm., 50 mm., and 32 mm.

Needlelike tool .- A very thin sliver of bone was converted into what appears to have been a needle. It is incomplete in that the butt, or eye, portion is missing. This object is 75.5 mm. in length and at the broken base it measures less than 2 mm. in diameter. Needles of this sort have not been described from sites in the Plains of South Dakota. Whether this is an intrusive tool from North Dakota or out of Minnesota cannot be determined.

Shaft wrenches.—Shaft wrenches of various lengths were made from sections of bison rib bones. Most of them have but a single hole, and these tend to be oval in shape with the sides beveled from use. Apparently the wrench was held at a slight angle to the shaft in the straightening process. In one the hole is beveled in three directions. This is not the rule but an exception. Some of the rib bones are highly polished. Very few were complete, for most of them had been broken and apparently discarded by their owners. This fracture tendency is at right angles across the hole dividing it in half.

An incomplete wrench was attempted. On one flat surface of a rib fragment there appears a conical pit 3 mm. in depth and 8 mm. across the top that had penetrated the cortical bone and started into the cancellous portion of the core. Drilling was attempted only on one side. There was no evidence that any attempt was made to drill from the opposite side to meet this section of the perforation.

Knife handles.—Knife handles were made from segments of bison ribs. These were grooved along one edge sufficiently deep to allow for the insertion of a stone knife blade. A complete knife was recovered from a shallow cache pit beneath the floor of Feature 22, a circular house (pl. 36, B). Other handles and blades were found unjoined.

Hide grainers.—Sections of bison humeri and femurs were sectioned so that a wide expanse of cancellous tissue was exposed. Four specimens were recovered from the Hosterman site. These were used

during the process of dressing down hides into usable pelts.

Notched ribs.—Two fragmentary ribs have opposing notches at the ends at right angles to the long axis. These were meant to receive either string or gut attachments. Not having heard that any of the Plains Indians ever made use of a bullroarer, it is suggested that these two objects could easily have functioned along this line. This could have been some boy's toy.

Cut ribs.-Numerous sections of ribs were recovered that were undoubtedly either unfinished and broken artifacts or rejects. Some

had acquired a high polish.

Punches.—In Lehmer's definition (1954, p. 66) he describes his Group 1 type as: "Irregular plates split from bison or elk ribs, cancellous tissues of split surface sometimes ground down, sometimes unmodified; edges unmodified; butts rounded; tips worked down to a blunt point."

Two similar specimens were found at the Hosterman site. Both of them follow a common configuration, but one has its edges smoothed and polished and the other has untreated edges; one has a tip that was brought to a modified point, and the other has a spatulate point. The complete specimen, except the extreme tip, measures 168 mm. in length, and 25 mm. in width across the base, and has an average thickness of 6 mm.

Scapula hoes with deep U-shaped notch.—This notch which was worn or cut into the bit end may have functioned, under certain conditions, as a type of thong stretcher. The inner edge of the longer spur has been beveled while the edge bordering the shorter spur is not quite as sharp (pl. 33, B, a).

Worked pronghorn metapodial bones.—One complete and one fragmentary pronghorn metapodial bone showed signs of having been used. The complete specimen was from a young individual, as shown by the incomplete joining of the epiphyses (ankylosis) to the shaft of the bone. The distal end was drilled. The shaft is lightly scarified by a series of parallel scratches running at a diagonal to the main axis of the shaft. Just above the basal articulative surface, on the shaft, is another series of shallow cuts. These cuts are at right angles to the axis of the shaft. The purpose and use of these scratches are unknown.

Fishhooks.—Four fragmentary and one unfinished bone fishhook were recovered during the process of uncovering remains at the Hosterman site. All were made of a very composite bone. With the exception of the unfinished hook, the others were round in cross section. All are of the unbarbed type and display excellent workmanship. The unbarbed arms are pointed and scored with a series of shallow parallel incisions at right angles to the main axis of the arm. The shank arms also are scored near the ends, probably to prevent whatever tie was used from slipping off.

The unfinished hook is from a section of bison long bone, demonstrating the method by which this sort of implement was made.

Worked animal scapula.—A small section of what appears to be the scapula of Canis sp. has two small holes just 9 mm. below the posterior border that were punched through the thin section of the blade. The two holes are 10 mm. apart and are not clean cut. None of the edges of this bone object were smoothed or worked. There is some question as to whether this particular bone object was perforated for suspension as an ornament or for some other purpose (pl. 37, B).

Pentagonal-shaped bone tool.—A large pentagonal-shaped bone

tool (pl. 36, A), prepared from a bison's scapula, shows considerable wear in that the surfaces as well as the bordering edges were polished. It measures 9.8 cm. across the base; the lateral sides are 16.4 cm. long, and the tapering sides average around 11.1 cm. in length. Both the tapering sides as well as the lateral edges show that they have received considerable wear. On both faces, bordering the sharp working edge, are series of thin shallow scratches running almost the entire length of the implement. Superimposed over these, on one face, is a roughly ovoid area that is highly polished, a gloss resulting from long-continued use. This ovoid area measures roughly 6.5 cm. in length and 4.0 cm. in width, and is located 3.3 cm. from the base of the implement; it was probably the position of the thumb while the tool was in use. It is definite that this was never used to dig into the soil, for the edges of this thin object could not have withstood such use. Its actual use cannot be determined. Similar objects have not been reported from this section of South Dakota.

Bone tubes.—Twenty-eight bone tubes of various lengths were recovered from the Hosterman site. Out of this number only one was fragmentary. Fourteen were made from cylindrical sections of bird bones. Most of them had their cut edges polished and smoothed, but few of them were completely polished. They ranged in length from 28 mm. to 119 mm. (pl. 33, A). The other 14 were from sections of mammal bones, and practically all of them had their cut surfaces smoothed and had developed a good polish. None of the bone tubes were decorated in any way. The lengths ranged from 56 mm. to 128 mm.

On the basis of lengths, the bone tubes were separated into three groups:

Group 1, 5 specimens:

Lengths: Range from 28 mm. to 49 mm., mean of 38 mm.

Group 2, 15 specimens:

Lengths: Range from 53 mm. to 94 mm., mean of 73 mm.

Group 3, 7 specimens:

Lengths: Range from 102 mm. to 128 mm., mean of 115 mm.

Bone awls.—Various types of bone awls are present at the Hosterman site (pl. 37, A). One of the prevalent types comprises those made from split deer or pronghorn metapodial bones with split distal ends forming the butt. The spit surfaces on most of the specimens were ground and smoothed and the cancellous material removed, leaving a U-shaped shaft to the tool. Both the shaft portion and the articulative surface had acquired a high polish through heavy use. Lengths varied from 58 mm. to 100 mm. This group easily falls within the limits of similar awls reported from the Dodd site, and Swan Creek site, and is ubiquitous in the Plains. Nineteen specimens are represented.

Rough splinter awls.—Seven specimens. Awls of this group are comparatively few in number. They were made from rough, irregular splinter sections of bison ribs and long bones as well as some of the long bird bones. They are unworked with the exception of the tip, which is ground to a smooth point. Lengths varied from 31 mm. to 118 mm.

A combination tool, made from a splinter of a long bone of bison, consists of an awl and a spokeshave. This tool, 19.6 cm. in length, was brought to a sharp point at one end; the other was broken off squarely. Forty-six mm. from the base there is a wide notch that functioned as a spokeshave. On either side of the notch the tool was well smoothed. Under magnification there is a series of parallel grooves within the notch at right angles to the axis of the bone, indicating that this was a working surface.

Other splinter awls were made from sections of shaft of long bones, mostly deer or antelope. These were well worked over most of the surface. In cross section some are round, others are on the flat side, and still others are shallow U-shaped. One of the specimens has a V-shaped cut on three of its sides near the base as though its owner intended to reduce the overall size of the implement and rid it of its irregular rough butt, but the task was never completed. Lengths range from 55 mm. to 131 mm.

Specimens from another group were made from the edges of bison ribs cut so that a portion of the cancellous tissue was still included. The cut sides were carefully smoothed and the butt ends were finished off either by working into a rounded, squared finish or bringing them to an abrupt, dull point. In some, the tips were brought to a gradual point; in others the tips tend to be more abrupt. In cross section the awls of this group tend to be triangular. Lengths range from 57 mm. to 144 mm., the majority being around 90 mm. in length.

In the next group, represented by seven specimens, the awls were made from edges of bison ribs with portions of the cancellous tissue included. As in the group immediately preceding, the awls received about the same treatment to convert the raw material into workable tools. Instead of being triangular in cross section, these tend to be more circular with tips brought to a more abrupt point.

Cancellous bone balls.—Three small ovoid-shaped cancellous bone balls were recovered. Two of them were found in Feature 9, a cache pit. One was found at a depth of between 6.5 feet and 7.0 feet; the second came from a depth of between 7.0 feet and 7.5 feet. The third ball came from one of the small isolated midden areas at a depth of between 2.0 feet and 3.0 feet from the present surface. Whether these were the remnant portions of bone abraders, or were actual abraders intended for some much finer work, or were a form of toy could not be determined from the evidence at hand.

Bone picks.—A form of pick was made from the shaft of a bison radius by splitting it lengthwise, leaving a part of the proximal articulative end intact and sharpening the other end. The one specimen that was recovered is badly battered. At the present time it measures 17.1 cm. in length, which is far from its original length. One edge has been smoothed to within 8 cm. of the articulative end. This smoothing was probably not intentional but acquired through use.

Split pronghorn metapodial bones.—Pronghorn metapodial bones were split lengthwise and the halves were used as beamers. The bone was sawed lengthwise in order to split it into two equal parts. The distal end displays additional saw marks that were not carried to completion. Awl blanks were similarly constructed from the splitting of metapodial bones.

Perforated rib sections.—Sections of small ribs were perforated at both ends. These were probably used as ornaments of dress since they were attached to objects, or they may have been worn as pendants. In the collection there is one complete specimen and fragments of five

others (pl. 37, B).

Punches.—Punches were made from the cutoff or broken ends of deer or elk antler. The tip ends of these show definite signs of having

been sharpened. Several acquired a fairly high polish.

Antler sections.—Sections of antlers with their prong tips missing definitely show the tips were severed from the main portion. To do this the prongs were sawed or cut almost through and then broken away from the stem. In one instance the prong was sharpened before it was severed from the stem for it must have been easier to do it this way than to do it afterward (pl. 36, B).

Split antler section.—A small section of deer's antler was cut and broken off and the ends left unworked. Later it was split down the center and most of the cancellous tissue removed. The long edges were then smoothed and evened up, leaving a sharp outer edge. From the looks of this artifact it would appear that it was intended to be

used as some sort of scraper-smoother.

Mineralized bone.—A small fragment of mineralized bone was found in Feature 22, a cache pit. It apparently was never used by the occupants of the Hosterman site. It was probably either picked up from the surface outside of the village and brought in as a sort of curiosity, and lost or discarded afterward; or, it could have appeared naturally on the surface of the site and later gathered up along with the rest of the trash and dumped into the midden pit.

Cut antler fragments.—Two large basal segments of deer antlers were made into percussion instruments or hammers by having one end slightly rounded and the other roughened. One was 17.0 cm. long

with a diameter of 3.7 cm., the other was 19.4 cm. long with a diameter of 4.6 cm.

FETISH OR TROPHY SKULL

The skull of one of the Plains kit foxes (Vulpes velox) was found in the midden of Feature 2 at a depth of 1.8 feet. This fragmentary skull (pl. 38) is peculiar in that there are, at the present time, four small round perforations with beveled edges occurring in the occiputal region penetrating the brain cavity. The diameter of these openings is 4 mm. on the outside, tapering somewhat until they entered the interior of the brain case. They were spaced so that they covered this area rather well. The central perforation just touches to the right of the sagital suture, two others are equidistant on either side of this suture about 1.25 cm. distant, and the fourth opening is just above the right auditory meatus. Whether there ever was a comparable opening above the left auditory meatus is not known, since that portion of the skull is missing, but it would seem plausible that such was the case.

As we do not know exactly why this particular skull was treated in this manner, we have assumed that there must have been some religious ritual significance attached to it. We do know that the Mandans and other Plains Indian groups utilized the skulls of bisons and humans during certain ceremonies. Then, too, each man had his own medicine bundle usually wrapped in some animal pelt. Whether the skull of this particular fox was especially valued would appear likely since so much work was performed on it.

SCORED BIRD STERNUM

A fragmentary sternum of Aquila chrysoelus canadensis (golden eagle) was found in Feature 3, a cache pit, at a depth of 3.0 feet from the present surface (pl. 37, B). Across the right keel and along the posterior margins are numerous sharp and shallow incisions. There is no definite pattern these scars take. It would appear that they were the result of cutting away the heavy fleshy parts during the term of a meal. Whether eagles were obtained just for their tail feathers and the flesh eaten afterward is not known; but it would seem very probable that the fleshy parts of the bird were consumed.

WORKED TEETH

The front half of the post-lingual surface of a split beaver's incisor, recovered from the floor of the circular house, Feature 22, shows cutting marks on the concave surface, the beveled cutting surface, and a shallow cut at the base of the tooth. Similarly prepared beaver incisor teeth were reported from the Dodd site in South Dakota, from

various sites in Minnesota, Ohio, and North Dakota, and they appear to be common throughout the Northeastern United States as well as in some of the Southeastern sites. This is a specific trait of the Point Peninsula Focus (Ritchie, 1944, p. 117), which appears to relate somewhat to the cultural horizon represented at the Hosterman site.

A heavily eroded wapiti's tooth (*Cervus canadensis*) was found in Feature 34. It had been perforated for suspension and was probably used as a pendant worn around the neck of some individual. It is the only specimen of this sort found at the site.

Human remains are represented by 5 incisors and 1 canine tooth. The five incisors were found in a small pit along with other debris, but no human bones were present. The single canine tooth was found in a nearby midden pit. All of the six teeth were greatly worn, having been reduced to about the gum line. All were flat across the top. Adhering to the sides of the roots of the five incisors was an osseous growth, known as cementosis. The amount of this growth or deposit was not constant; some teeth have more of it than others. This is an apparent indication of age, for all five teeth appear to have belonged to a single individual.

SHELL

Shells were not numerous at the Hosterman site. Several large mussel shells were found thinly scattered throughout the midden, some appeared in midden-cache pits, and a few came from house areas. Dr. J. E. P. Morrison, Department of Zoology, U.S. National Museum, identified four species of shells from this site. They are: Lasmigona complanata (Barnes); Anodonta grandis plana (Lea); Olivella biplicata (Sowerby) that was introduced from California; and Succinea grosvenori (Lea). Usually these shells are unworked. Sections of Lasmigona complanata were cut into triangular, rectangular, and other simple geometric forms, though none were perforated. Other Lasmigona complanata were converted into spoons or scrapers whereas portions of others were shaped to disk pendants that were perforated for suspension. A small section of a serrated shell fragment was found within the midden area at a depth of 2.5 feet to 3.0 feet. The margins on either side of the serrations have been rubbed smooth, while the basal section holds the fractured break. Apparently this was some form of pendant.

Table 6.—Shell identified

Species	Number	Artifact	Source
Anodonta grandis plana (Lea)	5 20 14 1 2	Unworked do Worked Bead Unworked	Local. Do. Do. California. Local.

A shell disk, 34 mm. in diameter, is incomplete. Near the outer margin is a small perforation for suspension. Presumably the pendant was made from a section of *Lasmigona* sp., for this type of shell was more numerous than any other and the texture fits this sort of shell.

COPPER

A single small copper bead, 16 mm. in length and 3 mm. in diameter, was found near the mouth of Feature 16. It is the only metal found during the period of excavation. The bead was made by rolling a small sheet of copper around a twig or some similar object. At the present time its surface is completely covered with a verdigris. From its location in the site, it is presumed that it was intrusive there either after the site was abandoned or at the terminal phase of occupancy.

SUMMARY AND CONCLUSIONS

The existence of rectangular house pits suggests that a group of the Upper Republican culture had established at least one permanent residence here at the Hosterman site. True to their nature they spaced and scattered their houses widely apart and without pattern.

Their economy consisted of limited agriculture with greater stress being placed on hunting and seasonal gathering. The presence of limited amounts of charred corn and a few beans and squash seeds attests that they had enriched food habits. Pits of wild plums and chokecherries show that these fruits were then in use. There is evidence that they were supplemented, in season, with the wild berries of the nearby area as well as with seeds from the many wild grasses growing there. Communities were located on bluffs or terraces and, in this case, the main stem of the Missouri River.

During this period, house pits were rectangular in form and were sunk to various depths, depending upon the inclination of the builders. This variation in depth probably accounts for the uneveness of the aeolian deposits that accumulated over the remains after the site was finally abandoned. Inside the pit was constructed a house with individual posts fairly closely spaced, surrounding four centrally located roof supports that in turn surrounded a centrally placed firepit. The walls served as studding to support the wall plates. Rafters were closely spaced, running from the wall to the center of the structure. Over this basic framework were piled layers of brush, grass, and finally a heavy dirt cover. The finished house resembled a low dome-shaped earthen mound which was entered by means of a long, narrow, covered passageway. Smoke escaped from a centrally placed opening in the roof.

Hunting played a paramount role in their economy. With limited farming and plenty of meat these people were assured of an abundance of food. There must have been surpluses that required storage. To meet this problem they dug storage or cache pits that were bell-shaped, narrow at the top and widest at the base. Most of these pits were placed outside of the houses, but smaller examples were found beneath the floors of some houses. The large pits were rather deep and were capable of holding vast quantities of supplies.

From the bison, and to some extent, the lesser animals, they obtained the bone material out of which they fashioned awls, flakers, bodkins, fishhooks, hoes, knives, scrapers, arrow-shaft wrenches, sickles, cleavers, and many other forms. The essential forms of many of the artifacts had carried over from an earlier Archaic horizon.

Flint tools were still common. Snub-nosed scrapers were very much in evidence, and though projectile points varied little in form and size they were never plentiful. They made use of the local stones, which furnished sandstone shaft polishers, hones, and smoothers of pumice. Hammerstones were many and were usually natural round boulders that were small enough to fit comfortably into the hand. Some were fashioned deliberately by pecking them into the desired shape; others were used as they were found. Some were employed until they shattered through use. The scattered fragments were found in midden piles and in midden pits.

Grooved axes were present, but they were few in number. They were not replaced at the Hosterman site by the broad, flat chisel or

gougelike implement called a celt.

After these people abandoned the site, another group, presumably from farther north, moved in and built circular houses around four centrally placed poles surrounding a firepit. The floors were sunk to various depths. Attached were covered entranceways. Smoke escaped from centrally placed openings in the roofs.

Subsistence apparently was equally divided between limited agriculture, hunting, and gathering, with fishing playing only a minor role. Charred corn, beans, and squash seeds demonstrate their limited capabilities. Seeds of wild fruits, charred and uncharred, indicate that gathering during the proper season was still of prime importance economically, while the greatest stress was placed on the plentiful supply of wild animals and the hunt.

Byproducts of the hunt consisted of the hides, bones, and sinew out of which were fashioned not only the tools used to sew the tanned or prepared hides into articles of clothing but those for other major purposes as well. The scapulae of the plentiful bison were fashioned into hoes which were used in the cultivation of crops in the rich bottom land below their village and for grubbing for roots and tubers that grew wild in the immediate vicinity. Other bones were made into

awls, punches, knives, hide scrapers, and grainers.

For some reason projectile points of stone were not plentiful. Those that were used were small, triangular forms. Earlier a side-notched variety was introduced. They all ranged from small to medium in size.

The crude grooved stone mauls, similar in form to those found at the Payne and Swan Creek sites, apparently were used in the preparation of pemmican, for none were badly battered.

Both hafted and unhafted flint knives were adequate for the skin-

ning of animals or for cutting purposes.

The manufacture of pottery was among the chief industries at the Hosterman site, as is demonstrated by the quantity of sherds recovered from the limited exploration. Due to the fragile nature of the pottery, its attrition rate must have been great. Pottery was first modeled and finished by the paddle-anvil method. The paddle was usually carved with simple shallow grooves that imprinted a simple decoration of ridges and sunken lands of the simple stamped variety. It was tempered with a fine to medium-sized grit of decomposed granite and fired to a tan, gray, or black color, depending upon the use of a covering of bison fat on the exterior. The use of fat was demonstrated by the heavy encrustation of soot on the exteriors of vessels. Their chief form of decoration was by crudely incising geometric patterns over portions of the lip, rim, upper neck, and shoulder areas. Cord-impressed and brushed designs occurred infrequently.

There is considerable range in both size and shape from miniature vessels to those capable of holding 3 to 5 gallons or more. No two pots are exactly alike. This same holds true as to decoration, for it seems that little if any attempt was made to establish a definite style. Bases, as a rule, are rounded, while most mouths are wide. Ornamentation is either incised or cord-impressed. Incised designs are neither precise nor carefully applied. Designs of both types appear on rims,

necks, and shoulders.

Incised designs are linear geometric elements consisting chiefly of series of parallel lines, chevrons, triangles, or herringbones. They appear to have avoided the use of the curved line in their incised designs. When it does occur, which is a rare event, the sherd fragment does not give any indication as to the design element. Punctations, while limited, are used either at the top or bottom of the designs or as a unit. On the whole, incised designs were rather carelessly applied and never developed to any great extent.

Contrariwise, the cord-impressed designs show greater fineness, neatness, and precision in that they were carefully applied either as a band of horizontal impressions around the rim, as short diagonal lines bounded by encircling lines, or as interspersed "rainbow" elements between series of horizontal parallel lines comparable to types illustrated by Will and Spinden (1906, pl. XL, g, i, and o). No two patterns are exactly alike. The size of the cords may vary—some are rather small and others are coarse; some have the horizontal elements closely spaced and others are spaced farther apart and not quite so carefully placed; and still others show greater neatness in covering up the ends of the diagonal lines by the horizontal lines.

The cultural pattern, as represented at the Hosterman site, does not seem reasonable. While the main portion of the settlement was surrounded by a palisade and ditch, which would indicate that it was built for defense against external marauding parties, other houses together with their trash areas occurred to the east and north of the palisaded area unsurrounded by any protective device. Why it should be necessary for one portion of the site to be protected by a palisade and ditch while another section of the same village did not require such features poses a problem. Whether the palisade was maintained throughout the short history of the site or only for a brief period, could not be determined. However, since there was such a feature the inhabitants must have felt the need for it; otherwise they would never have expended the time and effort to secure the necessary material and to erect such a structure. Furthermore, only a comparatively few projectile points were recovered. These were of insufficient number to arm the inhabitants against any agressive exterior action, to say nothing about the number that the hunters would require to secure sufficient game to feed the hungry. There must be some logical explanation to the situation, but it is not apparent. It may be that other materials were used on projectiles, such as hardened wooden tips, which were not preserved in the site.

Contrariwise, stone scrapers far exceeded in number the stone projectile points. This appears to indicate that the need for scraping far exceeded that of a killing nature and that the materials were at hand upon which these tools were used. The scrapers have been used to fashion wooden containers and tools but such would seem highly unlikely. With the great mass of animal bones present, attesting to success in the hunt, hides must have been plentiful and they would have had to be prepared for use. Hence the large number of scrapers.

Cultural refuse was nowhere thick on the site except in midden pits. Within the village it was sparse. Even house floors, while firmly packed, were not only barren of refuse but were not as firmly packed as they should have been if the house had been occupied over a long period of time. These two characteristics apparently would indicate a limited occupancy of the site, one of very short duration.

No traces of any European trade goods or contact were found.

On the basis of the correlation of pottery traits, dwelling forms, and village plan with others in the immediate vicinity, it would appear that the Hosterman site, while having certain characteristics commonly attributed to the pre-Arikara, is more closely associated with those of the pre-Mandan of North Dakota and possibly Minnesota.

BUREAU OF AMERICAN ETHNOLOGY

TRAIT LIST

The following list of traits for the Hosterman site (39 PO7) has been prepared from the present excavation. An attempt has been made to arrange these in a functional order (Fairbanks, 1942, pp. 228–229).

SUBSISTENCE ACTIVITY:

Collecting Complex:

Collecting of shellfish (Anodonta grandis (Say))

Collecting of wild plant seeds (Chenopodium acuminatum)

Collecting of wild fruits (Cleome capparius)

Collecting of wild fruits (Prunes virginiana)

Collecting of wild fruits (Celtis sp.)

Collecting of wild fruits (Rebes sp.)

Collecting of wild fruits (Prunus americana)

Agricultural Comlpex:

Limited growing of maize (Zea mays)

Limited growing of beans (Phaseolus vulgaris)

Limited growing of squash (Cucurbita pepo)

Limited growing of squash (Cucurbita mixta)

Hunting and fishing Complex:

Bison, deer, pronghorn, fox, rabbit, turkey, waterfowl, beaver, badger, coyote, red fox, gray fox, skunk, black bear, otter, prairie dog, ground squirrel, meadow vole, muskrat, pocket gopher and various kinds of fish. Use of hook and line. Domestic dog.

Use of bow and arrow inferential from the presence of small isosceles triangular projectile points.

COMMUNITY PLAN ACTIVITY:

Village location and plan Complex:

Village located in close proximity to stream

Houses clustered without plan

Palisaded village with accompanying ditch

Village without benefit of palisade or ditch

Midden pits numerous and outside of houses

Cache pits numerous and outside of houses

Cache pits, small, and inside of houses

Hearth areas (fired areas) with broken stones

Fire-cracked stones in debris

Hearths outside of structures irregular in outline

Architectural Complex:

Circular house structures

Rectangular house structure

Bell-shaped midden and cache pits

Midden and cache pits beneath floors of houses

Centrally located hearths in structures

Four central roof poles

TECHNOLOGICAL AND ARTISTIC ACTIVITY:

Pottery Complex:

Modeling or molding of clay vessels

Use of paddle and anvil in manufacture of clay vessels

Pulverized granite tempered

Jar shapes only

Rims vertical

Rims S-shaped

Plain

Simple stamped

Incised

Brushed

Curvilinear stamped

Cord impressed

Mat impressed

Fabric impressed

Painted

Punctated

Corncob impressed

Horizontal line punctates

Random punctates

Incising, narrow line

Incising, broad line

Herringbone

Horizontal incised lines

Horizontal bands of incised lines

Horizontal cord impressions

Curvilinear cord impressions

Clay dawdles

Rough-stone Complex:

Hammerstones, natural hardheads

Hammerstones, rough discoidals

Hammerstones, pitted

Chipped-stone Complex:

Projectile points:

Triangular with straight or convex edges, sides slightly longer than base, straight base as rule, some slightly concave or convex

Isosceles triangular with straight or slightly concave bases

Triangular with straight or convex edges, straight or convex base.

Maximum width at base.

Side-notched, straight-sided triangular, maximum width at base, straight bases, slightly concave or convex bases occur rarely. Notches are at right angles to long axis and are often narrow or shallow.

Microblades.

Scrapers:

End scrapers:

Keeled end scrapers

Type 1

Type 2

Small round scrapers

Large and small teardrop end scrapers

TECHNOLOGICAL AND ARTISTIC ACTIVITY—Continued

Chipped-stone Complex—Continued

Scrapers—Continued

End scrapers—Continued

Small planoconvex end scrapers

Large flake end scrapers

Small flake end scrapers

Flat end scrapers

Thumbnail end scrapers

Beveled retouched edge end scrapers

Type 1

Type 2

Triangular end scrapers

Slightly modified nodular end scrapers

Trapezoidal end scrapers

End scrapers with left carinate, type 3

End scrapers with right carinate, type 4

End scraper-graver combinations

Modified end scrapers

Side scrapers:

Small flake side scrapers

Medium flake side scrapers

Large flake side scrapers

Double edged side scrapers

Triple edged side scrapers

Prismatic flake side scrapers

Lunate side scrapers

Side and concave side scrapers

Pointed side scrapers

Modified side scrapers

Ovoid bifaces

Biface choppers

Knives

Burinlike implements

Burin

Perforators or gravers

Lamellar flake tools

Ground and pecked stone tools Complex:

Anvil stones

Rubbing stones

Paint stones

Grooved mauls

Catlinite

Belemnite

Pumice abraders

Sandstone abraders

Arrowshaft straighteners

Grooved ax

Handstones

Utilized pebbles

Hematite and other paint substances

TECHNOLOGICAL AND ARTISTIC ACTIVITY—Continued

Bone artifacts:

Cut animal bones

Scapula hoes

Scapula spines

Scapula knives

Scapula cleavers

Scapula hide scrapers

Scapula thong stretchers

Scapula sickle

Flakers

Needlelike tool

Shaft wrenches

Knife handles

Hide grainers

Notched ribs

Cut ribs

Punches

Worked pronghorn metapodial bones

Fishhooks

Worked animal scapula

Problematical bone tool

Bone tubes

Awls:

Rough splinter awls

Type 1 (group 1)

Type 2 (group 2)

group 3

group 4

Cancellous bone balls

Bone picks

Split pronghorn metapodial bones

Perforated rib fragments

Punches

Worked antler fragments

Mineralized bone

Antler hammers

Worked teeth:

Beaver incisor chisels

Wapiti's tooth pendant

Human teeth

Fetish or trophy skull

Shell:

Disk

Unworked

Metal: copper tubular bead

APPENDIX 1

VEGETAL REMAINS

A number of plant remains were recovered at the Hosterman site (39PO7). These were identified for the Smithsonian Institution by Hugh Carter, aided by Leonard Blake, John Bower, and Winton Meyer, of the Missouri Botanical Gardens, St. Louis.

They state:

All of the carbonized cultivated plant remains are of varieties similar to those grown in historic times by the Mandans and Omaha. The corn of this site has few rows, usually 8 but occasionally 10 or 12, and belonged to the race called Northern Flint (Brown and Anderson, 1947). The cupules are not as wide, the kernels thicker and the shanks more slender than in the eastern forms of this race. This difference may have been the result of mixture with corn from the south and west or with the race of corn which was grown at this site in earlier times. In the middle Mississippi Valley the Northern Flint race of corn came later than a race with more rows of grains, smaller grains, and smaller but deeper cupules. Corn similar to this earlier race is found in pre-1000 A.D. Among the cobs from 39PO7 it was possible to distinguish quite readily a few which were very much like the eastern form of Northern Flint. The fact that these were quite distinct makes it likely that they were grown as a special variety. The Mandans grew several kinds of corn and kept their varieties quite distinct.

The corn is almost identical to that described by Nickerson and Hou (1954). More collections of corn from dated sites over a wide area must be studied before a reasonable explanation for the distribution of the various kinds of corn can be prepared. The median measurements of the corn follows:

	Median for all 39PO7	Median for extreme variety	Median for all Northern Flints	Eastern extreme of Northern Flints	Dodd site 39ST30	Phillips Ranch site 39ST14
Row number	8 4. 0 12. 0 9. 0	8 4. 6 	8 4. 2 17. 0 10. 0 . 5	8 4. 0 22. 0 12. 0 . 75	8 4. 0 (18. 0?) 9. 5 25 16	8 3. 4 11. 4 8. 0

Several kinds of *Cucurbita pepo*, the common pumpkin and squash, were grown. Most abundant, nearly 700 seeds, was a very small-seeded $(9 \times 5.5 \text{ mm.})$ variety, probably like the one called "Mandan," with small green-striped fruit which sug-

gests in many respects, including flavor and texture, some of the wild species of Cucurbita. Most of the other seeds were small (12 \times 7 mm.) or medium (15 \times 7 mm.) in size and probably came from fruits like the small sugar pumpkin grown in the Plains area. There were very few large (18 \times 8.5 mm.) seeds and two of these were so thick that they resembled some of the less extreme forms of Cucurbita mixta, especially the Green-striped Cushaw variety, but this species had not been collected in sites this far east. The only peduncles were of C. pepo.

Although small fragments of a *Cucurbita* (probably *C. pepo*) rind were found, there were no fragments of the bottle gourd (*Lagenaria*).

A single seed ($10.5 \times 6 \times 5$ mm.) and some charred pods of the common (or kidney) bean (*Phaseolus vulgaris*) were not in good enough condition to determine the variety.

Wild materials found included, in order of abundance:
Wild plum seeds, Prunus americana, and?
Chokecherry seeds, Prunus virginiana
Hackberry seeds, Celtis occidentalis
Grass stem fragment,
Seeds, Chenopodium?, goosefoot.

APPENDIX 2

FAUNAL REMAINS

Animal remains within the deposits of the Hosterman site (39PO7), were very abundant. All identifiable whole and fragmentary bones were preserved and later identified by Dr. Theodore White and H. W. Setzer, as follows:

Rana sp. Class: Aves; order undetermined: Aquila chrysoelus canadensis_____ golden eagle. Class: Mammalia: Order Artiodactyla, family undetermined Antilocarpa americana (Ord)_____ pronghorn. Bison bison (Linnaeus)_____ bison. Odocoileus, referred_____ deer Order Carnivora: Canis familiaris_____ dog. Canis latrans____ coyote. Canis lupus_____ red fox. Urocyon cinereoargentheus_____ gray fox. Mephitis sp.____ skunk. Euarctos americanus_____ black bear. Lutra canadensis_____ otter. Taxidea taxus_____ badger. Order Lagomorpha: Lepus townsendii_____ jack rabbit (white Sylvilagus floridanus_____ cottontail. Order Rodentia:

Geomys bursarius______ pocket gopher.
Class: Pisces; order undetermined.

Class: Amphibia:

As White (1954, p. 161) has indicated:

The numerical count of the elements found in a site is subject to the accidents of preservation, the length of occupation, and the size of the excavation, but the ratio of various elements to each other and to the greatest number of individuals represented, from an excavation which satisfies the archeological requirements, should provide an adequate sample for this type of study. . . .

Cynomys ludovicianus prairie dog.

Citellus sp. ground squirrel.

Microtus sp. meadow mole.

Ondatra zibethicus muskrat.

Castor canadensis beaver.

Throughout this study the "number of individuals" means the greatest number represented by any single element, i.e., in this site, as shown

Table 7.—Frequency distribution of the various animal elements in the Hosterman site

	Distr	ibution	ofske	letal ele	ements	of indi	cated r	umber	of indi	lvidual	srcp	resen	ted
Element	Canis familiaris (dog)	Vulpes velox (swift fox)	Antilocarpa americana (antelope)	Bison bison (bison)	Sylvilagus floridanus (cottontail rabbit)	Canis latrans (coyote)	Odocoileus sp. (deer)	Citellus sp. (ground squirrel)	Lepus townsendii (W. T. jackrabbit)	Cynomys ludovicianus (prairie dog)	Taxidea taxus (badger)	Castor canadensis (beaver)	Mephitis sp. (skunk)
Skull, occiput Skull, frontals Skull, horn cores Skull, maxilla Mandible Hyoid Vertebra, atlas Vertebra, axls Vertebra, cervical Vertebra, lumbar Vertebra, lumbar Vertebra, lumbar Vertebra, sacral Vertebra, caudal Scapula Humerus, proximal Humerus, proximal Humerus, distal Ulna Metacarpal Femur, head Femur, head Femur, head Femur, idistal Tibla, proximal Tibla, proximal Tibla, distal Astragalus Sacrum Metatarsal	12 3 29 15 8 31 51 38 1 2 11 10 17 9 3 25 2 18 5 6 6 7	11 38 6 8 8 14 1 18 12 220 14 19 17 7 18 6 6 21 7 9 3 3 6 7	222 5 5 15 48 48 55 7 7 19 11 183 172 9 8 8 51 63 48 40 43 9 58 6 52 22 26 6 37 22 27 7 7 45	7 4 4 25 5 29 91 24 5 5 5 5 5 5 6 4 17 7 10 144 27 8 8 33 37 23 20 39 91 13 15 14 20 32 3 34 34 34	10 6 27 8 6 5 27 8 7 35 116 2 27 56 32 42 50 29 26	9 5 2 2 5 1 1 26 13 3 1 1 3 3 7 7 2 2 5 5 2 2 4 4 2 21	11 11 11 11 12 11 11 11 11 11 11 11 11 1	3 	1 4 4 4 13 4 12 2 12 12	1 10 1 2 2 2 2 6 4 1 10 6 6 1 1 1 1 1 1 1	3 2 4 2 3 3 1 4 4 2 2 2 3 4 4 2 2 2 2 3 4 4 2 2 2 2 3 4 4 2 2 2 2	1 1 3 12 1 2 1 1 2 2 3 3 1 1 4 2 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1

by the dorsal vertebrae of the antelope. This is not too highly indicative, since the animal was small enough to be easily transported from the point of killing to the village without too much discomfort on the part of the hunter. On the other hand, there are 91 whole mandibles of bison represented in the collection. Of this number 46 are right and 45 are left, indicating, at least, that there are more than 45 individual bison represented in the lot. Fragmentary mandibles were not saved due to the large mass of bone encountered. This is true also of the rest of the bone material. Only recognizable whole bone and some with identifiable articulative surfaces were salvaged for identification purposes.

An examination of table 7 discloses that certain elements are consistent (horn cores, maxillae, hyoids, scapulae, humerus distals, radius proximals, radius distals, ulnae, and tibia distals), which may indicate the maximum number of individuals represented in the bison grouping. Other elements (occiputs, frontals, atlas vertebrae, axis vertebrae, and sacra) are conspicious by their scarcity. This can be

partially explained in that animals that were killed at a distance from the village were dressed in the field and only the most desired portions were transported back to the village. In dressing, the head, along with the atlas and axis, was severed from the vertebral column, probably with a blow of the ax. As has been pointed out numerous times, the head, as a whole, is a heavy unwieldly part of the animal and is covered at the most with a minimum amount of usable meat; hence it was not usually transported from the kill to the village. On the other hand, if the brains and tongue were desired they could just as easily be removed at the time of the kill.

White (1954, p. 164) seemed to think that the mandibles at the Dodd site are close to the greatest number of individuals represented and that none were ever used for anything and were probably brought into the village along with the tongue of the animal. He states: "Certainly the easiest way to remove the tongue would be to smash the ascending ramus of the jaw and remove jaws and tongue as a unit for further cutting at a more convenient time." If the percentage were low, then he suggests that most hunting was performed at considerable distance from the village and the tongue eaten at the hunting camp and the mandibles discarded there.

Practically all of the mandibles in the Hosterman site were complete with the ascending rami entire. This fact would indicate that they were part of the skull when introduced into the village and that we did not find the entire assemblage.

On the other hand, we recovered 24 hyoid bones, which is a small bone attached to the tongue. This number approximates the number of maxillae, a fact that may be significant.

Vertebrae.—Very few animals are represented by the vertebrae, for their distribution covers the entire column. However, the interesting thing is the large number of caudal vertebrae, which signify that the entire tail was left intact with the pelt as it was removed from the animal and brought back to the village to be processed. This fact indicates that the tail was an important ornamental feature, since it was left attached to the hide after skinning.

Fish.—The remains of several fish were found in various of the midden pits. Fishbones were mixed with the midden in Features 1, 2, and 3. In Feature 9 they were found at various levels: between 3.0 feet and 3.5 feet, between 4.0 feet and 4.5 feet, and between 5.5 feet and 8.0 feet. Many were just miscellaneous bones, but the complete articulated skeletons would appear to indicate that the complete fish was discarded because it was not considered to be palatable by the Indian. Fish remains were also found in Features 10, 18, 21, 22, 24, and 25. Individual fishbones appeared in many of the small isolated midden heaps.

Dr. William Taylor, Division of Fishes, U.S. National Museum, rapidly examined the fish remains and has identified not only the families to which they belong but also certain skeletal elements. He states:

The fish material from site 39PO7 consists of remains of two families of fishes, Cyprinidae and Ictaluridae. The Cyprinidae remains are all pharyngeal arches, probably of Hybopsis (Platygobio) gracilis (Richardson). This cyprinid inhabits large streams and rivers in the Plains. The Ictaluridae or catfish remains consist chiefly of spines, pectoral girdles, and vertebrae, with relatively few of the heavy skull elements present, suggesting that the skull parts were often disposed of before reaching the midden. The bullheads, which probably live in the region, are not represented. All material seems referable to the channel catfish, Ictalurus punctatus (Rafinesque) and the blue catfish I. furcatus (LeSueur). Since these two species are superficially very similar, I do not wish to rest heavily on definite identifications of either species for any of the bones. Where identifications are made to species, they should be regarded as probable and not positive, for that species.

A brief list follows of elements from site 39PO7.

Catalog No.

2481____ Cleithra (3) of Ictalurus punctatus and 2 vertebrae of catfish.

1248____ Pectoral spines (2) and dorsal spine (1) plus parts, 2 cleithra of I. punctatus; also miscellaneous vertebrae and skull elements of catfish.

1117____ Spine and parts of cleithrum of I. punctatus.

1535____ Vertebrae, opercle, cleithrum, and spine of I. punctatus.

1403____ Miscellaneous bones, vertebrae, etc., of at least 2 individuals of *I. punctatus*.

1427____ Vertebrae, spine, cleithrum, etc., of I. punctatus.

3465____ Spine of I. punctatus and 2 catfish vertebrae.

1668____ Several bones of catfish, chiefly I. punctatus.

252___ Spine of catfish, probably I. punctatus.

234____ 2 spines of Ictalurus, probably I. punctatus.

3323____ Vertebrae and vertebral complex of catfish.

1302____ Vertebrae, opercle, vertebral complex, etc., of catfish; cleithrum of *I. punctatus*.

3983____ Spines of I. punctatus (2).

421___ Spine and cleithrum of I. punctatus.

1182___ Miscellaneous catfish bones, including spine and cleithrum of I. punctatus.

1344____ Miscellaneous bone of catfish.

1469____ Spines and cleithra of I. punctatus.

1864____ Miscellaneous bones and spines of I. punctatus.

1962____ Lower jaw of catfish.

2357____ Miscellaneous catfish bones.

1609____ Many vertebrae and miscellaneous bones of catfish.

4186____ Spine and cleithra of I. punctatus; other catfish bones.

976____ Pectoral spine of I. punctatus.

1173____ 4 catfish vertebrae.

1497____ Catfish vertebrae and bones.

2477____ 2 catfish bones.

1483____ Miscellaneous catfish bones, some identifiable as I. punctatus.

- 1270 Catfish bones including supraoccipital of I. punctatus.
- 1103____ Spine of I. punctatus; other catfish bones.
- 1608____ Spines of I. punctatus and 1 vertebra.
- 4074____ Many catfish bones, including parts of 5 skulls and ribs, vertebrae, cleithra, spines, etc., of *I. punctatus*.
- 1518___ Cleithra of I. punctatus.
- 1249____ Pharyngeal arch of cyprinid fish, probably Hybopsis (Platygobio).
- 3463____ Catfish bones and pharyngeal of cyprinid, probably *Hybopsis* (*Platygobio*).
- 1428____ 2 pharyngeals of cyprinid, probably genus Hybopsis (Platygobio).
- 1917____ Catfish bones.
- 1343____ Part of lower jaw of catfish.
- 3979____ Cyprinid pharyngeal with 1 to 4 teeth.
- 1862____ Fish rib and part of 2 catfish spines.
- 2480____ Cyprinid pharyngeal arch.
- 1271____ Cyprinid pharyngeal arch.
- 4102____ Catfish spine, I. punctatus.
- 1363____ Supraoccipital of catfish, I. punctatus.
- 3536____ Hyoid apparatus, catfish.
- 4185____ Pharyngeal of cyprinid, probably Hybopsis (Platygobio).
- 3749____ Pharyngeal of cyprinid, probably Hybopsis (Platygobio).
- 684____ Pharyngeal of cyprinid, probably Hybopsis (Platygobio) both arches.
- 2476____ Pharyngeal of cyprinid, probably Hybopsis (Platygobio) one arch.
- 420____ Pharyngeal of cyprinid, probably Hybopsis (Platygobio).
- 350____ 2 spines of I. punctatus.
- 1433____ Bones of rather large catfish, genus *Ictalurus*, part of supraoccipital possibly *I. furcatus*.
- 1585___ Miscellaneous bones, spines, etc., of catfish, including some identifiable as *I. punctatus*; some upper skull elements, possibly of *I. furcatus*.
- 1282____ Catfish bones, mostly skull, some axial; spines recognizable as *I.* punctatus.
- 1515 Miscellaneous bones, some skull of catfish including I. punctatus.
- 2457____ 2 pharyngeal arches of cyprinid: Hybopsis (Platygobio).
- 1918____ Bones of catfish, mostly identifiable as I. punctatus.

Birds.—Outside of the golden eagle sternum, identified by Dr. Herbert Friedmann, Department of Zoology, U.S. National Museum, none of the other bird bones have been identified. Bird bones were not scarce in the village fill and today there is still no scarcity of birds in the region. Today there are many large waterfowl that frequent the area during certain seasons of the year, and small birds number over 150 species according to Over and Thomas (1921).

APPENDIX 3

INSECT REMAINS

The chitinous remains of several insects were recovered while Feature 3, a cache pit, was being cleaned out. These have been identified by members of the U.S. National Museum staff and the U.S. Department of Agriculture as belonging to Carabidae *Pasimachus* sp. and Calliphoridae sp.

In most instances, remains of this sort are not saved, but since these were found in undisturbed deposits within the cache pit, the lowest stratum—between 5.0 feet and 5.5 feet—and the highest—between 1.5 feet and 2.0 feet—it was deemed wise to get determinations in case anyone should be interested in this phase of life at the Hosterman site.

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APPENDIX 4

TABLES OF MEASUREMENTS

Projectile Points

(Catalog No.	Maximum length	Maximum width	Maximum thickness	Shape	Material
-		Mm.	Mm.	Mm.		
	194 331	21 28	14 15	2 3	Isosceles triangular Small side notches triangular, concave	Quartzite. Chalcedony.
	332 359	21 20	14 13	3 3	base. Isosceles triangular Small side notches triangular, concave	Quartzite. Do,
	360	21	17	3	base. Medium side notches triangular, con-	Chalcedony.
	361	15	11	3	cave base. Isosceles triangular	Quartzite.
	362	20	13	3	do	Chalcedony.
	363	23	16	3 3 3 3	do	Quartzite.
	364	18	14	3	do	Chalcedony.
	365 366	17 20	13 11	် ၁	do	Quartzite. Do.
	367	18	11	2	do	Jasper.
	433	15	12	2	Isosceles triangular, with slight side notches.	Quartzlte.
	446	27	15	3	Isosceles triangular square side notches, square base.	Chalcedony.
	447	17	12	3	Isosceles triangular	Quartzite.
	457 458	18 24	13 16	3.5	do	Do. Do.
	459	24	16	4 5	Leasales triangular, conceye began	Do.
	520	29	18	3	Isosceles triangular, concave base Isosceles triangular	Chalcedony.
	521	21	16	3	do	Do.
	522	21	19	2.5	do	Quartzite.
	524	28	17	4	Isosceles triangular side notches, con- cave base.	Do.
	575	22	16	3	Isosceles triangular	Do.
	617 618	29 18	15	3	do	Do.
	619	17	14 13		Isosceles triangular, side notched Isosceles triangular	Do. Do.
	625	43	29	4 7 3	do	Chalcedony.
	654	17	15	3	do	Quartzite.
	704	26	17	6 5	do	Do.
	705	27	8	5	do	White flint.
	706	32	20	6	do	Chalcedony.
	743	24	14	3	Isosceles triangular, side notched	Quartzite.
	744 745	41	23 16	4	Isosceles triangular, side notched, concave base.	Chalcedony.
	746	20	9	4 3 3 3	Isosceles triangular, slightly concave base	Do.
	747	24	15	3	Isosceles triangular.	Do.
	753	34	19	š	Presumably isosceles, concave base	Obsidian.
	783	32	14	4 3	Presumably isosceles, concave base Isosceles triangular, side notched	Quartzite.
	784	26	19		Isosceles triangular, slightly concave base.	Do.
	785	23	13	3 3 3	Isosceles triangular	Do.
	786 788	21 20	17 16	ა ვ	do	Do. Chalcedony.
	888	20 23	19	4.5	Isosceles triangular, concave base	Quartzite.
	895	29	15	4. 5 3	Isosceles triangular.	Do.
	915	24	18	4	Isosceles triangular Isosceles triangular, side notched	Chalcedony.
	940		15	4	do	Do.
	988	25	16	3	Isosceles triangular, slightly concave	Quartzite.
	989 1038	21 24	14	2. 5	Isosceles triangular, side notched Isosceles triangular, slightly triangular	Do.
	1058	24	14 14	3	base.	Do. Do.
	1078	18	9	3	Isosceles triangular, slightly side notched concave base.	
	1078	18	14	2	Isosceles triangulardo	Do. Do.
	1088	38	23	5	do	Do.,
	1095	19	15	3	Isosceles triangular, deep concave base.	Chalcedony.
	1163	23	14	3	do	Do.
	1164	25	15	5 3 3 2 6	do	Quartzite.
	1195 l	30	20 1	6	dol	Chalcedony.

Projectile Points-Continued

Catalog	Maximum	Maximum	Maximum	Shape	Material
No.	length	width	thickness		
1274	Mm. 48	Mm. 22	Mm. 5	Isosceles triangular, deep concave base	Quartzite.
1285 1297	37	21	7	do	Chalcedony.
1297	18	13	2 3 2 3 3	Isosceles triangular, side notched Isosceles triangular, concave base Isosceles triangular, slightly concave base	Do.
1305	16	15 12	3	Isosceles triangular, concave base	Do.
1306	24	12	2	Isosceles triangular, slightly concave base.	Quartzite.
1307 1308	25 24	16	3	do	Do. Do.
1309	26	15	5	Isosceles triangular	Chalcedony.
1351	22	17	4	Isosceles triangular. Isosceles triangular, slightly concave base. Isosceles triangular, side notched. Isosceles triangular, slighty concave base.	Do.
1367	18	14	3 3	Isosceles triangular, side notched	Quartzite.
1369	22	13	3	Isosceles triangular, slighty concave base.	Do,
1412	16	13	3	do Isosceles triangular do Sida notched	Chalcedony.
1413 1414	$\begin{array}{c} 16 \\ 22 \end{array}$	11 15	2. 5 4	1808celes triangular	Quartzite. Do.
1415	21	13	4	do	Do.
1451	25	17	5	Side notched	Chert?
1452	21 25	14	3	Side notched	Quartzite.
1453	25	15		u0	Chalcedony.
1459	20	18	5	Equal sided triangular sides, slightly	Do.
1505	23	18	4	concave. Isosceles triangular, slightly concave base.	Quartzite.
1521	28	14	5	Side notched Isosceles triangular do Side notched Isosceles triangular	Chalcedony.
1522	24	20		Isosceles triangular	Do.
1523	17	17	5 3 3 3 3	do	Do.
1546	20	13	3	Side notched	Do.
1547	21 19	18 13	3	Isosceles triangular	Do.
1612 1615	23	13	3	Side notched	Quartzite. Do.
1620	42	13 17	4	Isosceles triangular, side notched	Chalcedony.
1651	22	15	3	Isosceles triangular, side notched Isosceles triangular, slightly concave	Jasper.
				base.	
1710	23	14	4	Isosceles triangular	Quartzite.
1733 1745	28 20	15 14	ა ვ	Isosceles triangular, slightly concave base.	Do. Chalcedony.
1746	20	14	3	do	Quartzite.
1747	20 25	18	5	do	Do.
1764	21	14	3 3 5 3	do	Do.
1772	19	14	3	do	Do.
1792	30	15	4	Isosceles triangular, slightly concave base.	Chalcedony.
1793	24	15	3	Isosceles triangular, side notched	Quartzite.
1795	20	14	3 3	do	Do.
1835	24	15	2.5	do	Do.
1836	20	15	3. 5	Convex-sided triangular, concave base_ Isosceles triangular, side notched	Do.
1837 1886	46	20 18	5 3	Stemmed	Chalcedony.
1887	21 26	14	3	Isosceles triangular	Do. Quartzite.
1898	19	14	4 3	Isosceles triangular Isosceles triangular, slightly concave base	Do.
1935	21	14	4	I Isosceles triangular	Chalcedony.
1964	29	17	4	Isosceles triangular, slightly concave base.	Quartzite. Chalcedony.
1979	17	11	3	Convey sided triangular conceys become	Chalcedony.
2052 2071	28 23	19 13	4 4	Convex sided triangular, concave base Isosceles triangular, slightly concave base.	Quartzite. Chalcedony.
2074	27	18	4	Convex sided triangular, straight base.	Do.
2090	27 23	16	3	Isosceles triangular, side notched	Quartzite.
2091	19 27	13	3 3 4	Isosceles triangular, side notched Isosceles triangular, slightly concave base.	Chalcedony.
2092	27	16	4	Isosceles triangular	Jasper.
2093	31 23 22	13	4 2 3 3 2 3 3	Tanganalas triangular glightly sida notahad	Quartzite.
2149 2150	23	14 13	2	Isosceles triangular, slightly side notched	Do. Do.
2151	22	13 12 12	3	do	Do.
2152	17	12	2	Isosceles triangulardo	Chalcedony.
2153	17	15	3	do	Quartzite.
2154	20	15	3	do	Chalcedony.
2155	17	14	4	Isosceles triangular, slightly concave base.	Quartzite.
2156 2157	17 22 27 26	16 16	6	Isosceles triangular, slightly side notched.	Chalcedony. Quartzite.
2158	26	13	3	Isosceles triangular	Do.
2159	24 23	13 21 18	4 6 3 5 4	[u0u0	Do.
2161		18	4	Isosceles triangular, side notched	Do.
2171	23	16	4	do	Do.
2172 2178	29	14	3	Fragmentary side notched	Do. Do.
2178	30	21	8	Isosceles triangular, slightly side notched	Chalcedony.
2238	21	13	4	Isosceles triangular, slightly side notched. Isosceles triangular, unfinished. Isosceles triangular, side notched	Quartzite.
2239				Fragmentary side notched	Do.
2253		16	3	Very crude point?Convex sided triangular concave base	Do.
2276	18	16	3	Convex sided triangular concave base	Do.

Projectile Points-Continued

atalog No.	Maximum length	Maximum width	Maximum thickness	Shape	Material
2277 2278	Mm. 31	Mm. 26	Mm. 3	Side notched	Quartzlte.
2326	25	16	3	Isosceles triangular, side notched	Obsidian.
2327	19	14	3	Isosceles triangular, slightly side notched.	Chalcedony
2328	29	14	3	Isosceles triangular	Quartzite.
2330	25 22	13	3	Isosceles triangular, slightly concave base.	Chalcedony
2335 2346	22 35	17 14	3	Table 1	} Do.
2388	24	14	4 2	Isosceles triangulardododododo	Quartzite. Do.
2390	22	16	3	do	Do.
2391	24	17	3	do	Do.
2394	19	13	4	Isosceles triangular, slightly side notched	Do.
2464	19	12	3	Isosceles triangular. Isosceles triangular, slightly concave base.	Do.
2469 2470	25	14	3	Isosceles triangular, slightly concave base.	Do.
2484	21 20	10 11	3		Do.
2537	16	15	3	Triangular	Do. Do.
2539	35	21	5	Isosceles triangular	Do.
2680	18	18	2		Do.
2681	21	15	3	Isosceles triangular, slightly concave base	Do.
2720	21	14 13	3	Convex sided triangular, convex base.	Do.
2741	17	13	4	Convex sided triangular, convex base	Do.
2742 2765	22 21	12	3		Do.
2766	13	12 12	3 3 3 3 3 4 3 3 3 3 4 3 3 3 3 3 5 2 3 3 3 4 3 3 3 2	Concave base Triangular Isosceles triangular	Do. Do.
2767	23	14	4	Isosceles triangular	Do.
2768	17	15	3	Triangular, side notched fragmentary. Fragmentary, side notched Isosceles triangular, slightly concave base.	Do.
2769				Fragmentary, side notched	Do.
2770	20	16	3	Isosceles triangular, slightly concave base.	Do.
2831 2864	15 15	12	2	Triangular	Chalcedony
2865	25	13 17	3 5	Tenegolog triangular	Quartzite.
2866	27	12	2 3 5 3	Triangulardodo Isosceles triangular. Crude side notched Isosceles triangular. Fragmentary side notched. Side notched. Isosceles triangular. side notched. Isosceles triangular. odo Side notched.	Do. Chert?
2867	18	13	3	Isosceles triangular	Quartzite.
2882				Fragmentary side notched.	Quartzite. Chalcedony.
2888	20	16	4	Side notched	Quartzite.
2889 2901	32	22	5	Isosceles triangular	Do.
2901	15 22	14 16	3	Side notined	Do.
2904	25	16	4	do	Do. Do.
2907	19	14	ŝ	Side notched	Chalcedony.
2963	21	13 20	3	do	Quartzite.
2964	24 31	20	4	Convex sided triangular	Do.
2994 3058	31	21 12	6	Isosceles trlangular	Chalcedony.
3059	27 27	14	5 3 4 3 4 6 4	dodoConvex sided triangular	Quartzite.
3060		12	4	Fragmentary side notched	Do. Do.
3090	16	12	ŝ	Isosceles triangular	Chalcedony.
3107	16	12	3	do	Chert.
3130	24	14 13	4	Isosceles triangular, side notched	Do.
3153 3208	14 20	13 12	2		Chalcedony.
3306	16	13	3	Side notched straight base abrupt tip	Do. Quartzite.
3308	22	17	3	Side notched straight base, abrupt tip Isosceles triangular, slightly concave base.	Chalcedony.
3334	25	15	3	Side notched	Quartzite.
3335	28	14	4 3 3 4 2 3 3 3 4 5 2 3	Side notched Isosceles triangular do	Do.
3378 3389	22 15	15 13	5	do	Do.
3397	15	13	2	do	Do.
3430	22	15	4	do	Do. Do.
3431	17	îi	4 2	Isosceles triangular, slightly concave	Do.
3471	16	11	,	base.	D-
3472	20	10	3	4-	Do. Do.
3473	16	13	3	Convey sided triangular concern bess	Do.
3489	25	16	4	Corner notched.	Chalcedony.
3490	15 21	14	3 3 4 3 3 4	Corner notched. Isosceles triangular, slightlyconcave base. Stemmed slightly. Isosceles triangular.	Quartzite. Chalcedony.
3491 3500	21	13 13	3	Isosceles triangular, slightly concave base.	Chalcedony.
3515	18	13	4	Teography triangular	Quartzite.
3521	21	15	3 3	do	Chalcedony.
3522	28	14	3	Isosceles triangular, side notched	Do. Do.
3539	17	14	4	Isosceles triangular, slightly concave	Quartzite.
25/0	0.1			base.	
3540 3541	24	15	4	do	Do.
2540	23 21	13 14	3 3 6	do	Chalcedony.
			- 0	WU .	Quartzite.
3546 3601	32	19	6	Isosceles triangular, side notched	Do.

Projectile Points-Continued

Catalog No.	Maximum length	Maximum width	Maximum thickness	Shape	Material
	Mm.	Mm.	Mm.		
3616	29	14	4	Isosceles triangular	Quartzlte.
3617	19	12	3	Isosceles triangular, slightly concave base.	Do.
3633	18	14	3	Isosceles trlangular, medium concave base.	Chalcedony.
3634	17	13	3	do	Quartzite.
3647	l îs	15	l š	Isosceles triangular, slightly concave	Do.
0011			"	base.	20.
3649	26	14	4	do	Do.
3661	24	15	Ī .	do	Do.
3663	18	14	4	do	Do.
3694	24	16	4	do	Chalcedony.
3714	19	14	3	Side notched, short and stubby	Quartzite.
3715	20	îâ	3	Isosceles triangular, slightly concave	Chalcedony.
0,10	20	10	1	base.	Chalcodony,
3721	20	13	4	do	Quartzite.
3752	20	14	1 A	do	Chalcedony.
3760	24	15	4 3	Isosceles triangular, chipped one side	Quartzite.
3872	30	14	3	Side notched, chipped one side only, slightly concave base.	Chalcedony.
3873	25	14	3	Isosceles triangular, concave base	Quartzite.
3874	21	13	4	do	Chalcedony.
3876	21	14	4	do	Quartzite.
3877	26	15	4	Isosceles triangular, convex sided, concave base.	Chalcedony.
3878	21	13	3	Isosceles triangular	Do.
3879	20	14	3	do	Quartzite.
3948	19	15	3	do	Do.
3987	20	12	3 3 3	Isosceles triangular, side notched	Do.
3988	33	16	4	Isosceles triangular, side notched	Do.
3989	18	13	3	do	Do.
3990	32	14	3 3	do	Chalcedony.
4029	19	16	4	do	Quartzite.
4050	21	14	4	Isosceles triangular, medium concave	Chalcedony.
4106	32	12	3	base. Side notched	Quartzite.
4134	28	20	5	Isosceles triangular, slightly concave	Do.
1101		20		base.	201
4165	22	15	4	do	Do.
4197	19	13	2	Isosceles triangular, side notched	Do.
4201	28	15	3	Side notched, tip missing	Chalcedony.
4202	25	14	3	Side notched, one car missing	Do.

Microblades: Group 1

Catalog No.	Length	Width	Thickness				
4009 1244 541 2746 3068 1929 1631 4236 1358 2784 2281 1928 3116 763 1007 950 2210 2056 2212 1491	Mm. 31 32 34 35 35 35 36 37 37 38 38 38 40 40 40 40 47 47 49 57	Mm. 13 18 13 12 14 16 16 16 13 15 22 17 14 16 18 20 15 16 13 16 23	Mm. 1 3 4 3, 5 2 2 2 3 2 4 4 4 4 4 5 6 2 5, 5 4				

¹ With attached graver tip. Longest, 57 mm.; shortest, 31 mm.

Microblades: Group 2

Catalog No.	Length	Width	Thickness
655	Mm. 18 19 20 20 20 22 22 22 23 23	Mm. 12 12 19 15 16 13 21 16 16	Mm. 2 3 2.5 2 3 4 4 4 6 6 5
072 51 370 901 601 667 006	24 25 25 25 25 25 25 25 26	12 17 17 17 17 14 15 14	3 5 5 3 3 4 3
414 495 05 934 568 982 363	36 26 26 36 27 27 27 27 28 28	11 16 13 17 14 15 15 14	4 5 3 5 2 5 3 3 3 3

Pointed Side Scrapers

Catalog	Degree of angle	Maximum	Maximum	Maximum
No.		length	width	thickness
184 403 407 508 594 640 813 818 822 901 1109 1216 1336 1393 1630 2102 2206 2314 2419 2421 2594 3012 3181 3384 3445 3606 3899	62 50 65 81 32 26 26 43 32 45 13 74 28 69 59 18 30 87 31 30 84 71 78 58 67 69 57	Mm. 31 30 28 35 39 35 26 50 34 26 25 42 44 44 43 32 26 31 42 22 33 17 39 34 25 19 22	$Mm.$ $\begin{array}{c} 31\\ 20\\ 23\\ 22\\ 28\\ 25\\ 21\\ 27\\ 25\\ 20\\ 23\\ 41\\ 29\\ 43\\ 40\\ 26\\ 21\\ 22\\ 33\\ 24\\ 30\\ 31\\ 34\\ 27\\ 22\\ 32\\ 20\\ \end{array}$	Mm. 11 4 5 9 11 6 3 13 8 4 6 9 9 7 7 7 7 5 4 7 8 5 5 10 6

Keeled End Scrapers, type 1

Field catalog No.	Maximum length	Maximum width	Maximum thickness
280	Mm. 21 24 28 25 27 32 34 37 32 30 22 30 22	Mm. 17 18 22 21 22 22 26 26 22 24 23 20 21	Mm. 9 9 7 7 11 11 7 10 11 8
643 646 647 648 758 759 797	27 26 25 30 28 31 24 25	19 17 18 19 22 22 22 22 22	8 7 7 9 7 11 9

Keeled End Scrapers, type 1-Continued

Heeteu Emu	Scrapers, type 1	Continued	
Field catalog No.	Maximum length	Maximum width	Maximum thickness
	Mm.	Mm.	Mm.
922	21	18	9
923	23	20	6 1 5
924	31 14	17	1 5
926 955	14	17 22	6 11
961	40	25	1 12
1213	34	23	1 8
1330	34	20	9 9 8 9 1 7
1334	25	23	9
1388	39	16	8
1390 1462	$\begin{array}{c} 35 \\ 24 \end{array}$	$\begin{bmatrix} 21 \\ 20 \end{bmatrix}$	17
1463	26	$\begin{bmatrix} 20 \\ 21 \end{bmatrix}$	10
1508	$\frac{20}{24}$	23	9
1557	23	21	6
1719	26	22	9 6 9 5 8 8 7 8 8 8
1858	$\begin{array}{c} 24 \\ 28 \end{array}$	21 23	5
1905	25 25	19	8
1940	28	22	7
2055	39	21	8
2081	24	17	8
2124	24	19	8
2126	$\begin{array}{c} 31 \\ 27 \end{array}$	21 18	8
2196 2201	39	$\begin{bmatrix} 16 \\ 27 \end{bmatrix}$	1 14
2217	23	19	10
2312	35	24	9
2403	29	18	10
2408	33 25	16	5 7
2488 3046	28 28	$\begin{array}{c c} 16 \\ 21 \end{array}$	12
3095	23	19	8
3215	20	17	9
3342	30	18	9
3381	$\begin{array}{c} 33 \\ 22 \end{array}$	22 17	9
3410	22 29	19	- 8
3439	28	20	7
3440	28	20	12 8 9 9 8 8 8 7
3528	32	27	12
3555	23 26	19	97
3622	33	$\begin{bmatrix} 21 \\ 17 \end{bmatrix}$	8
3846	25	19	8 7 12
3863		25	12
3896	26	26	1 7
3952	28	17	1 7
4025	$\begin{array}{c} 24 \\ 37 \end{array}$	18 21	7 11
4113	25	20	9
4138	16	20	7
4139	34	15	. 11
4173	32	19	1 10
3.0		1	

¹ Slightly planoconvex.

Keeled End Scrapers, type 2

Field catalog No.	Maximum length	Maximum width	Maximum thickness
Simple Catalog No.			thickness Mm. 10 8 110 11 7 17 10 8 9 18 8 6 11 112 10 9 16 111 10 8 7 12 11 10 9 16 11 17 9 9 11 10 10 10 11 10 10 11 10 10 10 10 10
2781 2919 2920 3009 3156 3437 3448 3556 3665 3745 3815 3817 3821 3847 3898 3911 3951 4004 4032	41 29 29 32 29 29 29 29 22 26 24 23 24 31 33 30	23 25 16 19 19 22 23 19 17 20 26 20 22 21 19 22 23	.8 12 77 1 6 8 7 9 11 8 1 6 8 1 6 8 1 12 12 12 12 9 10 7

¹ Slightly planoconvex.

Carinated End Scrapers, type 1 (cutting edge advancing to the right)

Field catalog No.	Maximum	Maximum	Maximum
	length	width	thickness
614	Mm. 23 29 25 23 25 28 29 25 28	Mm. 20 19 19 19 21 20 18 15	Mm. 1 7 6 7 9 7 6 1 6 1 6 1 6 8

¹ Slightly planoconvex.

Carinated End Scrapers, type 2 (cutting edge advancing to the left)

Field catalog No.	Maximum	Maximum	Maximum
	length	width	thickness
392	Mm. 25 25 24 24 21 25	Mm. 17 18 18 17 17 17 17 20	Mm. 8 7 6 1 4 6 8

¹ Slightly planoconvex; rest are trianguloid

End Scrapers with Left Carinate-type 3

Field catalog No.	Maximum length	$egin{array}{c} ext{Maximum} \ ext{width} \end{array}$	Maximum thickness
	Mm.	Mm,	Mm.
319	25	22	8
536	29	16	6
644	2 3	18	8 6 5 7
645	31	22	
650		28	10
760	25	19	7
856	43	30	12
1006		21	6
1209	25	19 22	7
1211	26	$\frac{22}{22}$	5 10
1275	26	31	10
1464	32	20	9
1510	26	20	5
1558	24	23	5 8
1627	28	25	6
1717	22	20	8
1775	23	18	10
1816	27	22	5
1924	25	19	7
2079	24	19	6
2193	24	2 3	5
2202	39	20	11
2416	31	21	5
2422	29	22	1 4
2423	28	20	5 7
2663	31	21	7
2921	$\frac{21}{21}$	19	5 7
2968	25	18 23	6
3411		$\frac{23}{22}$	7
3441 3506	26	$\frac{22}{22}$	6
3581	$\frac{20}{24}$	$\frac{22}{21}$	6 7
3790		16	6
3999	29	21	7
4098	39	26	7
4224		30	11

¹ Planoconvex ventral surface.

End Scrapers with Right Carinate, type 4

Field catalog No.	Maximum length	Maximum width	Maximum thickness
019	Mm.	Mm.	Mm.
212 342	$\begin{array}{c} 25 \\ 34 \end{array}$	$\begin{array}{c} 21 \\ 21 \end{array}$	1 7 1 6
391	$\frac{34}{24}$	19	5
438	$\tilde{2}_{4}^{\pm}$	18	6
540	$\tilde{23}$	$\begin{vmatrix} \hat{20} \end{vmatrix}$	6
591	$\frac{23}{24}$	$\frac{20}{22}$	6
652	$\overline{25}$	19	6
798 	22	22	4
799	32	22	7
1089	24	19	16
1203	26	21	5 5
1241	28	17	5
1385	23	18	7
1509	22	$\frac{22}{10}$	1 4
1624	26	19	5
1625	29	19	16
1628 2080	35	28	11
2080	26 30	20	5
2082 2197	28	$\frac{19}{17}$	4
2240	$\begin{array}{c} 20 \\ 22 \end{array}$	$\frac{17}{23}$	1 7
2661	$\begin{bmatrix} \frac{22}{27} \end{bmatrix}$	$\begin{bmatrix} 23 \\ 20 \end{bmatrix}$	6
3096	33	19	1 9
3212	$\frac{33}{22}$	17	16
3438	$\frac{5}{25}$	19	$\ddot{6}$
3909	30	$\tilde{26}$	9
3953	24	18	7
1002	25	24	6
1034	28	28	5
1068	18	18	6
1136	22	17	6
1239	26	20	1 6

¹ Slightly planoconvex.

Slightly Modified Nodular End Scrapers

Field catalog No.	Maximum	Maximum	Maximum
	length	width	thickness
219	Mm. 26 23 28 24 23 26 26 26 30 22 24 23	Mm. 22 19 18 19 16 24 20 18 20 23 21 15	Mm. 66 77 17 4 17 8 16 110 8 6

¹ Slightly planoconvex.

Scraper-graver End Scrapers

Field catalog No.	Maximum length	Maximum width	Maximum thickness	Side
227 800 1289 1879 1909 2313	Mm. 27 27 23 30 30 32 25	Mm. 21 22 20 26 25 23	$Mm. \begin{tabular}{c} 5 \\ 9 \\ 7 \\ 7 \\ 10 \\ 9 \\ 7 \end{tabular}$	Left. Right. Do. Left. Do. Do. Both.

Small Rounded Scrapers

Field catalog No.	Maximum length	$\begin{array}{c} {\bf Maximum} \\ {\bf width} \end{array}$	Maximum thickness
317 338 715 716 717 761 1329 1529 1556 1859 1972 2189 2316 2490 2778 2871 3158 3159 3159 3159 4007 4007	Mm. 26 28 28 22 22 28 25 24 22 22 24 43 25 16 21 23 19 19 19 19 23 20 28	Mm. 20 26 26 22 22 25 20 19 22 20 24 39 20 16 19 20 17 18 19 21 20 23	Mm. 10 9 6 9 8 7 8 9 11 8 9 7 8 10 10 11

Large Teardrop End Scrapers

Field catalog No.	Maximum	Maximum	Maximum
	length	width	thickness
929 1243 1420 2127 2339 2380	Mm. 40 51 46 38 37 40	Mm. 22 25 30 26 21 23	Mm. 7 9 9 11 1 9 6

¹ Positive bulb of percussion on ventral surface cradicated by chipping.

Small Teardrop End Scrapers

Field catalog No.	Maximum	Maximum	Maximum
	length	width	thickness
1064	Mm. 31 25 23 30 33 31	Mm. 19 16 19 19 19 18	Mm. 7 5 8 8 6

Large Flake End Scrapers

Field catalog No.	Maximum	Maximum	Maximum		
	length	width	thickness		
389	Mm. 34 28 37 35 32 32 45 38 33 32 30 27	Mm. 15 24 20 17 22 18 14 25 17 19 28 22 29 29 16 25 20 23	Mm. 2 8 9 7 6 8 7 6 6 7 5 6 6 9 9 9 6 6 6 11 4 8		
3717	33	24	9		
3820	29	29			

Small Planoconvex End Scrapers

Field catalog No.	Maximum	Maximum	Maximum
	length	width	thickness
1332	Mm. 32 23 26 29 29 27 29	Mm. 20 16 18 20 20 20 21 18	$Mm.$ $\begin{array}{c} 9 \\ 1 \ 8 \\ 6 \\ 7 \\ 10 \\ 9 \\ 7 \end{array}$

¹ Has a graver tip attached to side of scraper edge.

Small Flake End Scrapers

Field catalog No.	Maximum	Maximum	Maximum
	length	width	thickness
172 182 302 318 320 321 388 394 428 537 590 802 803 927 1003 1205 1210 1210 1210 1289 1290 1507 1598 1626 1660 1752 1939 1944 2100 2209 2405 2407 2560 2724 2925 3066 3084 3180 3442 3574 3818 3895 4114 4115	Mm. 27 21 25 28 24 20 22 27 25 23 23 27 25 24 22 27 27 25 23 29 24 22 22 25 28 22 26	Mm. 18 17 20 17 21 21 21 22 23 23 16 19 14 17 19 15 17 17 20 20 13 16 18 16 17 15 16 17 15 16 19 17 18 21 20 17 18 21 20 19 19 19 19 19 19 19 19 19 19 19 19 19	$Mm.$ $\begin{array}{c} 6 \\ 3 \\ 7 \\ 6 \\ 5 \\ 7 \\ 7 \\ 6 \\ 6 \\ 7 \\ 7 \\ 6 \\ 6 \\ 6 \\ 7 \\ 7$

¹ Possible graver tip. 2 Burinlike tool at base.

Thin Flat End Scrapers

Field catalog No.	Maximum length	Maximum width	Maximum thickness
	Mm.	Mm.	Mm.
263	18	26	
281	18	18	4
399	38	23	
400	28	22	8
350	24	19	
315	22	19	
956	26	18	
1204	23	23	
1208	18	19	4
1559		20	
1661	26	20	8
1662	27	20	4
1718	23	16	•
1720	17	17	(
1877	19	18	
1967	23	22	4
2142	24	23	
2144	27	21	7
2420	20	22	
2518	21	19	
2664	25	25	
2723	17	18	(
2969	23	23	(
3115	24	23	(
2194		19	
3242	28	24	
3296		20	,
3391	15	18	4
3848	34	30	
3892	24	21	9
1006	20	20	
1112	24	16	
1204	28	18	*

Thumbnail End Scrapers

Field catalog No.	Maximum	Maximum	Maximum	
	length	width	thickness	
426 812	Mm. 21 17 21 19 18 18 18 17 14 16 22 15 19 19 14 21 17 16 18 23 19 20	Mm. 17 16 15 17 14 14 17 19 18 16 18 14 14 15 17 17 17 17 17 17 17 14 13 14 15	Mm. 1 5 6 1 4 5 5 4 6 5 5 7 7 3 6 1 4 5 7 6 1 4 5 1 6	

¹ Borderline specimens. Probably should have been placed in type 1 keeled end scrapers.

Triangular End Scrapers

Field catalog No.	Maximum	Maximum	Maximum
	length	width	thickness
472	Mm. 22 24 25 23 27 23 29 29 23 27	Mm. 18 22 18 22 20 20 25 20 24 21	Mm. 4 6 4 1 4 6 1 8 7 5

¹ Planoconvex.

Trapezoidal End Scrapers

Field catalog No.	Maximum	Maximum	Maximum
	length	width	thickness
473_ 806_ 928_ 1560_ 1857_ 1942_ 2031_ 2188_ 2191_ 2192_ 3211 3673_ 3816_ 3894_ 3904_	$Mm.$ $\begin{array}{c} 28 \\ 26 \\ 29 \\ 26 \\ 23 \\ 23 \\ 23 \\ 19 \\ 22 \\ 30 \\ 24 \\ 26 \\ 23 \\ 24 \\ 24 \\ 24 \\ 27 \end{array}$	Mm. 22 22 23 18 19 22 23 17 22 18 21 19 20 19 20	Mm. 7 1 6 6 5 7 7 1 7 4 7 6 6 6 7 6 6 5 6

¹ Slightly planoconvex.

Lamellar Flake Tools

Field catalog No.	Length	Breadth	Thick- ness	Tool type
950 1358 2784 4009 541 4236 1945 1631 2056 3068 3116 1491 2210 763 2212	Mm. 45 37 38 31 34 37 28 36 42 35 40 56 48 40 49 40	Mm. 15 14 22 13 13 14 14 16 13 14 16 18 16 19	Mm. 5 4 4 3 4 3 3 4 3 2 4 4 6 4 5. 5	Possibly hafted knife. Scraper. Do. Knife-scraper-graver. Knife. Scraper. Do. Do. Do. Do. Do. Do. Do. Do. Do. Do

Large Gravers

Catalog No.	Length	Breadth	Thickness
2931	Mm. 48 43 42 31 36 26 29 26 31 27 34	Mm. 21 24 19 19 13 17 13 16 24 16 18	Mm. 15 12 6 8 7 6 5 7 4

Comparable gravers from Lindenmeier site (after Roberts, 1935, pl. 13)

h	33 37 39 39	30 24 16 30 24	
<i>l</i>	43 39	24 23	

Small Gravers

Catalog No.	Length	Breadth	Thickness		
809	Mm. 24 24 19 18 21 24 22 20 25 25 31 22 27	Mm. 21 17 18 15 18 17 20 17 17 18 18 18 19 22	Mm. 7 4 4 4 7 5 3 3 17 3 6 8		

¹ Scraper-graver. Lengths of tips range from 1 mm, to 4 mm.

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APPENDIX 5

HUMAN SKELETAL MATERIAL FROM THE VICINITY OF THE HOSTERMAN SITE (39PO7), OAHE RESERVOIR, SOUTH DAKOTA

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INTRODUCTION

The preceding article by Carl F. Miller describes the archeological investigation of the Hosterman site (39PO7) in Potter County, S. Dak. No human skeletal material was recovered during his excavations. In September of 1962, while boating on the Oahe Reservoir, Richard Weeks of Pierre, S. Dak., discovered the partial remains of six human burials eroding out of the east bank of the Missouri River and sent the bones to me for identification. Mr. Weeks is an amateur collector who, in the past few years, has checked the changing banks caused by the rising waters of the Reservoir. I accompanied Mr. Weeks on two such boat trips in the summer of 1962 and at that time encouraged him to collect carefully all human skeletal material for study. Charles L. Keeler, a student in anthropology, assisted in the preparation of the material herein described.

The skeletal material was found just north of Whitlocks Crossing on the east side of the Reservoir at an elevation of 1,565–1,570 feet. The location of the find corresponds to that of the Hosterman site, and the burials therefore may have been associated with that earth-lodge

village.

In his letter of transmittal, Mr. Weeks states that the skeletons were found in three different concentrations. The first was found in 1 foot of water; the ribs, vertebrae, and mandible were in the original burial position in the mud with the rest of the bones scattered nearby in the water. A few more scattered bones were found on the bank approximately 30 feet south. A complete burial was found in the bank about 10 feet from the first group. The skeleton "was on its back, head toward the west, legs flexed to the right, arms down to the sides with hands on pelvis" (Weeks, 1962, personal communication).

In no case were there any associated artifacts, covering, or anything else which might suggest cultural affiliation.

DESCRIPTION OF BURIALS

The bones were submitted in groups corresponding to the three areas of concentration in which they were found. We have retained these area designations and have assigned individual numbers to the remains of the six individuals present. Many of the bones were broken and scattered due to wave action and slumping of the loess. Whenever possible the bones were reconstructed to obtain anthropometric measurements.

GROUP 1

Group one (those found in the water) consists of portions of two skeletons. These have been numbered Individuals 1 and 2.

Individual 1.—Male, 35–45 years old; the skeleton material of this individual was fairly complete though fragmentary, but the skull was broken beyond repair. Age at death is based on changes in the pubic symphysis after McKern and Stewart (1957, p. 85). Although not a good criterion for aging, cranial suture closure substantiates the assessed age according to Krogman (1962, pp. 76–91). There is complete endocranial closure but ectocranially all of the sutures are visible except for a small area of the sagittal suture between the apex and obelion. The determination of sex is based on pelvis, cranial, and long bone morphology. Stature estimations are based on measurements of the left humerus using Trotter and Gleser's (1958, p. 120) formula for Mongoloids. The three parts of the sternum (manubrium, body, and xiphoid process) have fused completely. Slight arthritic lipping is present on all of the vertabrae with fusion of the second and third cervicals.

Stature range:	Low	167. 02 cm. (5' 5%'')
	Mean	171. 18 cm. (5' 7½")
	High	175, 34 cm. (5' 9'')

Individual 2.—Child, approximately 6 years old, represented only by a right humerus. Age, based on a maximum diaphyseal length of 162 mm., is estimated from mean measurements given by Johnston (1962, p. 251), whose measurements of sub-adult Indian Knoll skeletons go only through 5.5 years with a mean humeral length of 154.67 mm. for the age group 4.5 to 5.5.

Group 2

The analysis revealed the partial remains of at least three individuals based upon the occurrence of three right femora.

Individual 3.—Male, 35–50 years old; represented by a right femur and possibly a right and left humerus, a fragmentary right scapula and a mandible. The femoral head has a maximum diameter of 46 mm.

which places it in the male range for this measurement (Krogman 1962, p. 144). The mandible, two humeri, and scapula were assigned to this individual on the basis of coloring of the bones and general morphological characteristics. The mandible has a square chin indicative of the male sex. The humeri are rugged and neither contains a septal aperture. Age is based on wear of the teeth. The enamel of the masticating surfaces of the eight remaining teeth are worn off completely and correspond to Hrdlička's (1952, p. 53) third stage of wear. Age for this stage is suggested as 35-50. Only eight teeth (four incisors, right canine, left first premolar and the right and left first molars) are present. The remaining six teeth were lost after death. The third molars have not erupted. The missing right first premolar was abscessed and may have been lost just prior to death since little or no resorption had taken place. There is a cavity in the first left molar below the gum line and all of the teeth present contain tarter.

Stature range:

Low 162.51 cm. (5' 4'')

Mean 166.31 cm. (5' 5½'')

High 170.11 cm. (5' 7'')

Individual 4.—Adult female (?) represented by a fragmentary and weathered right femur shaft only. Sex, which is questionable, is based on the smallness and gracility of the shaft.

Individual 5.—Child, approximately 7 years old, represented by a right femur shaft only. Age is based on maximum diaphyseal length (222 mm.) which, when compared with the generalized postnatal growth curve of the femur given by Stewart (1954, pp. 407–450) suggests an age of around 7 years.

GROUP 3

Group 3 consists of the complete flexed burial of an adult interred with the head oriented toward the west. When first discovered only a small portion of the skull was exposed in the face of the bank. No artifacts or covering of the burial were found. Mr. Weeks states, however, that "the soil was very discolored, a yellowish green" (personal communication) and suggests that this may be due to a decayed hide covering.

Individual 6.—(fig. 52). Male, 30–40 years old. Age of this individual is based on changes in the pubic symphysis and corresponds to a mean age of 35.84 according to McKern and Stewart's (1957, p. 85) classification. Wear on the teeth compares with stage 3 in Hrdlička's (1952, p. 53) system. Cranial sutures are beginning to close endocranially and are visible ectocranially. Arthritic lipping is present in the fourth and fifth lumbar vertebrae only. Sex is based on

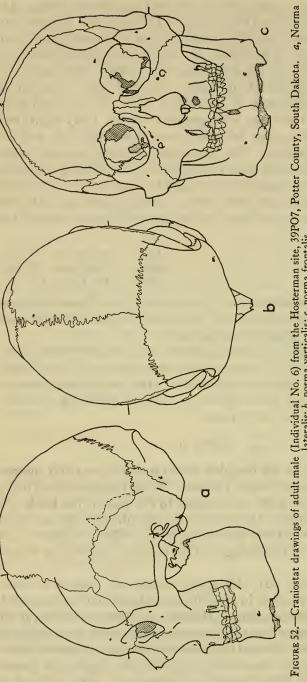


FIGURE 52.—Craniostat drawings of adult male (Individual No. 6) from the Hosterman site, 39PO7, Potter County, South Dakota. a, Norma lateralis; b, norma verticalis; c, norma frontalis.

pelvic, cranial, and long bone morphology. All are consistent in exhibiting characteristics considered to be those of the male sex. Stature was calculated using the formula for Mongoloids on measurements for the femur plus the tibia given by Trotter and Gleser (1958, p. 120).

Stature range: Low 168. 51 cm. (5' 6 6/8'') Mean 171. 74 cm. (5' 7 5/8'') High 174. 98 cm. (5' 8 7/8'')

ANALYSIS

Table 1 gives the cranial measurements and indices for Individuals 1 and 6 and for the mandible of Individual 3. All are males and represent the only measurable cranial material.

Stature calculations could be made on three individuals, all males. It is interesting to note that the mean estimated stature does not vary more than 5.43 cm. (2½ inches) among the three. Individual 1 has a calculated mean stature of 171.18 cm. (5 feet, 7½ inches); Individual 3, 166.31 cm. (5 feet, 5½ inches); and Individual 6, 171.74 cm. (5 feet, 7½ inches) for a sample mean stature of 169.74 cm. or 5 feet, 6½ inches.

Table 1.—Measurements and indices of 39P07 male crania 1

100	No. 1	No. 3	No. 6	Mean
	Mm.	Mm.	Mm.	Mm.
Maximum length			177	
Maximum breadth			137	
Basion-bregma height			(132)	
Basion-porion height			(20)	
Cranial module			(148.66)	
Bizygomatic breadth			143	
Minimum frontal breadth			92	
Endobasion-nasion			102	
Nasal height			57	55
Nasal breadth	26		26	26
Orbital height:				
Right	35			
Left			37	
Orbital breadth:				
Right				
Left			42	
Length-height			(74.58)	
Breadth-height			(96.35)	
Indices:				
Cranial 2			77.40	
Mean height			(84.08)	
Fronto-parietal			67.15	
Orbital:				
No. 1	74.47			
No. 6			88.10	81.28
Nasal	49.06		45.61	47.34
Flatness of cranial base			(15. 15)	
Mandible: Bigonial breadth	110	100	(100)	(108)
		102	(106)	(107)
Symphysis height	(36)	38		(37)
Bicondylar diameter		132	70	
Ascending Ramus height		72	76	74
Corpal length (Gonion-Gnathion)	. 88	93		90.5

110 000 mm () _ T T 100

¹ In all tables figures in parentheses represent estimated measurements.
² Indices of the cranium are based on measurements indicated here.

DISCUSSION

Because there were no cultural artifacts associated with the burials, no positive cultural identification can be assigned. However, a comparison of the morphological characteristics of the crania may give some indication of possible cultural affiliation. Table 2 compares selected cranial measurements and indices for two adult males from 39PO7 with samples of Arikara, Mandan, Pawnee, and Central Plains Phase associated skeletons. The Arikara and Mandan were inhabitants of the region around the Hosterman site. Recently, summaries of anthropometric measurements of skeletal material for protohistoric Arikara (Bass, 1961) and Mandan (Bass and Birkby, 1962) have been published.

One of the major areas of cranial difference between the Arikara and Mandan is in the index. The Mandan are dolichocranic, whereas the Arikara are mesocranic. The only individual from 39PO7 upon which a cranial index could be calculated gave an index of 77.40 or mesocranic. On the basis of both the length-height and mean height indices, the single male from the Hosterman site falls closer to the Arikara means. Although cultural associations based on cranial measurements of only one individual are quite speculative, Individual 6 seems to be related most closely morphologically to the Arikara.

Table 2.—A comparison of selected mean measurements and indices

	39PO7 No. 1	39PO7 No. 6	Arikara ¹ N 116 ⁸	Mandan² N 12	Pawnee ¹ N 29 ⁴	Central 1 Plains N 37 5
Glabella-occipital length Maximum breadth Basion-bregma height Indices: Cranial	Mm.	Mm, 177 137 (132) 77, 40 (74, 58)	Mm. 174. 7 140. 7 132. 9 78. 6 74. 5	Mm, 184, 50 136, 17 131, 75 73, 90 71, 49	Mm. 175. 8 139. 6 128. 7 79. 3 73. 2	Mm. 174. 7 143. 0 137. 7 82. 5 79. 5
Mean height Upper facial Nasal Orbital: Right Left	49. 06 74. 47 8	(84. 08) 52. 45 45. 61	83. 59 53. 40 49. 27 82. 31	82. 31	81. 55 51. 80 49. 03	86. 35 51. 50 51. 96

Bass, 1961.
 Bass and Birkby, 1962.
 The sample size varies with the individual measurement but in no case are there less than 49.
 In no case is the sample size less than 17.
 In no case is the sample size less than 14.

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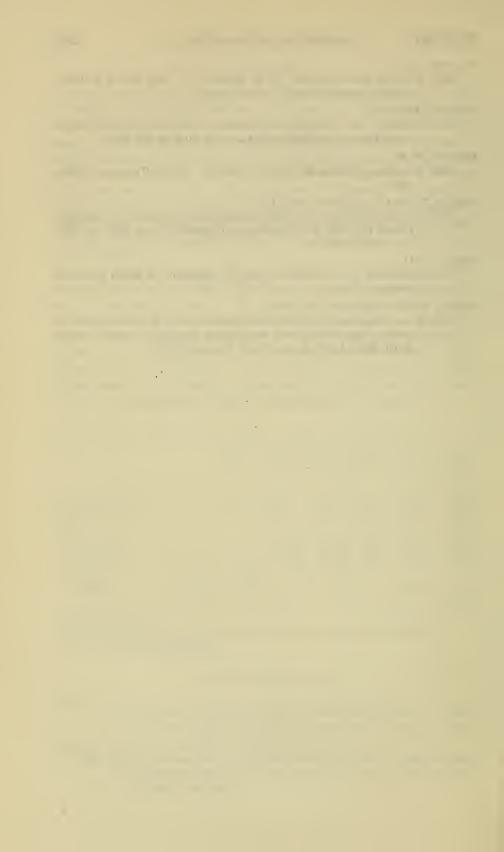
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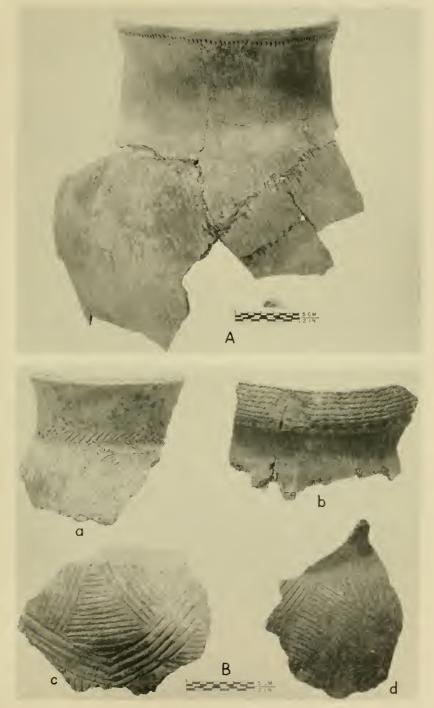
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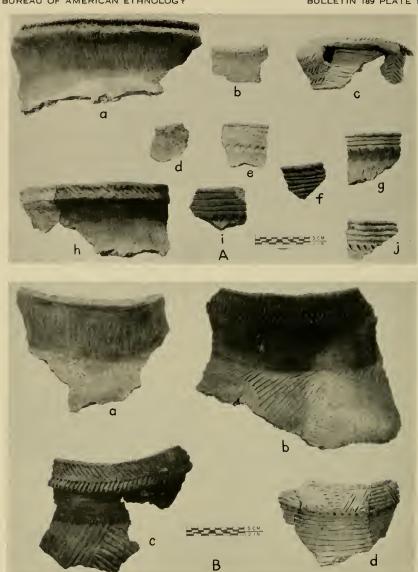
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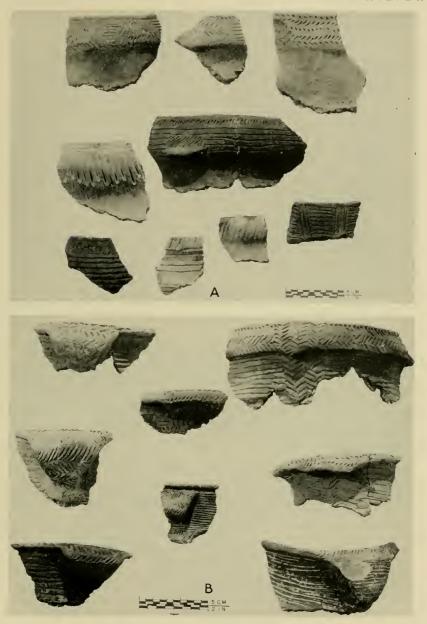




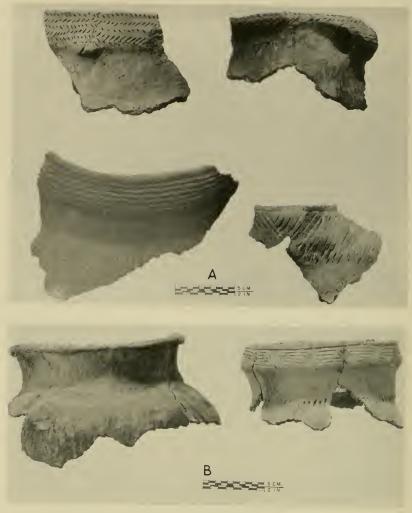
A, B, Vertical and S-shaped rim types, Hosterman site.



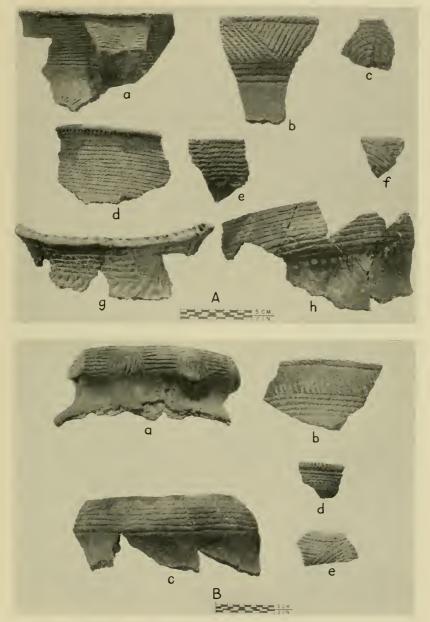
A, B, Rim types, showing typical forms and treatments.



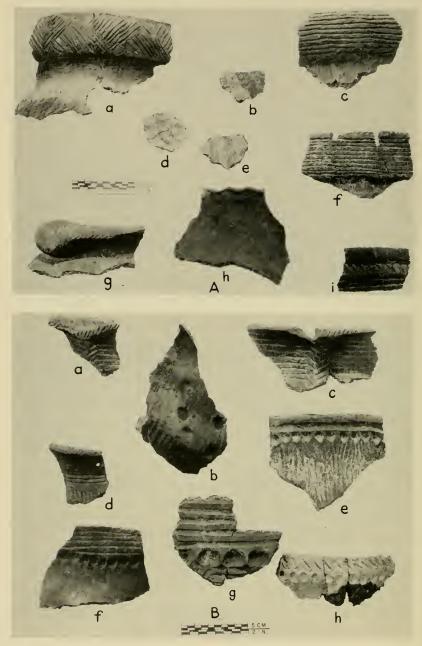
A, B, Typical rims with and without handles.



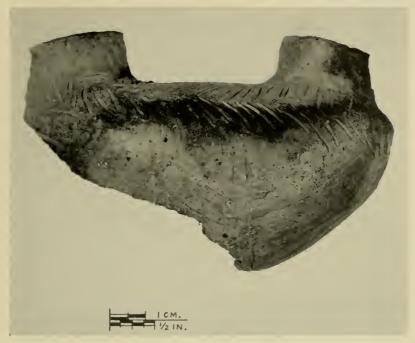
A, B, Rim types, Hosterman site.



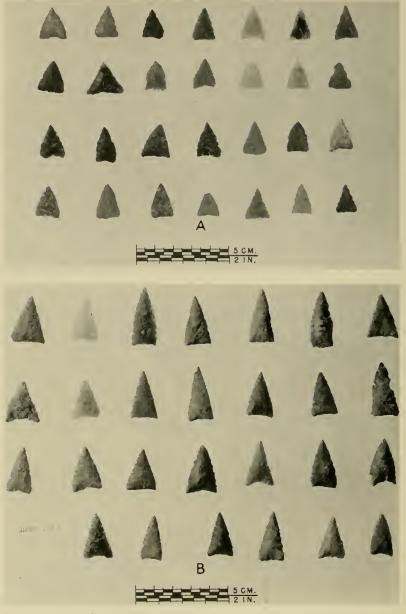
A, B, Cord-impressed rim treatments, Hosterman site.



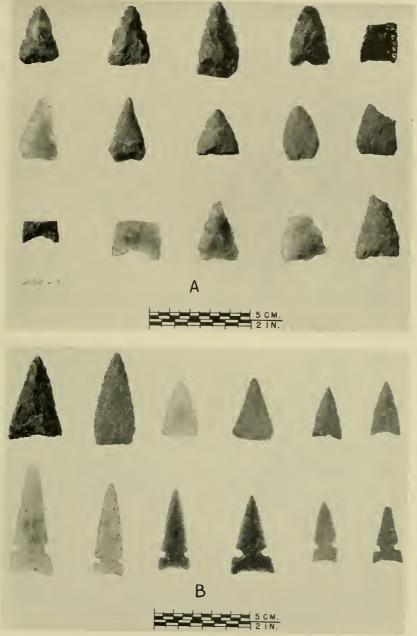
A, B, Incised rim sherds, Hosterman site.



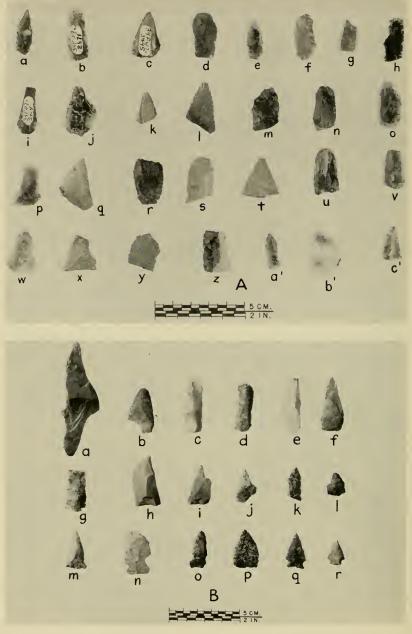
Double spouted miniature vessel, unusual to the Plains.



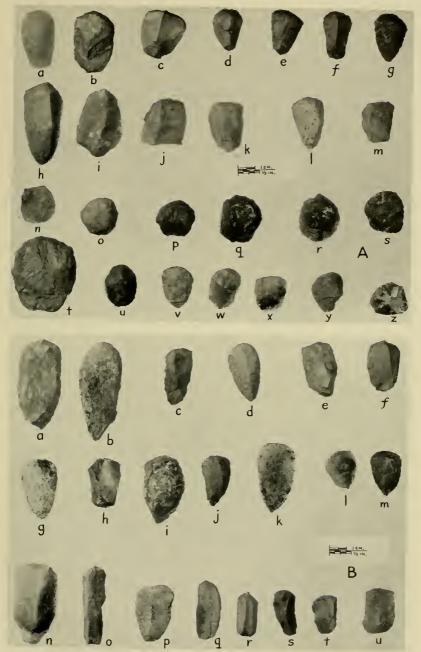
A, B, Group 1 and Group 2 projectile types, Hosterman site.



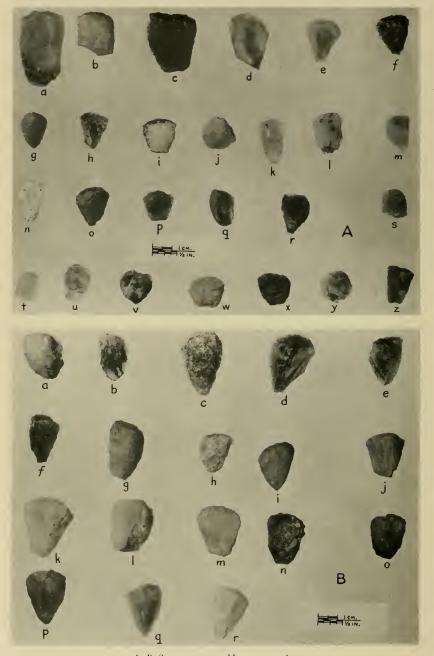
A, B, Group 3, Group 4, and notched projectile types.



A, B, Microblades and lamellar flake knives.



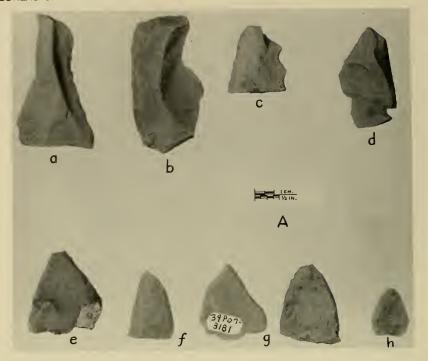
A, B, Scraper types, Hosterman site.

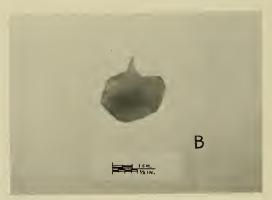


A, B, Scraper types, Hosterman site.

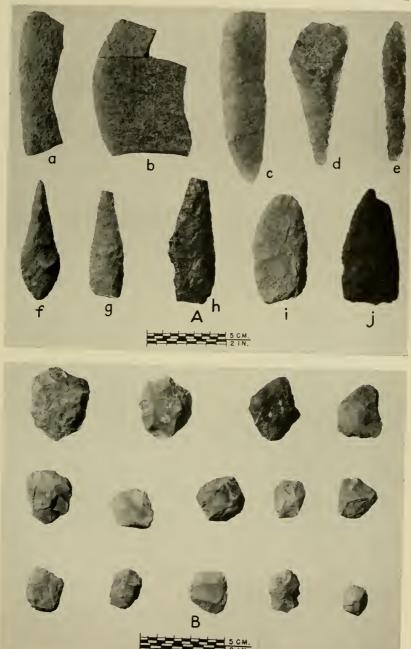


A, B, End and side scraper types.

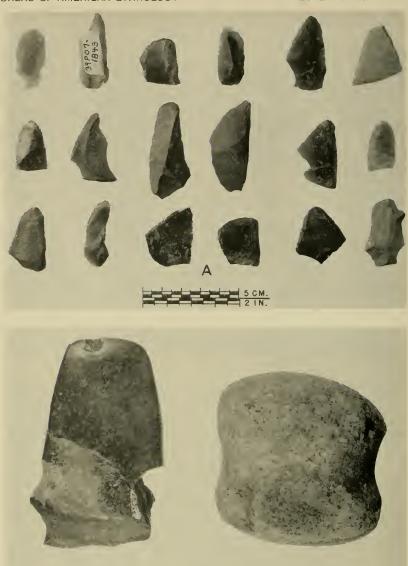




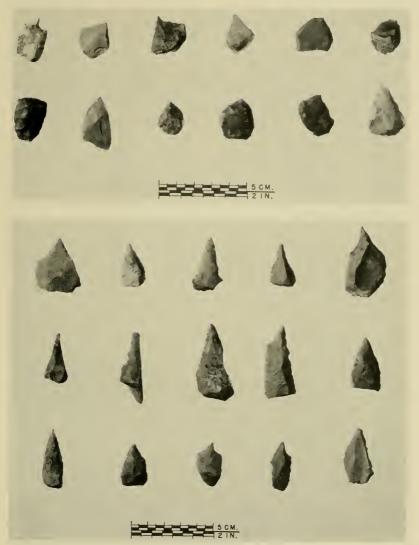
A, B, Side scrapers and burin form, Hosterman site.



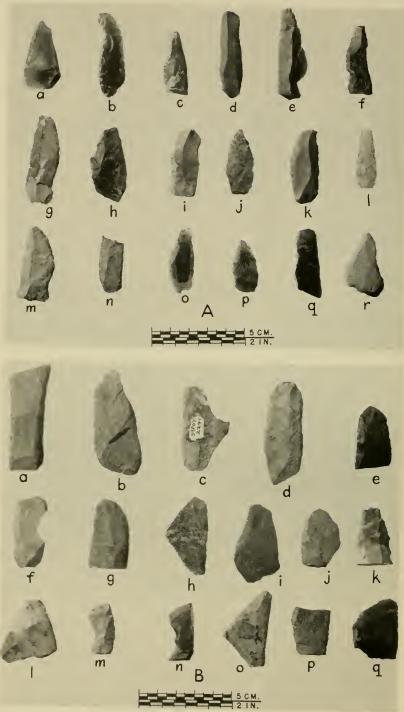
A, B, Knife forms and biface ovates.



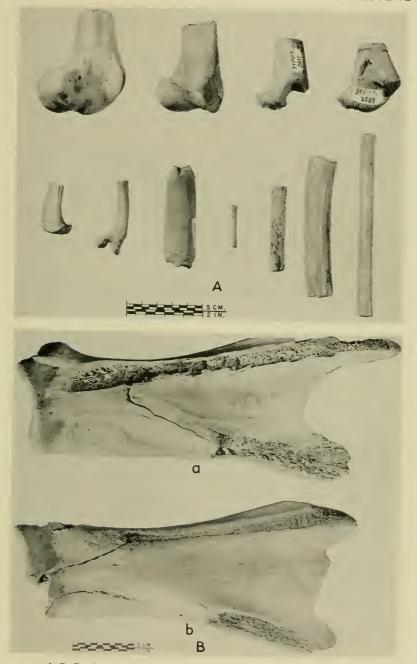
A. B, Flake knives and side scrapers; grooved ax and maul.



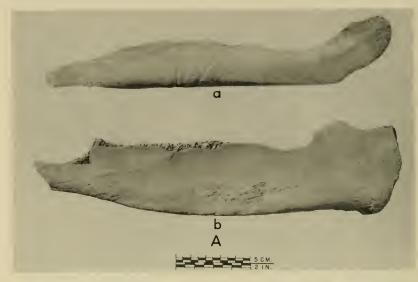
Graver forms, Hosterman site.

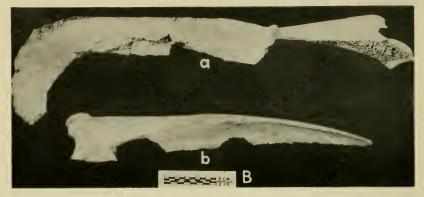


A, B, Lamellar flake tools.



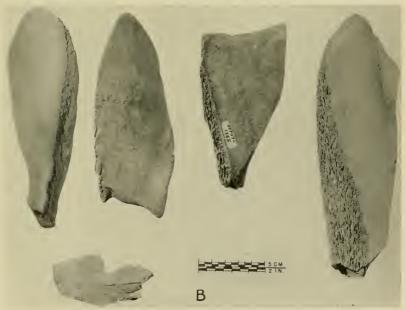
A, B, Cut bone sections, worked antler, bone tubes, and scapula hoes.



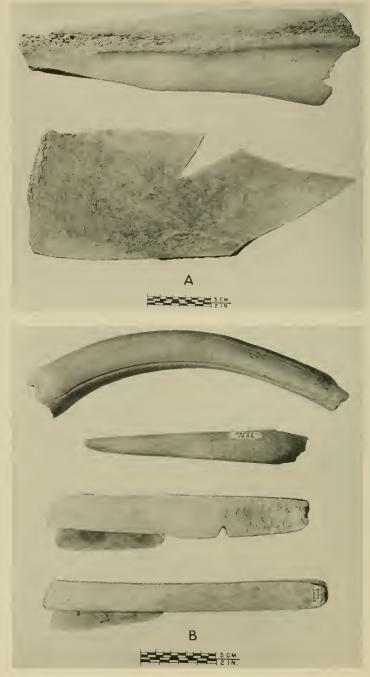


A, B, Scapula tools; fleshers and sickles.

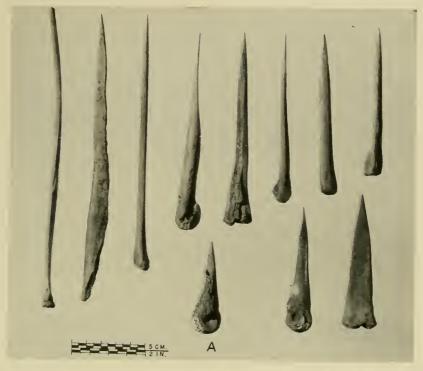


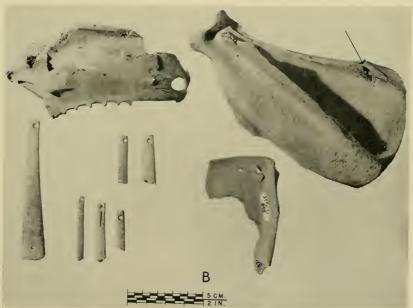


.1, B, Scapula knives and fleshing tools.

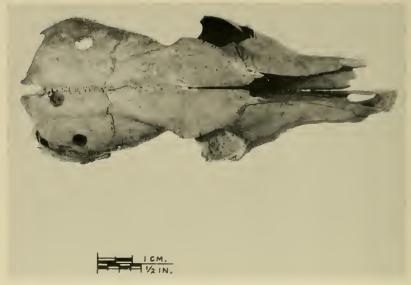


A, B, Scapula cleaver, pentagonal-shaped tool, hafted knives, and antler tools.





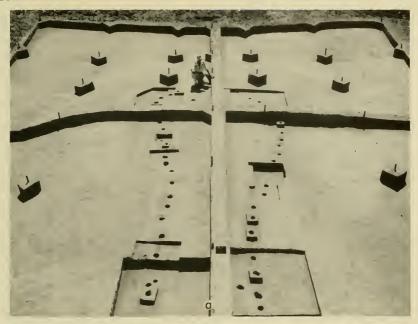
A, B, Bone awl types and miscellaneous worked-bone objects.



Fetish or trophy skull of *Vulpes velox*.



a, Feature 4 cleared of sod and staked in 10-foot squares; 39LM4-19. b, Surface contour of ditch in the vicinity of Feature 5, prior to excavation; 39LM4-22.





a, The stockade line of Feature 4, excavation completed; 39LM4-46. b, Feature 18, postholes of the stockade along the inner edge of the defensive ditch, fire area about 5 feet to the east; 39LM4-48.



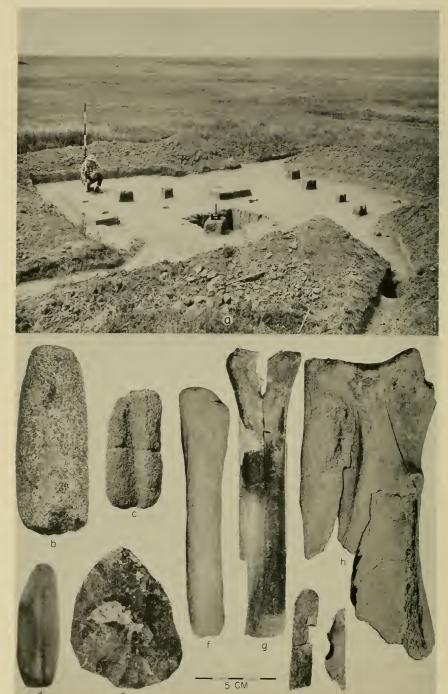


a, Profile of west wall, Feature 5; the dark fill outlines the aboriginal ditch excavation; 39LM4-30. b, Profile of east wall, Feature 6, showing rodent disturbance and possible postholes; 39LM4-24.

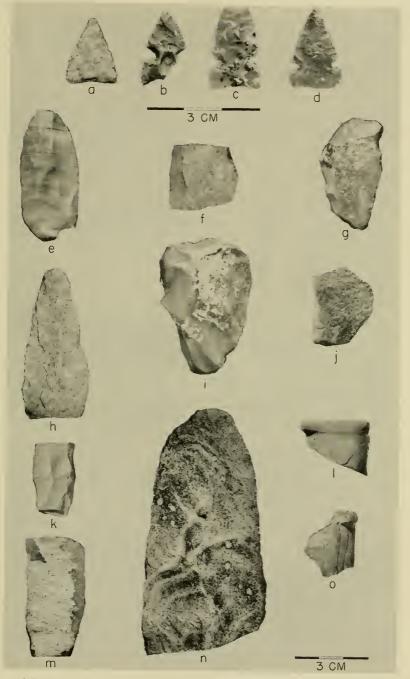




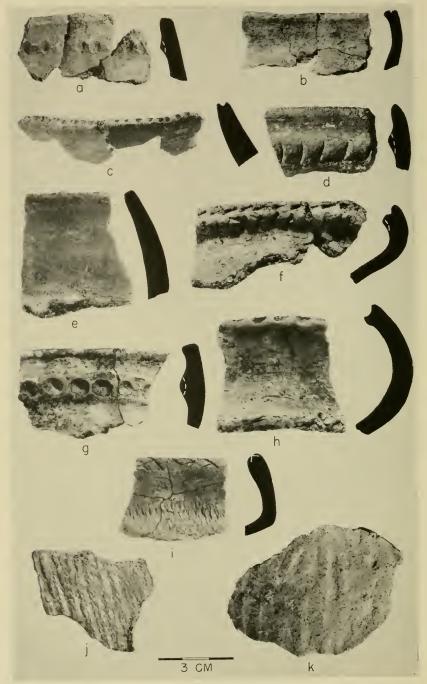
a, Feature 10, excavation completed, 1958; 39LM4-40. b, Feature 25, a burned area with a concentration of sherds, possibly roof fill of a house; 39LM4-42.



a, Feature 39, a house of indeterminate form, postholes, firepit on pedestals; 39LM4-51.
b, Celt; c, d, shaft smoothers; e, chopper; f, g, fleshers; h, scapula hoe; i, quill flattener; j, shaft wrench.



a-d, Projectile points; e, g, h, j, m, n, knives; f, i, k, scrapers; l, o, pipe fragments.



Ceramic remains from Hickey Brothers site. a, d, g, Riggs Punctate; b, c, e, h, Riggs Flared Rim; f, i, Anderson Low Rim; j, cord-roughened body sherd; k, simple-stamped body sherd.

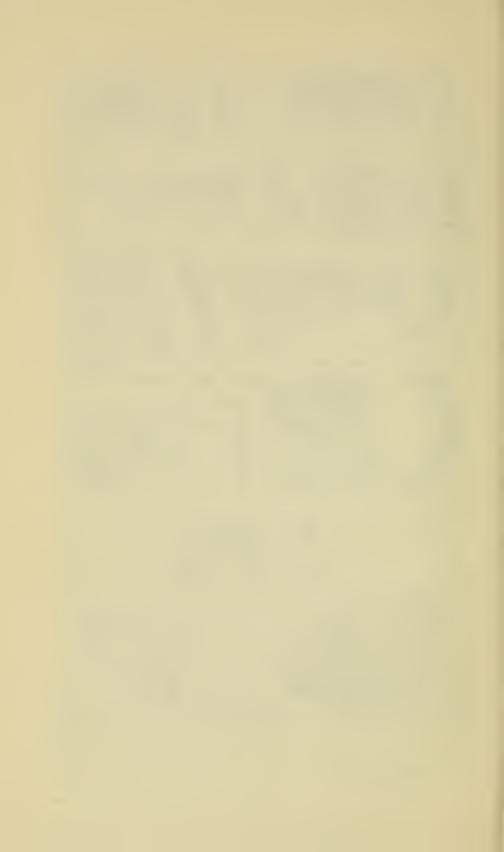
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River Basin Surveys Papers, No. 37

The Good Soldier Site (39LM238), Big Bend Reservoir,
Lyman County, South Dakota

By ROBERT W. NEUMAN

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ILLUSTRATIONS

PLATES

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- 47. a., View east-northeast of Good Soldier site and surrounding vicinity. Missouri River flows eastward in the upper left. b, View north of trench cross-sectioning the long axis of the natural mounds. Broken rocks are adjacent to the large pit (Feature 4).
- 48. Pottery specimens from the Good Soldier Component: a, b, Iona Indented; c, d, Grey Cloud Horizontal-Incised; e, f, Talking Crow Straight Rim; g, Cadotte Collared; h, Stanley Tool Impressed; i-k, miscellaneous.
- 49. Stone and bone specimens from the Good Soldier Component.
- 50. Pottery and stone specimens from the Badger Component.

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THE GOOD SOLDIER SITE (39LM238), BIG BEND RESERVOIR, LYMAN COUNTY, SOUTH DAKOTA

BY ROBERT W. NEUMAN

INTRODUCTION

In July of 1958 a field party of the Missouri Basin Project, Smithsonian Institution, spent 14 days conducting archeological excavations at the Good Soldier site (39LM238), a prehistoric Indian camp site in the Big Bend Reservoir area, South Dakota. The site was first recorded and tested in 1956 by a survey team of the Missouri Basin Project under the direction of Harold A. Huscher (Huscher and McNutt, 1958). The 1958 investigations were supervised by the writer; James J. Stanek acted as field assistant. Excavations at this prehistoric site were made possible through Federal funds provided for the Inter-Agency Archeological Salvage Program of the Smithsonian Institution, the National Park Service and cooperating Federal, State, and local institutions.

ACKNOWLEDGMENTS

A number of people from the Missouri Basin Project assisted in the compilation of this report, and to the following I am sincerely grateful: Warren W. Caldwell, G. Hubert Smith, and Robert L. Stephenson, who read the original manuscript and offered helpful suggestions; Evelyn B. Stewart, who proofread and handled the illustrations; Ione Wilson, who did the final typing; Jerry Livingston, who did the drafting; and Wayne Nelson, who did the photographic work for the plates.

Special thanks are due Hobart Eagle, Superintendent of Maintenance, Bureau of Indian Affairs, at the Crow Creek Indian Reservation. It was through his cooperation that I was loaned a boat, motor, and other water equipment for our daily crossings of the Missouri River from Fort Thompson to the Good Soldier site. To the crew of the 1958 field party I am also deeply indebted, because no task or suggestion was beyond their endurance.

¹ Members of the 1958 field party were as follows: Lee Azure, Joseph Benthall, Eugene Brother-of-All, Adolph Burns Day, Michael Forth, Donald Howe, Milo Kearney, Frederick Middle Tent, Horace Slow, and Junior Yellow Back.

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LOCATION AND DESCRIPTION

The Good Soldier site (39LM238) lies on a low, flat terrace (Missouri River Terrace 1, Coogan, 1960) in a narrow valley formed by Good Soldier Creek (formerly Badger Creek) just south and west of the confluence of this tributary and the Missouri River in Lyman County, central South Dakota. The valley is bounded on the east and west by steep, thoroughly dissected breaks that rise abruptly to heights of 30 to 90 feet above the valley floor. The occupational debris at the site was concentrated on a low hummock located about 400 feet south of the right bank of the Missouri River and 150 feet west of the left bank of Good Soldier Creek (the approximate intersection of latitude 44°02′30′′ N. and longitude 99°27′ W.) at an elevation of 1,372 feet m.s.l. (Missouri River Map (1:24,000) Omaha District, Corps of Engineers, Sheet No. 52, 1949). The hummock measured 130 feet north-south and 65 feet east-west and had a maximum apical height of 5 feet (pl. 47, a).

EXCAVATIONS

During the 1956 reconnaissance a test pit was dug at the southern end of the rise to a depth of 1.0 foot below the surface. Artifacts recovered from this test include pottery sherds from a single vessel and several hematite-coated bison rib fragments. The restorable portion of the vessel was reconstructed in the laboratory and is identified as of the type Iona Indented (Smith and Grange, 1958, pp. 98–100).

At the time of the 1958 investigations a grid of 5-foot squares oriented with the cardinal directions was superimposed over the natural rise and the peripheral area. Each square was given a letter and number designation noting its location in the grid. The squares were scraped horizontally with shovels, and artifacts were placed in bags labeled according to their vertical and horizontal provenience within the grid. All excavations, except eight widely scattered 5- by 5-foot test pits, were conducted within the northwest quadrant of the grid. Depth measurements were made from the top of the present soil surface downward.

Excavations were initiated by digging a trench 5 feet wide and 130 feet long across the north-south axis of the mound (pl. 47, b). As work progressed it became apparent that the mound was a natural structure of stream-deposited gravel capped with five distinct soil strata. The stratigraphic sequence in the trench profiles read as follows from top to bottom: Stratum 1, the top soil zone, consisted of a layer of undisturbed sod and humus about 0.3 foot thick. Only rarely were artifacts present in this zone. The underlying soil zone, stratum 2, was com-

posed of a brownish silt. This deposit ranged from 0.3 to 0.5 foot in thickness and became increasingly thicker along the east and west slopes of the mound. Stratum 2 contained the artifactual material belonging to the latest component at the site. The third deposit, stratum 3, was a zone of yellowish, loess-like material generally 0.3 foot thick. This zone was sterile of cultural material except for the intrusion of postholes from stratum 2. The next soil layer, stratum 4, was composed of a fine, grayish silt, ranging from 1.2 to 1.4 feet in thickness. Stratum 4 contained the archeological specimens belonging to the earliest component found at the site. The deepest soil deposit was stratum 5; it was composed of a thin, yellowish layer identical in appearance to stratum 3. This deepest deposit was about 0.2 foot thick and was present only in the central area of the mound (fig. 58).

Soon after beginning excavations at the Good Soldier site it became evident that two distinct archeological deposits were involved. The deposits were separated by the yellow band of silt designated as stratum 3. A closer examination, in the laboratory, of the artifact proveniences and other archeological data left no doubt that at least two human occupations were represented. In this report the top, and last, occupation is called the Good Soldier Component; the deepest oc-

cupation is referred to as the Badger Component.

GOOD SOLDIER COMPONENT (39LM238)

All of the archeological material belonging to this component was recovered from the two top soil zones, stratum 1 and stratum 2. The most characteristic trait is sherds from globular vessels that have straight to flaring rims and are simple-stamped on their exterior surface. Another trait, somewhat less diagnostic, was the occurrence of numerous posthole remains; 29 post molds were randomly distributed over the central portion of the mound. Of the 29, 13 contained only soft, dark earthfill. Bison bone wedges or supports were found in 14 of the postholes; 2 of these contained small rock fragments, 2 others contained portions of the original posts, and in another a stone projectile point was found. Two postholes contained the remains of unwedged wooden posts. The diameters of the postholes ranged from 0.3 foot to 1.1 feet, the majority being between 0.4 and 1.1 feet. The depths of the postholes ranged from 0.2 to 1.9 feet. Whether or not these postholes are the remains of an earth lodge or lodges cannot be determined from the available data.

FEATURES

In the field certain peculiarities, such as soil discolorations that marked the locations of pits or concentrations of archeological re-

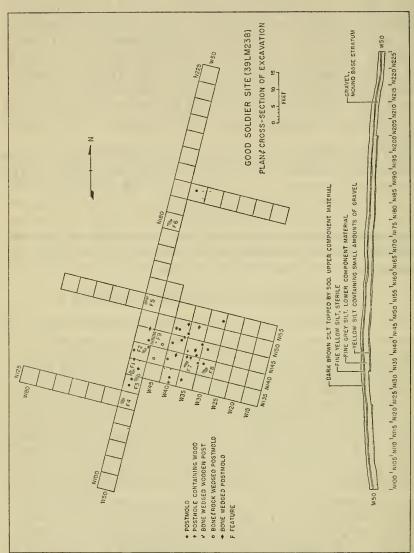


FIGURE 58.—Plan and cross section drawings of excavations at the Good Soldier site.

mains, were designated as features. Each feature was numbered, carefully described on special "Feature Forms," and photographed in the order of its discovery regardless of the component with which it was associated. Therefore, the feature numbers assigned to the various components are not in consecutive order. Features 2, 7, 8, and 9 were associated with the Good Soldier Component and are described in detail below.

Feature 2.—One posthole and three articulated bison vertebrae. The bone was 2.0 feet north of the posthole. After being cored, the posthole was found to contain a portion of coyote skull. No artifacts were located in direct association with these remains. The top of this feature was in square N140W50 at 0.6 foot below the surface.

Feature 7.—A concentration of pottery, a fragment of worked bison scapula and several catfish bones. The pottery fragments, 3 rims and 14 body sherds, all belong to a single vessel. This section of the vessel was restored in the laboratory and is identified as the type Iona Indented (Smith and Grange, 1958). Feature 7 was located in square N140W35 at 0.8 foot below the surface.

Feature 8.—Consists of five articulated and two separate bison vertebrae.

The remains were located in situ at square N140W30 between 0.3 and 0.5 foot below the surface.

Feature 9.—A line of stones 5 feet in length, two postholes, and a basin-shaped pit. The stone line, oriented almost exactly north-south, consisted of 17 hand-sized cobblestones. The two postholes were located symmetrically on opposite sides and about 1 foot from the stones. A line joining the centers of the postholes would be perpendicular to the line of stones and would intersect it at a point 2.0 feet from the south end. The easterly posthole had bison bone wedges while the western one contained the remains of a cedar post. The basin-shaped pit was located less than 1 foot east of the eastern posthole. Fill from the pit was composed of hematite-stained soil and a small amount of burned earth. The pit measured 2.3 feet north-south, 2.0 feet east-west, and had a maximum depth of 0.5 foot. This feature was located in square N145W45 at 1.5 feet below the surface.

ARTIFACTS

POTTERY

The ceramic collection associated with the Good Soldier Component at 39LM238 includes the following pottery types: Iona Indented, Grey Cloud Horizontal-Incised, Talking Crow Straight Rim, Cadotte Collared, Stanley Tool Impressed, and a few miscellaneous rims.

A total of 241 body sherds was recovered; 83 of these were simple stamped and 158 were plain surfaced. In addition, there were 51 decorated sherds, almost all of which are from the shoulder area of vessels; 39 of these sherds bear parallel incised lines, 2 have parallel trailed lines, 8 are incised with opposed diagonals, 1 has trailed, opposed diagonals, and 1 bears an incised herringbone motif. These decorative designs are common to all of the above-named pottery types,

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and I have not attempted to correlate any of the decorated sherds with particular rim-sherd types.

IONA INDENTED

This pottery has been described in detail and assigned as a component type of Iona Ware by Smith and Grange in the Spain site (39LM301) report (Smith and Grange, 1958). There are no significant differences between the Iona Indented pottery from the Spain and Good Soldier sites.

Sample: Two partially restored vessels (pl. 48, a and b) and four separate rim sherds.

METHOD OF MANUFACTURE: Probably built up from lumped clay by the paddle and anvil technique. There is no evidence of coiling.

PASTE:

Temper: Moderate amounts of tiny grit particles composed of quartz, mica, and feldspar.

Texture: Medium coarse to smooth.

Color: Buff, grading into gray. Many areas on the interior and exterior surfaces are blackened from use.

FORM:

Lip: Thickened, T-shaped or resembling an inverted 1. Flattened or rounded on top. Lip thickness ranges from 9 mm. to 11 mm. At the Spain site most lips were from 9 mm. to 16 mm. thick.

Rim: Slightly flaring to straight. Heights range from 36 mm. to 46 mm. Most rims at the Spain site were from 26 mm. to 47 mm. in height.

Shoulder: Quite rounded. The rims extend out from the vertical at an angle of about 25 degrees. The angle between the exteriors of the rim and the shoulder ranges from 85 degrees to 110 degrees on the two measurable specimens.

Base: Presumably rounded.

Appendages: None recovered at the Good Soldier site; however, four strap handles and one lug are reported for the Spain site.

SURFACE FINISH:

Interior: Smoothed, otherwise unmodified.

Exterior: Simple-stamped, large areas have been smoothed to the extent of almost obliterating the simple-stamped impressions.

Decoration: Limited to lip and shoulder areas. Two rims have a continuous series of opposed diagonals on the lip. Four other rims are decorated with a series of diagonal lines interrupted at equal intervals by single, opposing lines. The shoulder of one vessel bears incised opposed diagonal lines.

GREY CLOUD HORIZONTAL-INCISED

Pottery of this type has been described in detail and assigned the above name by Smith and Grange (1958, pp. 102–103) in the Spain site report. Only three Grey Cloud Horizontal-Incised rims were recovered at the Good Soldier site.

The first rim is grit tempered, buff shading into gray and black on the exterior and light buff on the interior surface; the core is gray. The rim is slightly flaring and has a flat lip. Decoration consists of a series of diagonal punctates on the lip and four horizontally trailed lines on the rim exterior (pl. 48, d). The rim measures 27 mm. in height and the lip is 6 mm. thick. This specimen most closely resembles the type Grey Cloud Horizontal-Incised, Variety A.

The second rim is incomplete, it resembles the first rim in all respects

The second rim is incomplete, it resembles the first rim in all respects except that it is decorated on the lip with a series of tool identations. I have also classified this specimen as Grey Cloud Horizontal-In-

cised, Variety A (Smith and Grange, 1958, p. 103).

The third rim is grit tempered, buff colored on the exterior and gray on the interior surface; the core is also gray. The rim is slightly flaring and the lip is somewhat rounded and beveled toward the exterior. Decoration consists of four horizontally trailed lines on the rim exterior and a series of vertically oriented tool indentations on the lip interior (pl. 48, c). This sherd falls within the Grey Cloud Horizontal-Incised, Variety C category as described by Smith and Grange. This type is also represented by a small number of sherds from the Talking Crow site (39BF3).

TALKING CROW STRAIGHT RIM

Talking Crow Straight Rim is a component type of Talking Crow ware (Smith, 1951, pp. 36–37; Smith and Grange, 1958, pp. 101–102). Charles H. McNutt, in a subsequent classification of certain Plains pottery (McNutt, 1959), prefers to assign similar sherds to the Russell Plain Rim type, a component of Russell ware. I have grouped five of the rim sherds from the Good Soldier Component into the Talking Crow Straight Rim category (pl. 48, e, f).

The rims are grit tempered. The exterior surfaces are buff, grading

The rims are grit tempered. The exterior surfaces are buff, grading into gray, and one sherd is black and orange. Interior surfaces are buff to gray on four of the specimens and black on the fifth. Cores are generally lighter than the darkest side-surfaces. In form the rims are straight and the lips are flat to slightly rounded. Decoration is confined to the lips and consists of a series of diagonal tool indentations on three of the specimens and punctations on the remaining two. Three of the rims are complete enough to measure; they range from 31 mm. to 41 mm. in height. Lips range from 5 mm. to 7 mm. in thickness.

CADOTTE COLLARED

Pottery of this type has been described in a manuscript prepared by Carlyle Smith. The ceramic classification is based upon specimens excavated at the Two Teeth site (39BF204). Smith (personal communication) also includes four collared rims, listed under the Miscellaneous category in the Spain site report, as Cadotte Collared (Smith and Grange, 1958, p. 104, pl. 31, b). Only one rim sherd from the Good Soldier Component can be classified within this grouping (pl 48, g).

The rim is grit tempered; gray shading into black on the exterior and buff shading into black on the interior surface. Only a small portion of the shoulder area remains; however, the collared area and the lip are complete. The collar is straight in form and measures 39 mm. in height. The lip is slightly rounded and beveled toward the exterior; it is 6 mm. thick. Decoration consists of a series of vertically oriented tool indentations on the lip interior and four rows of punctations on the exterior of the collared area. The only difference between this sherd and Cadotte Collared, Variety D, is that the type description of Variety D makes no mention of lip decoration.

STANLEY TOOL IMPRESSED

This pottery type was established by Donald J. Lehmer (1954, p. 45) as a component type of Stanley Braced Rim ware. Only one rim fragment from the Good Soldier Component is classified under this category (pl. 48, h).

The rim is grit tempered, buff to gray on the exterior and gray on the interior surface. The rim is slightly flaring and has a braced fillet extending down onto the rim exterior. The lip is flattened. Decoration is limited to the braced area and the lip and consists of a series of opposed diagonal impressions.

MISCELLANEOUS

Included in this category are three rim sherds, one appendage, and one incised body sherd.

The first specimen is a grit-tempered rim sherd; it is gray on the exterior and interior surfaces. The rim is straight and the lip is rounded. Decoration consists of two diagonal tool impressions on the lip exterior and three horizontally incised lines on the rim exterior (pl. 48, i).

The second specimen is also a grit-tempered rim sherd. It is buff to gray on the exterior and interior surfaces. The rim is flaring and has a rounded lip. Decoration is limited to the rim interior at the lip in the form of vertical tool indentations. Incised lines, which undoubtedly decorated the shoulder area, extend up to the lower extremity of the rim (pl. 48, j). The specimen measures 18 mm. in rim height and the lip is 5 mm. thick. This rim resembles pottery classified by W. Raymond Wood as Evans Indented, a component type of Evans ware reported from late prehistoric sites in Holt and Knox Counties, northeast Nebraska (Wood, MS.)

The third rim is grit tempered, buff on the exterior and gray on the interior surface. The rim is straight in form and the lip is rounded. An appendage has been broken from the upper portion of the rim. The remaining portion of the projecting appendage is round and suggestive of a loop handle or lug. There are two parallel incised lines

extending longitudinally on the lip. To one side of the appendage, on the rim exterior, there are two horizontally trailed lines (pl. 48, k).

The fourth specimen appears to be a loop handle. It is gray and lacks decoration. The appendage measures 15 mm. in height and is 6 mm. thick.

The fifth specimen is a body sherd with an incised motif on the exterior surface. The sherd is grit tempered, buff on the exterior and black on the interior, and measures 6 mm. in thickness. It is quite jagged around the edges and unsymmetrical. Portions of the design have been broken off; however, the remaining portion consists of a circle and two diagonal lines that intersect each other in the approximate center of the circle.

STONE

projectile points (5 specimens)

Triangular, straight base (one specimen).—It is a planoconvex in cross section and displays jagged percussion flake scars on both faces and along all side edges. The point is made from a reddish-brown quartz. It measures 30 mm. long, 22 mm. wide, 7 mm. thick and weighs 4.8 gm. (pl. 49, a).

Triangular, concave base (one specimen).—The point displays fine, bifacial pressure flaking. It is made from a brown jasper and measures 20 mm. long, 11 mm. wide, 3 mm. thick and weighs 0.8 gm. (pl. 49, b).

Triangular, basal notched.—This point lacks a portion of the tip. There is some doubt as to whether or not the very shallow basal notch was intentionally made. The specimen is made from a yellowish-brown quartzite. It measures 34 mm. long (estimated), 20 mm. wide, and 6 mm. thick (pl. 49, c).

Triangular straight base, side notched (two specimens).—The largest point is made from a gray chert. It measures 19 mm. long, 14 mm. wide, 3 mm. thick, and weighs 0.8 gm. (pl. 49, d). The smaller point is made from a whitish chalcedony. It measures 14 mm. long, 12 mm. wide, 3 mm. thick, and weighs 0.5 gm. (pl 49, e).

END SCRAPERS (2 specimens)

The first specimen is triangular in outline and planoconvex in cross section. The "keel" has been removed from the convex face, and secondary chipping on that face is limited to the working end and one side edge. A single percussion flake scar extends down the total length of the long axis on the convex face. The scraper is made of Knife River flint and measures 40 mm. long, 28 mm. wide, and 8 mm. thick (pl. 49, f). The second specimen is rectangular in outline and concavoconvex in cross section. The convex face has been retouched along the working end and the two side edges. The planer surface is flat near the working end, but it has a pronounced concavity at the

opposite end. The specimen is made of a clear, banded quartz. It measures 27 mm. long, 21 mm. wide, and 5 mm. thick (pl. 49, g).

KNIVES (2 specimens)

Specimens in this category are bifacially flaked along one or more edges. Each piece is but a fragment of the original tool.

The first fragment is rectangular in outline and has two flat faces. Chipping is limited to one end and one side edge. The chipping along the side edge has resulted in a steep bevel from one face. This specimen is made from plate chalcedony; it measures 49 mm. long, 30 mm. wide, and 7 mm. thick.

The second specimen appears to be the main portion of an elliptical knife. One end and a side have been chipped from only one face. The other side edge has been bifacially chipped, but it has a definite bevel from one face. The knife is made of Bijou Hills quartzite; it measures 63 mm. long, 43 mm. wide, and 8 mm. thick.

DRILL (1 specimen)

This piece appears to be the butt end of an expanded base drill. The sides and the base are quite straight. Both faces have been flaked along the edges, and in cross section the drill resembles a flattened oval. The specimen is made from tan quartz; it measures 32 mm. long (estimated), 12 mm. wide, and 5 mm. thick (pl. 49, h)

MISCELLANEOUS CHIPPED STONE

Four specimens, generally ovoid in outline, bear a small amount of retouching along one or more edges. These may have been modified intentionally for immediate use and then discarded. Two of the flakes are made of quartz, one of quartzite, and the other of gypsum. They range from 21 mm. to 41 mm. long, 19 mm. to 27 mm. wide, and 6 mm. to 15 mm. thick.

GROUND STONE ARTIFACTS

shaft smoothers (1 specimen)

This piece consists of a fragment of scoria. It is slightly triangular in outline and planoconvex in cross section. There is a shallow U-shaped groove extending longitudinally down the entire length of the planer surface. Toward one end, the groove becomes quite shallow and narrow.

ABRADERS

(3 specimens)

The first specimen somewhat resembles a discoidal. One of the faces has been smoothed from use, the opposite face is rough and unaltered. It is made from a piece of scoria and measures 26 mm. thick and 56 mm. in diameter.

The second specimen is shaped like a parallelogram. The two faces are flat and have rounded side edges. The sides vary from wedge shaped to rounded to flat. The specimen is made of gypsum. The top and bottom measure 50 mm. and 48 mm. long respectively; it is 29 mm. in width and 15 mm. thick.

The third specimen is a rectangular piece of sandstone that appears to have been artificially shaped. Both faces and one long side are quite smooth. One face has a shallow, ovoid concavity and the side surface of one end bears pecking scars. The tool measures 98 mm. long, 57 mm. wide, and 27 mm. thick.

64 specimens)

Scapula fragments (three specimens).—Each is a fragment of bison scapulae. The first fragment is from a right scapula which has had the spine removed. The proximal and distal portions are lacking, as is the posterior border. The remaining distal portion of the anterior border has been smoothed from wear. The specimen measures 231 mm. in length.

The second specimen is also a fragment of a right scapula. It is a rectangular piece lacking the proximal and distal portions and the posterior border. The proximal end of the fragment, as well as the lateral surface and the anterior border, has been smoothed from wear. This specimen is 174 mm. long (pl. 49, i).

The third fragment is a thin, elongated piece of scapula that converges to a rounded point at one end; the opposite end is fractured. Both side edges along the pointed half of the bone are sharp and smooth from wear. Each face of the bone is marked with numerous longitudinal scratches, most of which are concentrated toward the pointed end. The specimen is 182 mm. long (pl. 49, j).

Cut bone (one specimen).—A portion of the proximal end of a bison or elk right metacarpal. The bone has been cut diagonally down from the articular facets to a point along the vascular groove. No other area on the bone appears to be artificially altered. The specimen is 39 mm. long.

GOOD SOLDIER COMPONENT AND RELATED SITES

In the following discussion I have attempted to describe the Good Soldier Component more fully by relating its remains to similar material from other sites. This method, I hope, will afford the reader

a meaningful understanding of the people represented by these arche-

ological data.

The excavated remains that have been assigned to the Good Soldier Component at site 39LM238 were recovered from the two top strata of a natural mound. Features, of which there were four, consisted of concentrations of worked and/or unworked mammal bone, stone artifacts, and pottery fragments. One rather interesting feature was a line of cobblestones associated with postholes and a firepit. The inventory of pottery, stone, and bone was indeed meager; of these specimens, only pottery and specifically vessel rims, are diagnostic enough to show relationships between the Good Soldier Component and certain other sites.

The ceramic collection from the Good Soldier Component includes vessel rims assigned to five pottery types. Each of these types is characterized by globular vessels having constricted necks. The rims are straight, slightly flaring or collared. The trait of simple-stamping the exterior surface of the vessels is common to each of the types. This trait is generally associated with the "farming-hunting villages" of the late prehistoric and historic peoples who lived on the northern and central Great Plains. The earliest date on a simple-stamped pottery occupation in these regions is from the Thomas Riggs site (39HU1), a rectagular house village in Hughes County, S. Dak. A charcoal specimen from this site provided a carbon-14 date of A.D. 1228±200 years (Missouri Basin Chronology Program, Statement No. 2, Missouri Basin Project, June 15, 1959, Lincoln).

A site bearing close artifactual relationships to the Good Soldier Component is the Spain site (39LM301). This small, compact village is located about 1 mile upstream from the mouth of Bull Creek in Lyman County, S. Dak. The creek flows eastward into the Missouri River about 33 miles downstream from the Good Soldier site. Excavations at the Spain site were conducted in 1953 by a field party of the University of Kansas under the direction of Carlyle S. Smith.

The principal occupation at the Spain site has been designated Component A and is characterized by a small, prehistoric village situated in the tree-sheltered bottoms of a minor stream course (Smith and Grange, 1958). The remains of two and probably four earth lodges were located on low hummocks or rises. The ecological situation closely duplicates what was found at the Good Soldier site, where the occupational remains were concentrated on a low, natural rise in a narrow stream valley.

The one completely excavated house at Spain had a basin-shaped floor 29 feet in diameter and an extended entryway 7 feet long and 4 feet wide. The entryway faced southeastward toward Bull Creek. Features within the house included a central hearth, a secondary

firepit, and two small pocket caches. A bell-shaped cache pit and a midden deposit were located along the outer edge of the house. Abundant remains of charred beams indicated that the structure had been destroyed by fire.

Table 1.—Collection of identifiable rim sherds from Spain site (Component A)

Pottery type	Total	Percent
Iona Indented	50 14 8	26. 5 25. 2 6. 6 6. 2 4. 1 1. 1 . 7 25. 2 4. 4

There are also 320 rims, representing 20.5 percent of the total collection, that are listed under the heading of Miscellaneous. As mentioned previously, four of these were later classified as Cadotte Collared. It is apparent that the ceramic inventories and their proportional representation, at the Spain site (Component A) and the Good Soldier Component at 39LM238, are very similar, indicating a close archeological relationship. The presence of one Stanley Tool Impressed rim at Good Soldier and the absence of such a type at Spain may be reason to suspect that the former site was occupied at a slightly later date. Component A at the Spain site has been assigned to the Shannon Focus of the Chouteau Aspect; a postulated date for the component lies between A.D. 1550 and 1650. (Smith and Grange, 1958).

Another component of the Shannon Focus is the Two Teeth site; excavated in 1955 by a crew of the University of Kansas under the supervision of Carlyle S. Smith. This village is located across the Missouri River and about 4 miles upstream from the Good Soldier site. Excavations here were conducted into the remains of two circular earth lodges and several midden deposits. Smith (1959) states that the same pottery types found at Spain plus "Cadotte Collared, a small amount of Stanley Braced Rim Ware, and one stray Campbell Creek Cord Marked sherd" were present at Two Teeth. It would seem that the pottery inventories from Two Teeth and Good Soldier are almost identical and that each of the components may be contemporaneous occupations. On this basis the Good Soldier Component fits into the Shannon Focus of the Chouteau Aspect and dates no later than A.D. 1600.

BADGER COMPONENT (39LM238)

FEATURES

On the basis of their location within stratum 4, Features 1, 3, 4, 5, and 6 were assigned to the Badger Component of the Good Soldier site. The features and their associations are described below.

- Feature 1.—A small pile of 31 unworked stone chips, some of which fit together. The concentration, 0.3 foot by 0.4 foot, measured 0.3 foot from top to bottom. The chips range from 38 mm. to 53 mm. long, 26 mm. to 35 mm. wide, and 3 mm. to 14 mm. thick. The cache was located at a depth of 1.2 feet in square N125W50.
- Feature 3.—A small, basin-shaped firepit containing charred and uncharred bone fragments and a small quantity of charcoal. The pit was 2.6 feet in diameter and had a maximum depth of 0.4 foot. The top of the pit was defined at 2.2 feet below the present ground surface in square N130W50.
- Feature 4.—A large, basin-shaped firepit containing charred and uncharred bone fragments, charcoal, and 225 fire-cracked, handsized, granitic rocks. Most of the rocks were in the bottom two-thirds of the pit. The feature measured 3.3 feet by 4.6 feet and had a maximum depth of 1.4 feet. A definite outline of the pit was apparent at 2.0 feet below the surface; however, indications of the pit were noticeable at a depth of 1.5 feet in square N125W50. A charcoal specimen from Feature 4 was submitted to the University of Michigan carbon-14 laboratory; it was cataloged M-1090a and dated 419 ± 150 years B.C.
- Feature 5.—Two shallow, basin-shaped firepits. The fill in the northern-most pit was stained red with hematite. It measured 1.9 feet in diameter and had a maximum depth of 0.19 foot. The second pit, located about 0.3 foot south of the first, measured 0.9 foot in diameter and 0.4 foot in depth. Fill from this pit contained charcoal, flint chips, and fragments of bone. The pits became apparent at 1.2 feet below the present ground surface in square N155W50.
- Feature 6.—A shallow, basin-shaped firepit containing burned earth, small flecks of hematite, and fragments of bone, stone, and shell. The pit, 1.3 feet in diameter and 0.4 foot in maximum depth, was located at 1.6 feet below the surface in square N180W50.

POTTERY

The pottery collections from stratum 4 at the Good Soldier site consist of sherds, most of which have been cord-paddled on their exterior surfaces. At least two vessel shapes are represented, one being globular with a constricted neck and a straight, everted rim. The other is an almost shoulderless vessel with a conoidal base. The shapes and decorations on the rims are such that they may be sorted into three groups.

GROUP A

This category consists of two undecorated rims, apparently from the same vessel (pl. 50, b and c). They measure 24 mm. in height and are 7 mm. thick, becoming slightly thinner in the area immediately

below the lip. The flattened lip slopes slighty downward toward the vessel exterior and is 8 mm. wide. The interior suface is smooth, almost polished in appearance, and dark gray to black. The exterior, tan to dark brown, has faint, vertical, cord-paddled impressions extending a short distance up the rim. Both specimens are abundantly tempered with fine to medium-sized grit particles. The largest rim was located at a depth of 1.6 feet in square N145W15. The other rim came from a depth of 2.1 feet in square N145W19. The other rind came from a depth of 2.1 feet in square N145W20. These fit the descriptions of the plain Great Oasis pottery reported by Lloyd A. Wilford (1945 pp. 35–36; 1955 p. 138). Elden Johnson, of the University of Minnesota, examined the sherds and stated "The flat-lipped rims... are identical to Wilford's Great Oasis undecorated rims" (Personal communication March 24, 1961). Other Great Oasis sherds have been collected from at least four sites in South Dakota; the Oldham site (39CH7) in Charles Mix County (Cooper, 1955, p. 60), and the Gavins Point site (39YK203) in Yankton County (Hall, 1961). In November 1960, this writer was allowed to examine the private collection of Mr. Francis Deuder of Ree Heights, Hand County. The collection included a number of decorated Great Oasis rims from the Ree Heights Buffalo Kill site (39HD3). Finally, sherds bearing some resemblance to Great Oasis pottery are mentioned in the Swanson report (Hurt, 1951, p. 38). The comparison is made with the type Chamberlain Incised Triangle; Hurt notes that ". . . none of the Chamberlain Incised Triangle found at the Swanson site has a cord-marked body like Great Oasis pottery." This should make little difference in the comparison, since a fair percentage of Great Oasis wares do not have cord-paddled exterior surfaces (Wilford, 1945, p. 36). It is worth mentioning here that a wooden post, excavated from a rectangular house at the Swanson site was analyzed at the University of Michigan carbon-14 laboratory; it was cataloged M-839 and dated A.D. 858 ± 250 years.

In a 1949 publication Wilford refers to a vessel and some sherds "... which are clearly of the Great Oasis type" and speculates that they may represent prehistoric Omaha pottery because they are from the Ryan site (25DK2) which is thought to be a burial place for the Omaha "Large Village." The vessel and its resemblance to Great Oasis is mentioned again in Wilford's 1955 report. John L. Champe, of the Laboratory of Anthropology, University of Nebraska, permitted an examination of this vessel and another from the same excavation. The specimens excavated in 1939 are from a natural mound designated 25DK2A near the town of Homer in Dakota County, Nebr. Stanley Bartos, Jr., supervised the excavations and his notes, on file at the University of Nebraska, state that the mound measured 125 feet north-south, 20 to 50 feet east-west, and had a height of 2.5 feet (also see Champe, 1946, pp. 117–118). It contained prehistoric secondary

burials, and at a later date primary interments ascribed to the Omaha, were intruded into it.

GROUP B

These are five undecorated rim sherds, four of which fit together. All five apparently belong to a single vessel (pl. 50, d). The rim section is about 9 mm. thick and has a rounded lip. The interior surface is black and smooth. The exterior, ranging from tan to dark gray, is covered with large (3 per centimeter), parallel, cordpaddled impressions extending diagonally downward from the lip. The sherds are tempered with minute particles of calcite and occasional large and small grit inclusions. They were recovered from the 2.0-2.5 foot level in square N135W40. The specimens bear a general resemblance to several varieties of Plains Woodland vessels that are almost shoulderless and have conoidal bases. Calcite tempering is a characteristic of Harlan Cord-Roughened, the diagnostic pottery of the Keith Focus (Kivett, 1953). Two sites within this focus have been dated by radiocarbon methods. The Woodruff Ossuary in northcentral Kansas (Kivett, 1953) was dated at A.D. 611±240 years (Wedel and Kivett, 1956), and site 25FT18 in south-central Nebraska was dated at A.D. 828 ± 200 years (Crane and Griffin, 1960, p. 40). The Valley Cord-Roughened is characteristic of the Valley Focus (Hill and Kivett, 1941), the type site being 25VY1 in central Nebraska (Kivett, 1949). A dendrochronological estimate of A.D. 1000 to 1150 was assigned to a Valley Focus occupation at Ash Hollow Cave in southwest Nebraska (Champe, 1946, p. 86). The trait that allies the Group B specimens from the Good Soldier site to Valley Cord-Roughened is the diagonal orientation of the cord impressions on the vessel exterior.

GROUP C

Only one large rim and shoulder section of a vessel is represented here (pl. 50, a). The rim is vertical with a very faint outward bulge between the neck and the lip. A very weak shoulder is evident below the neck. The lip is flat and slants downward toward the vessel exterior. Rim height, measured between the neck and lip top, is 34 mm. and the thickness is 6 mm. The specimen is abundantly tempered with grit particles ranging up to 2.0 mm. in size. The interior surface is a brownish-orange and smooth. The exterior is the same color, but it is covered with extremely fine, parallel, cord-paddled impressions that extend vertically down from the lip. The rim is decorated with parallel, notched-stick indentations that extend from the lip top diagonally downward onto the rim exterior. The indentations are about 13 mm. in length and V-shaped in cross section. The notches run perpendicular to, and average about six per indentation. The rim was recovered at a depth of 2.0 feet in square N145W50. Al-

though this rim does not resemble any of the reported pottery types on the northern and central Plains, I was able to find two similar specimens that belong to a single vessel. They are from site 39BR11, located on the opposite side of the Missouri River and about 21 miles downstream from the Good Soldier site. Field parties of the Smithsonian Institution located and made tests at the site in 1947, 1953, and 1954. Paul L. Cooper's notes (on file at the Lincoln office of the Smithsonian Institution) show that an occupation area at 39BR11 was overlain by two distinct strata. The uppermost was the plow zone or present surface, under which was a sterile zone of fine, yellowish silt. Beneath the silt was a "dark brown" layer of soil containing small, basin-shaped firepits and artifacts. One of the rims (cat. No. 39BR11-18) was recovered from this stratum at "Profile 6 . . . 2.6' to 3.3" below the surface; the other rim (cat. No. 39BR11-37) came from dirt that had sloped down onto the riverbank.

There are also certain artifactual similarities between the Badger Component and the Clear Lake site, which is located along the Illinois River in Tazewell and Mason Counties, Ill. (Fowler, 1952). I believe the rim from Group C (Badger Component) resembles those from the conoidal vessels of Weaver ware, the predominant pottery type at Clear Lake. The projectile points from Group 2 (Badger Component) also bear a resemblance to those of Group A that are illustrated on page 155 of the Clear Lake Report. Melvin L. Fowler kindly examined specimens from the Badger Component and his statements, regarding the Group C rim and the Group 2 points, are as follows: "... I would not compare it closely with Weaver. The general resemblances are there in the rather tightly twisted parallel cords and general vessel shape. The paste is different and not as compact as Weaver. . . . In general, if such a sherd were found in Illinois, it would be classified as Late Woodland on a general Weaver Horizon. . . . " (Fowler, personal communication February 2, 1960).

"The projectile points are not Weaver but are similar to those associated with the so-called Maples Mills and Dillenger cultures in Illinois. . . ." Weaver ware is generally assigned to the Woodland period in the Illinois Valley and the ware has been dated by carbon-14 from the Irving Village at A.D. 770±250 years, and from the Rutherford Mound at A.D. 425 ± 200 years (Griffin, 1958, pp. 12-13 and 15).

STONE

PROJECTILE POINTS (6 specimens)

Group 1. Triangular, straight base (two specimens).—Each has slightly convex sides and shows haphazard bifacial flake scars. The

largest specimen lacks the tip and is made from a grayish-brown quartzite (pl. 50, f). It measures 20 mm. long (estimated), 18 mm. wide, and 5 mm. thick. The other point (pl. 50, e), made from a crystal clear quartz, is 15 mm. long, 17 mm. wide, 4 mm. thick and weighs 1.8 gm. Both points were recovered from the 1.0-1.5 foot level in square N145W45.

Group 2. Triangular, corner-notched (four specimens).—None are complete, but all show straight to slightly convex sides. Evenly placed, bifacial flake scars extend outward at right angles from the longitudinal axis to the side edges. One point, broken almost its entire length down the long axis, has a slightly convex base (pl. 50, g). It is made from a brown chalcedony, but one face is completely coated with a white patination. The specimen measures 38 mm. long, 27 mm. wide (estimated), and 5 mm. thick; it was located at a depth of 1.3 feet in square N125W70. The next piece also has a convex base, but lacks the tip portion (pl. 50, h). It was made from a very finegrained, light-brown quartzite and measures 32 mm. long (estimated), 24 mm, wide and 4 mm, thick. The specimen was recovered 2.2 feet below the surface in square N175W50; it is similar to a point (Catalogue No. 43) found at site 39BR11, Brule County, S. Dak. The third specimen, made of basalt, lacks the base, and the tangs were accidentally broken off in the laboratory (pl. 50, i). It was located at a depth of 2.3 feet in square N190W40. The fourth piece, made from a fine-grained, olive-drab quartzite, consists only of a point section (pl. 50, j). It was recovered from a depth of 1.8 feet in square N150W35.

END SCRAPERS (10 specimens)

Group 1 (four specimens).—All are planoconvex in cross section, ovoid in outline, show little or no secondary flaking on the convex surface, and have been retouched at one end and both side edges. The first specimen (pl. 50, k), made from a gray chalcedony, is 40 mm. long, 28 mm. wide and 7 mm. thick. It was located at a depth of 2.3 feet in square N155W15. The second scraper (pl. 50, l), made from a brown chalcedony, is patinated on the convex surface. It measures 35 mm. long, 29 mm. wide, 10 mm. thick and was recovered from the 1.5-2.0 foot level in square N155W25. The third piece (pl. 50, m), also made from a brown chalcedony, is patinated on the base and along the side edges. It measures 26 mm. long, 12 mm. wide, 7 mm. thick and was found in the 1.0-1.5 foot level at square N135W50. The fourth specimen has been fractured opposite the working end; it was made from a brown chalcedony and is heavily patinated on the convex surface (pl. 50, n). The fragment measures 22 mm. wide, 9 mm. thick and was located in the 1.0-1.5 foot level at square N145W40.

Group 2 (three specimens).—All are planoconvex in cross section, rectangular in outline and have a keel toward one side of the convex surface extending down the long axis for almost the entire length of the scraper. The first specimen, made from a brown chalcedony and patinated on one side, has a small semicircular notch chipped into one side edge (pl. 50, o). The piece measures 18 mm. long, 18 mm. wide, and 7 mm. thick. It was recovered from the 2.0-2.5 foot level at square N150W40. The next specimen, made from a mottled gray flint, is patinated along portions of one end and a side edge and has secondary chipping along the opposite side edge (pl. 50, p). It is 20 mm. long, 18 mm. wide, 5 mm. thick and was located in the 2.0-2.5 foot level at square N145W35. The third specimen is incomplete; it is made from a brown chalcedony and shows retouching only at the working end (pl. 50, q). The fragment was recovered from the 1.5-2.0 foot level in square N160W50.

Group 3 (three specimens).—These pieces are planoconvex in cross section, triangular in outline and have been retouched over the entire convex surface. The largest scraper, made from a brown chalcedony (pl. 50, r), is 30 mm. long, 23 mm. wide, and 6 mm. thick. It was located in the 1.0–1.5 foot level at square N135W35. The second scraper, also a brown chalcedony (pl. 50, s), is 19 mm. long, 21 mm. wide, and 6 mm. thick. It was located in the 1.0–1.5 foot level at square N135W35. The last specimen, made from a yellowish-brown jasper (pl. 50, t) is 20 mm. long, 19 mm. wide, 6 mm. thick and was recovered from the 1.5–2.0 foot level at square N140W50.

KNIVES

(7 specimens)

Group 1 (three specimens).—Ovoid in outline, each of these pieces displays large, bifacial, percussion flake scars. The largest knife has been finely retouched on one face almost entirely around the outer edge. It is made from a brown chalcedony and has a thin, whitish patination on one face (pl. 50, u). The knife is 87 mm. long, 65 mm. wide, 13 mm. thick and was recovered from 1.8 feet below the surface at square N150W30. The second specimen is incomplete, but the recovered portion lacks any secondary flaking (pl. 50, v). It is made from a fine-grained, mottled brown and tan quartzite and measures 46 mm. long (estimated), 35 mm. wide, and 10 mm. thick. The piece was located in the 1.0–1.5 foot level at square N155W55. The third specimen, also incomplete, is made from a fine-grained, yellowish quartzite (pl. 50, w). It measures 47 mm. wide, 9 mm. thick and was recovered from the 1.5–2.0 foot level at square N140W50.

Group 2 (two specimens).—Triangular in outline, each shows hap-hazard, bifacial chipping along the two side edges. The first piece, made from a fine-grained, purple quartzite, measures 32 mm. long,

28 mm. wide, and 12 mm. thick (pl. 50, x). It was found in the 1.0-1.5 foot level at square N145W45. The second specimen is a knife fragment. It consists of a fine grained, grayish quartzite that is patinated along portions of one face and a side edge (pl. 50, y). The piece is 20 mm. long, 34 mm. wide, and 6 mm. thick. It was located at a depth of 1.3 feet in square N150W50.

Group 3 (two specimens).—Both pieces are steeply beveled along the side edges, rectangular in outline, and are made of Bijou Hills quartzite. The larger specimen is incomplete and appears to be the upper portion of a knife, or possibly a drill with opposite faces alternately beveled. It was located in the 1.0–1.5 foot level at square N145W30. The smaller piece is the midsection of a bifacially flaked blade that has been steeply beveled along one side edge from both faces. It was located in the 1.0–1.5 foot level at square N145W45.

worked flakes (14 specimens)

These pieces consist of asymmetrical flakes showing unifacial retouch along one or more side edges. A few are no doubt fragments broken from side and/or end scrapers. One specimen has a semicircular notch chipped into each of its two side edges. It has been suggested that this type of tool may have been used for cutting arrow shafts (Cosner, 1956). All of these flakes were recovered from within 1.0 to 2.5 feet depths.

PROBLEMATICAL OBJECT (1 specimen)

This specimen is tubular and broken at one end. It may be a section of a bead, or simply a limestone concretion (pl. 50, z). The piece measures 22 mm. long, has an outside diameter of 14 mm. and an inside diameter of 6 mm. It was located in the 1.5–2.0 foot level at square N190W50.

DISCUSSION OF THE BADGER COMPONENT

In describing the pottery and certain projectile point specimens from this component I have referred to other sites from which similar artifacts were collected. It is evident that the remains of at least three types of pottery vessels are represented in the relatively thin soil zone of stratum 4; evidence as to whether or not the makers of these vessels occupied the site contemporaneously or at different times is inconclusive. A comparable archeological situation involving the kinds of specimens assigned to the Badger Component has not been reported. Nevertheless, in light of the carbon-14 dates related to pottery specimens similar to those in Groups A, B, and C,

I do not think that the possibility of a simultaneous occupation for the component should be ruled out.

Two discrepancies remain to be discussed. The first concerns the question of whether or not Great Oasis pottery is prehistoric Omaha in origin. Statements alluding to the possibility of this origin have appeared in print at least twice (Champe, 1946, p. 48; Wilford, 1949, p. 36), and each reference concerns the vessel or vessels recovered from the excavations at 25DK2A mentioned earlier in this report. have examined the field notes and sketches from the site and am of the opinion that the vessels, both of which are good Great Oasis specimens, belong to the prehistoric burial remains rather than to the intrusive Omaha interments that were accompanied by European trade goods. I am not aware of any Great Oasis ceramics found in undisturbed, direct association with White trade material. The trait of cord-paddling that appears on the exterior surface of some Great Oasis vessels is not a late prehistoric technique in the central Plains or Middle Missouri region, nor is this pottery type very similar to others that are diagnostic of the protohistoric or historic periods in those areas. Great Oasis sherds have been more aptly compared to pottery from the Middle Ceramic Period (Champe, 1946), and tracing this pottery type up through time to Omaha occupations has yet to be validly demonstrated.

The second problem is in connection with the carbon-14 date obtained from charcoal at Feature 4. This date, 419 B.C.±150 years, is certainly not compatible with the artifactual material of the component; however, it may be a perfectly acceptable date for the basin-shaped pit in Feature 4. As other sites are dug, in locales where stratigraphy is not so subject to stream erosion and deposition, artifacts may be found that show significant relationships to some of those in the Badger Component, thus validating an earlier occupation not recognized now.

In conclusion, the Badger Component represents an early occupation site, the artifacts of which are most closely comparable to those from other sites assigned to the Plains Woodland Period, and a date no later than A.D. 1200 is suggested for the occupation of this component.

CONCLUSIONS

The Good Soldier site (39LM238), located along the Missouri River in central South Dakota, consists of two stratigraphically separated occupations. The latest has been named the Good Soldier Component. It comprises remains closely resembling those from two other sites in the vicinity and has been assigned, together with those sites, to the Shannon Focus of the Chouteau Aspect. The early occupation at

39LM238 is designated the Badger Component. Its artifactual resemblances to certain other sites in Minnesota, Nebraska, and South Dakota indicate that it falls within the Plains Woodland Phase. The possibility of a still earlier occupation at the Good Soldier site is suggested.

APPENDIX

BONE AND VEGETAL IDENTIFICATION FROM THE GOOD SOLDIER SITE 2

BONE

The small quantity of bone from the Good Soldier site was more or less evenly distributed throughout the arbitrary half-foot levels of the excavations. Buffalo (Bison bison) remains were by far the most common, while the whitetailed deer (Odocoileus speleus), coyote (Canis latrans), kit fox (Vulpes velox), prairie dog (Cynomys ludovicianus), and the cottontail rabbit (Syvilagus floridanus) are also present. Included in the inventory are a few fish bones; however, there was no evidence of fowl in the excavations.

I have assigned all of the osseous remains recovered from the surface, down to 1 foot in depth to the Good Soldier Component and all below that depth to the Badger Component. The results are shown in table 2.

Table 2.—Osseous remains from Good Soldier and Badger Components

GOOD SOLDIER COMPONENT

Bison	Num- ber	White-tailed deer	Num- ber	Coyote	Num- ber	Kit fox	Num- ber	Catfish	Num- ber
Lower jaw Occiput Scapula Humerus Radius Tibia Metacarpal Metatarsal Phalanges	1 2 1 1 3 3 2 1	Upper tooth. Lower jaw Meta- carpal Phalanges Cuboid	3 1 1 1	Muzzle Lower jaw Atlas Axis Humerus Calcaneum	1 1 1 1 1	Humerus	1	Dorsal vertebra Pectoral girdle Fin parts	1 1 4

BADGER COMPONENT

Bison	Num- ber	Prairie dog	Num- ber	Cottontail	Num- ber
Lower jaw Teeth Ulna Radius Metacarpal Femur Astragalus Cuboid Phalanges	2 4 1 1 3 1 3 1 14	Lower jaw	1	Humerus	1

² The fish bone was identified by David H. Dunkle, United States National Museum. All other bone was analyzed by Theodore E. White, Dinosaur National Monument. Norton H. Nickerson, Washington University, identified the vegetal specimen.

The lists show buffalo, deer, coyote, kit fox, and fish associated with the Good Soldier Component, and buffalo, prairie dog, and rabbit with the Badger Component. Interestingly, almost all of the buffalo remains are from the limbs of the animals; previous writers have suggested that this phenomena indicates that the kills and the butchering took place some distance from the main camp or village (Lehmer, 1952; White, 1952 a, 1952 b, 1954).

VEGETAL

Only one vegetal specimen, a pit of the *Prunus americana*, was recovered. It came from square N140W40 in the 1.0-1.5 foot level.

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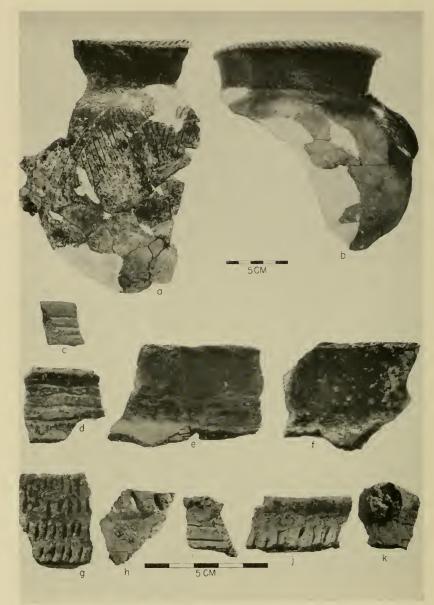
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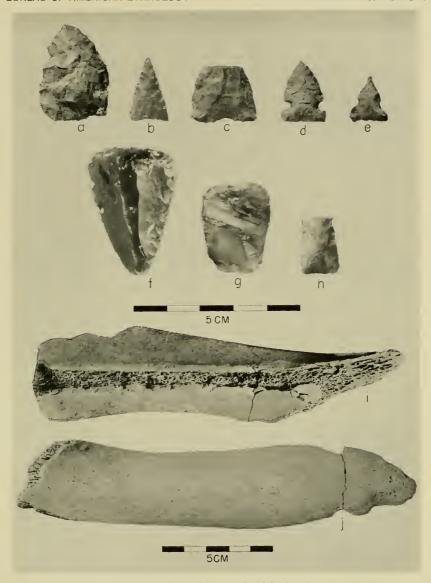




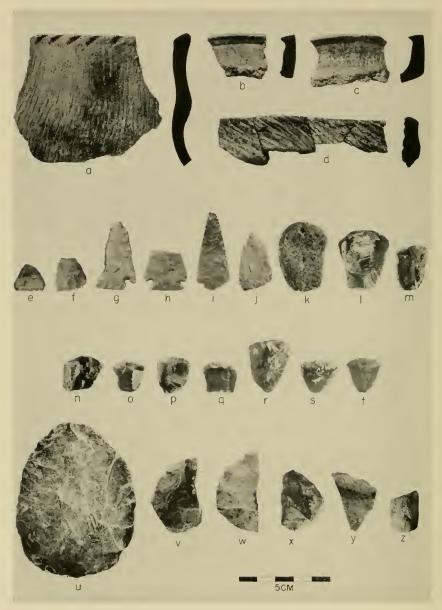
a, View east-northeast of Good Soldier site and surrounding vicinity. Missouri River flows eastward (upper left). b, View north of trench cross-sectioning the long axis of the natural mound. Broken rocks are adjacent to the large pit (Feature 4).



Pottery specimens from the Good Soldier Component: a, b, Iona Indented; c, d, Grey Cloud Horizontal-Incised; e, f, Talking Crow Straight Rim; g, Cadotte Collared; h, Stanley Tool Impressed; i-k, miscellaneous.



Stone and bone specimens from the Good Soldier Component.



Pottery and stone specimens from the Badger Component.

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Archeological Investigations in the Toronto Reservoir

Area, Kansas

By JAMES H. HOWARD



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ARCHEOLOGICAL INVESTIGATIONS IN THE TORONTO RESERVOIR AREA, KANSAS 1

By James H. Howard

INTRODUCTION

The Toronto Dam and Reservoir, a flood-control and conservation project of the U.S. Army, Corps of Engineers, Tulsa District, is located on the Verdigris River in Greenwood and Woodson Counties, southeastern Kansas (see fig. 59). The dam is a rolled, earthfill structure, 4,712 feet in length and 90 feet in height, above the river channel. It is 31/2 miles south of the town of Toronto in Woodson County, Kans., 55 miles north of the Oklahoma border, and 75 miles west of the Missouri border. It forms a reservoir some 11½ miles long, with a maximum width of approximately 1½ miles at full-pool level of 931 feet (m.s.l.). This reservoir extends up the Verdigris River and its tributaries in the eastern portion of Woodson County and the western portion of Greenwood County to cover a total area of approximately 10,000 acres. Dam construction was begun in November 1954 and was essentially completed in December 1959. Flooding of the reservoir began in the spring of 1959 with maximum pool level to be reached intermittently after completion.

In this area the Verdigris River flows in a generally southeasterly direction, forming a wide flood plain between bluffs of Pennsylvanian sandstone and limestone. Numerous bends and meanders indicate that the drainage system is old. A heavy growth of trees, principally scrub oak, elm, cottonwood, and hackberry, clothes the valley and the sides of the bluffs. Above the valley proper, the bluffs slope gradually upward to rolling, grass-covered plains. This upland country is used mainly for grazing, since numerous sandstone and limestone outcrops hinder the use of the plow for breaking the land.

In early historic times, two Thegiha-speaking Siouan tribes, the Osage and the Kansa, are known to have lived in this area along the Verdigris River (McDermott, 1940). However, no sites that could definitely be attributed to either of these tribes were located during the archeological investigation.

¹ Submitted September 1959.

Archeological sites here are characteristically located on slight rises close to a river or stream. Numerous sandstone fragments lie on or near the surface of the sites, and other than these stones, all surface archeological features have been obliterated by intensive cultivation. The principal stone used in the manufacture of chipped-stone artifacts is a chert from the Flint Hills region, some 50 miles to the northwest, in Marion, Chase, and Morris Counties, Kans. A popular source of material for ground-stone tools is a coquina-like Permian limestone of the Cottonwood formation, which outcrops in Greenwood County.

The Inter-Agency Archeological Salvage Program has conducted three seasons of archeological investigations within the area of the Toronto Dam and Reservoir (see report of the Committee for the Recovery of Archaeological Remains, 1958). The first season of investigations consisted of a brief, initial survey of a portion of the area in May 1953 by Edward H. Moorman, working out of the Region 3 Office of the National Park Service. The short time available for this survey limited the results to the locating, visiting, and recording of but three archeological sites in Greenwood County (14GR1-3) and two sites in Woodson County (14WO1-2). No testing or excavation was possible, but the survey was sufficient to indicate that considerable archeological potential existed in several sections of the flood area. Additional survey and investigation was recommended within the framework of the Salvage Program.

The second season of salvage in the Toronto Reservoir was undertaken in September and October 1956, by Alfred E. Johnson and two assistants, working out of the Lincoln, Nebr., office of the River Basin Surveys, Smithsonian Institution. Johnson, then a student at the University of Kansas and a temporary staff member of the River Basin Surveys, and his party worked intermittently for 6 weeks in the area, revisited the sites located by Moorman, made additional surface collections from them, and excavated three 5-foot test squares in one of the most promising of them (14WO1). In addition, this party located, visited, and recorded 18 more sites in Greenwood County (14GR201-218) and 13 more sites in Woodson County (14 WO201-213), to bring the total of sites in the Toronto Reservoir area to 36. Johnson also dug three 5-foot test squares in site 14WO203 and excavated three hearths in site 14GR209 that had been partially exposed by heavy equipment in road-construction activities. Surface collections of artifacts were made from nearly all sites located, petroglyphs were recorded in one site, and data regarding terrain, geology, and general archeological considerations were recorded. Johnson (1957) prepared a report of these sites, analyzing the materials recovered, recommending certain sites for more intensive investigation,

and suggesting that some portions of the reservoir area still might

provide additional sites.

On the basis of surface collections and the three brief, subsurface tests, Johnson was able to identify tentatively the cultural assemblages of nine of the sites as follows:

Upper Republican
Kansas City Hopewell and Keith Focus
Upper Republican
Kansas City Hopewell
Upper Republican, Keith Focus, and Archaic
Keith Focus
Woodland
Kansas City Hopewell
Upper Republican

The remaining 27 sites did not provide sufficient material upon which a cultural identification could be based, though many of them appeared to be simple, nonceramic (Archaic?) camps. The nature of most of these sites was such that no significant results would appear likely from further investigations, and none were recommended. However, there were seven sites (14GR2, 14GR202, 14GR210, 14GR 212, 14GR216, 14WO203, and 14WO209) where further work appeared likely to produce clarifying information. These sites were, therefore, recommended for additional investigation.

Johnson then drew the following conclusions regarding the cultural manifestations in the area:

Preceramic remains are rare. Only one component of a three-component site (14GR216) can definitely be assigned to an Archaic complex. Some of the sites presented under the heading "Nonceramic Sites," may also be associated with an Archaic complex, but the remains are so scanty that no positive statement can be made in that respect.

Woodland remains are fairly common. There are four sites or components of sites affiliated with this pattern. Of these, three have artifacts which allow them to be placed within a subdivision of the pattern, the Keith Focus. The remaining site contains traits which do not permit its placement in one of the previously defined foci, but this may be because of the insufficient quantity of material collected. The fact that Keith Focus remains are present in the reservoir extends the distribution of this complex further to the east and south than previously realized.

The Hopewell complex has a known distribution through central Kansas as far as Ellsworth. The presence of three sites in the Toronto Reservoir, having an affiliation with this complex, extends its distribution farther to the south and indicates that the complex may have a much wider distribution throughout the eastern section of the state than was previously realized.

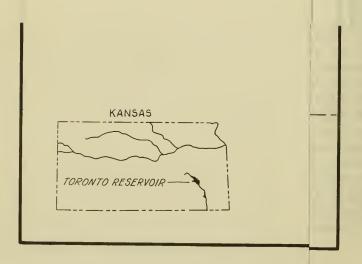
The presence of sites of an Upper Republican affiliation, situated within the boundaries of the Toronto Reservoir, extends the limits of this cultural complex considerably farther to the south. The nearest site with an Upper Republican affiliation which could be found in a perusal of the literature is located in the Kanapolis Reservoir, on the Smoky Hill River to the north and west (Smith, 1949, p. 295).

Using a recently published date as a starting point, we find that the area to be inundated by the waters of the Toronto Reservoir was occupied, at least, from A.D. 611 (plus or minus 240 years) on. This date is from the Woodruff Ossuary, situated just south of the Nebraska line in Phillips County, Kansas, which has been assigned to the Keith Focus of the Woodland Pattern (Wedel and Kivett, 1956, p. 414). This beginning date would probably be extended considerably into the past if the material from the Archaic component at 14GR216 were sufficient to allow its identification with other sites from that complex. [Johnson, 1957, pp. 58–59.]

The third and final season of archeological salvage in the Toronto Reservoir area was accomplished during a continuous 6-week period from May 15 to June 30, 1957, by Dr. James H. Howard and four assistants, working out of the Lincoln, Nebr., office of the River Basin Surveys, Smithsonian Institution. Howard, then a temporary staff member of the River Basin Surveys, and his party revisited many of the sites located by Moorman in 1953, and by Johnson in 1956, made additional surface collections from them, and conducted excavations in four of the sites that had been recommended by Johnson for further work. All four were open, occupation areas. One of these was site 14GR210, where four 5-foot test squares were excavated, and to which Johnson's data did not permit assignment of a cultural affiliation. A second was site 14GR216, where a trench 65 feet long and 5 feet wide was excavated and later widened by excavation of three 5-foot squares on each side of the base trench. Johnson had assigned the three components of this site to the Upper Republican Aspect, the Keith Focus, and the Archaic, respectively. A third was site 14WO203, one of those briefly tested by Johnson with three 5-foot test squares. The Howard party dug three additional 5-foot test squares. Johnson's identification of this site was Kansas City Hopewell. The fourth was site 14WO209, to which Johnson had assigned a cultural designation of Upper Republican, and within which Howard excavated two 5-foot squares. The other three sites recommended by Johnson for further work (14GR2, 14GR202, and 14GR212) were revisited in 1957, and additional surface materials were collected, but the sites were not considered of sufficient potential, at that time, to warrant excavation.

In addition to revisiting these previously recorded sites, the 1957 party located, visited, and recorded 3 more sites in Greenwood County (14GR219-221) and 18 more sites in Woodson County (14WO214-231) to bring the final total of recorded sites in the Toronto Reservoir area to 57. Only four of these new sites were of sufficient archeological significance to warrant excavation or assignment of cultural affiliation, though petroglyphs were recorded in two others (14WO225 and 14WO226). The four significant sites included 14WO215, in which Howard excavated two 5-foot test squares; the Walleye Rockshelter (14WO224), in which nearly the entire surface area (eleven 5-foot





squares) was excavated; and the Possum Point site (14WO228), in which he excavated six 5-foot squares. The present report will detail the work done by Howard's party in the eight excavated sites and the

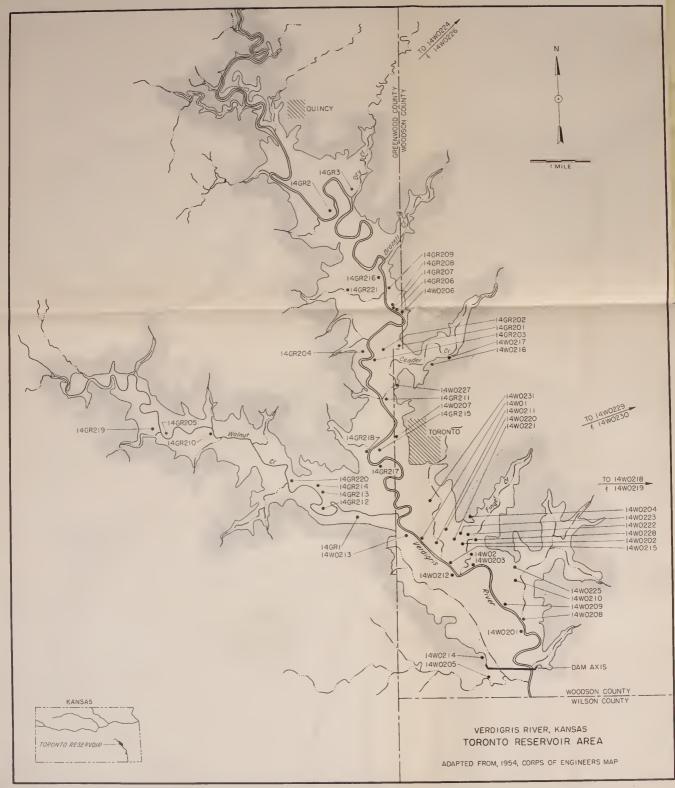
two petroglyph sites mentioned above.

The work of Edward H. Moorman in the 1953 season was done under the supervision of Dr. Erik K. Reed and Charlie R. Steen of the Region 3 office of the National Park Service, Santa Fe, N. Mex., under whose jurisdiction the southern Kansas area was administered at that time. The work of Alfred E. Johnson and his party in 1956, and that of Dr. James H. Howard and his party in 1957, was done under the administrative supervision of Dr. Frank H. H. Roberts, Jr., Director of the River Basin Surveys, and Dr. Robert L. Stephenson, Chief of the Missouri Basin Project. The Toronto Reservoir is situated outside the Missouri Drainage Basin, and funds for the work were transferred by the National Park Service from the appropriations for work outside the Basin. For purposes of convenience and economy, the work was administered through the Missouri Basin Project office of the River Basin Surveys, Smithsonian Institution, in Lincoln, Nebr.

Assisting Johnson in the field were Wayne O. Wallace and Gaylord S. Tefft. Tefft and Richard Fischer assisted Johnson in his laboratory analyses, and Sidney Anderson identified the animal bones. All five were students at the University of Kansas, where Dr. Carlyle S. Smith kindly made laboratory facilities available to Johnson. Assisting Dr. Howard in the field were Edward A. Danaczko, D. William Chatfield, August Love, and Joseph Marshno, employed by the Smithsonian Institution for the project. The regular staff of the Missouri Basin Project in Lincoln assisted Howard in his laboratory analyses and preparation of this report. Others who assisted in a number of ways in the archeological salvage in the Toronto Reservoir area include George Fritz, Mark Sample, George Phillips, Albert Webb, George Webb, Frank J. Adenauer, J. E. Sower, H. W. Pashe, and Fred Jamison, all of Toronto, Kans.; Richard Phillips and Lester Harding of Yates Center, Kans., and Mr. and Mrs. Kenneth Landes and Mrs. James H. Howard of Kansas City, Mo. Mr. Lloyd Tanner of the University of Nebraska State Museum in Lincoln identified the bone materials from the 1957 excavations. Sincere thanks are expressed to all of these people for their generous assistance, without which the work would have been much less pleasant and rewarding.

THE SITES

The 57 archeological sites recorded in the Toronto Reservoir are located on the reservoir map (fig. 59) and tabulated in the Appendix. Johnson (1957) has described and identified some of these sites, and





others are so insignificant as to warrant but little comment. These latter produced so few artifacts and so little archeological data that no more may be said than that they are probably places where aboriginal peoples of unknown affiliation have camped at some unknown time. A third group of these sites did, though, provide sufficient information, when excavated, to support cultural identification and thus warrant rather full descriptions here.

The following analyses of sites include only those in the third group, the sites that were partially or fully excavated in the 1957 season. As 6 of these 10 sites have more than 1 component, they will be described in the order in which they were investigated, rather than in the order of cultural sequence. The Woodson County sites are described first, followed by the Greenwood County sites.

Five culture complexes have been identified in the Toronto Reservoir area. These are: Archaic (5000 to 200 B.C.); Kansas City Hopewell (200 B.C. to A.D. 500); Plains Woodland (A.D. 500 to 900); Aksarben (A.D. 1100 to 1500); and Great Bend (A.D. 1500 to 1700). The dates given in parentheses are provisional and subject to any revisions which new information may suggest.

SITE 14WO203

This site is located on a slight rise on the northwest side of the Verdigris River (fig. 59). It is bounded on the northeast by an abandoned railroad grade, on the southeast by the Verdigris River, and on the southwest and northwest by an oxbow lake. An area of refuse concentration approximately 150 feet in length by 140 feet in width lay near the center of the site. The entire site has an overall length of 900 feet. Long utilization of the site for agricultural purposes has obliterated any traces of surface features, if they were ever present (fig. 60).

EXCAVATIONS

Johnson and his party tested this site by means of three 5-foot-square test pits. Two of these were carried to a depth of 1.5 feet, and a third to a depth of 2.0 feet. Arbitrary levels of 0.5 foot were maintained during the excavation. As agricultural operations had obliterated all traces of these test pits by the time the site was mapped in 1957, the locations of these pits do not appear on the site plan.

In the summer of 1957, Howard and his party further tested the site by means of three more 5-foot-square test pits, placed in areas of greatest surface concentration and artifacts. Two of these were carried to a depth of 4.0 feet, and one to a depth of 2.0 feet. In the first of these, no artifacts were recovered below the surface until a

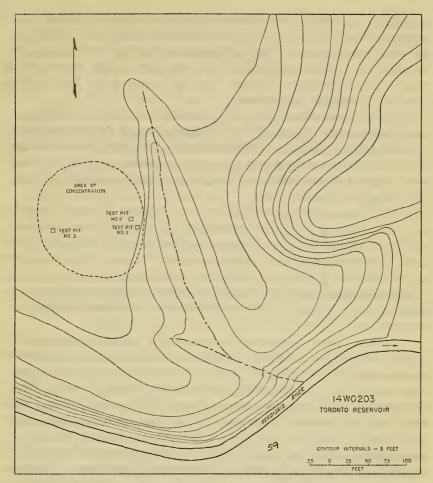


FIGURE 60.—Plan of site 14WO203, showing excavations.

depth of 1.0 foot was reached. Here the broken end of a drill or projectile point and a fragmentary scraper were recovered. Nothing was found below this depth.

In the second pit, the only artifact, a large body sherd, was recovered at a depth of 0.5 foot. The third pit also yielded but a single artifact. This was a large, expanding-stem point, which appeared at a depth of 1.5 feet.

specimen descriptions (pl. 51, a-l)

 $Rim\ sherds$.—Two rim sherds were recovered, one from the surface of the site and one from a test pit dug by Johnson's party. The specimen from the surface (pl. 51, a) is slightly flaring and has a

rounded lip. Decoration consists of a series of vertical, incised lines, running downward from the lip for a distance of 22 mm. and, slightly below the lower limit of these lines, a single row of dentate stamp impressions. The sherd is tempered with grit, and its color ranges from tan through gray to black. The lip thickness is 9 mm. and the lower rim thickness is the same.

The second specimen (pl. 51, b) shows considerable weathering and lacks the lip. Its decoration consists of square dentate stamping, arranged in parallel lines. Below this is a horizontally incised line, and below this, and here and there superimposed upon it, is rocker-stamping. Temper, color, and thickness are the same as in the specimen described above.

Body sherds.—Of the 51 body sherds obtained, 32 were from the surface of the site, 18 were recovered by Johnson's party in their test pits, and 1, mentioned above, was recovered in Howard's test pit 2. Forty-six are plain, and five are cord marked. Superimposed on the surface of the plain sherds are examples of rocker-stamping, dentate-stamping, and parallel, incised lines. Temper and color are the same as in the rim sherds described above. Thickness ranges from 6 to 12 mm.

Projectile points.—Two complete projectile points and the bases of three others were recovered. These can be divided into two categories on the basis of size. Four of the points are in the "large point" tradition and probably served as atlatl dart points (Fenenga, 1953). They all have expanding stems with straight or slightly convex bases. only complete point of this style (pl. 51, f) was recovered at a depth of 1.5 feet in Howard's test pit 3. It measures 84 mm. in length, is 27 mm. wide at the widest point, which is just above the notches, and has a maximum thickness of 9 mm. Its base is slightly convex. The point is made of a grayish-white chert. Another point of this style (pl. 51, e), consisting of only the basal portion, is made of a gray chert with white inclusions. It has a maximum width of 40 mm. and a maximum thickness of 7 mm. Its base is straight. The third point of this style, also a fragment, has a slightly convex base (pl 51, d). It has a maximum width of 40 mm. and a maximum thickness of 8 mm. It is made of gray Flint Hills chert. The fourth large point, very fragmentary, is of dark gray chert. Its maximum thickness is 5 mm.

The remaining point is in the "small point" tradition (pl. 51, c) and probably served as an arrowhead (Fenenga, 1953). It is triangular in outline and unnotched, made of gray Flint Hills chert. Its length is 11 mm., its maximum width 9 mm., and its maximum thickness 2 mm. Points of this type are generally considered to be "late horizon" markers, i.e., characteristic of late prehistoric and historic cultures.

Drill.—One possible drill point, fashioned from gray chert, was

obtained. This specimen was found in Howard's test pit 1 at a depth of 1 foot. The point of the drill is 2 mm, wide. It has a maximum thickness of 6 mm., measured at the point where this portion was broken off, and a maximum width of 15 mm., measured at the same place.

Graver.—One graver, suitable for incising wood or bone, was obtained by Johnson in his testing. It has been fashioned from an irregularly shaped flake of gray Flint Hills chert. The only modification of the flake is in the point itself, which is extremely narrow. The width of the point is 2 mm.; the width of the base 20 mm.; and the length of the tool 33 mm. Its maximum thickness is 3 mm.

Blades.—The bases of three blades were recovered, two from the surface of the site and one from one of Johnson's test pits. The largest blade fragment is of grav Flint Hills chert (pl. 51, q). It is rounded. indicating that the complete blade may have been pyriform in shape. It is 47 mm. in width and has a maximum thickness of 11 mm. second rounded base, also of gray Flint Hills chert, measures 28 mm. in width and has a maximum thickness of 6 mm. The third basal fragment has a contracting stem with a rounded base. This piece is of pink chert. Its dimensions are: maximum width, 29 mm., maximum width of stem, 22 mm., maximum thickness, 5 mm.

End scrapers.—Five objects of this sort were collected. Three are of gray Flint Hills chert, two are of pink chert. In all examples the working end is thicker and has been sharpened by the removal of flakes almost at right angles to the plane of the artifact. Two of the scrapers are pyriform in outline, one is trianguloid, and the remaining two, fragments, appear to have been rectanguloid when complete. Lengths of the pyriform specimens are 51 and 72 mm., maximum widths are 30 and 42 mm., and maximum thicknesses are 10 and 14 mm., respectively (pl. 51, h, i). The trianguloid specimen, which appears to be the reworked tip of a projectile point, measures 24 mm. in length by 17 mm. in width, with a maximum thickness of 4 mm. (pl. 51, j). The maximum widths of the rectanguloid specimens are 40 and 20 mm., their maximum thicknesses 7 and 6 mm. (pl. 51, k, l).

Flake scraper.—One fragmentary artifact bearing traces of secondary chipping along two edges was recovered. It is made of gray Flint Hills chert, is quite irregular in form, and has a planoconvex cross section. It is 43 mm. long, 33 mm. wide, and has a maximum thickness of 14 mm.

Chopper.-One fragmentary chopper, made from a fine-grained green quartzite, was found on the surface of the site. The flaking is entirely of the percussion type, and is restricted to the edges of the specimen. The edges show evidence of repeated pounding, indicating a possible secondary use as a hammerstone. Dimensions: width at point of breakage, 48 mm., maximum thickness, 18 mm.

Miscellaneous chipped stone fragments.—In addition to the above specimens, which can be placed in artifact categories, 31 specimens were collected that are too fragmentary to be classified. These consist of 6 projectile-point tips, 5 projectile-point or blade fragments from the area between the base and the point, 2 probable end-scraper fragments, and 18 fragments which show secondary chipping along only one edge. The predominant material is gray Flint Hills chert. One unfinished projectile point was also recovered.

Unidentified artifact.—One piece of highly siliceous, worked hematite with a hardness of 6.5 (vesuvianite in the modified Mohs hardness scale) was recovered. It shows definite signs of rubbing and scratching on two surfaces. Were it not for its hardness, one might suspect that it had served as a source of pigment. The piece measures 54 mm. in length, 34 mm. in width, and averages 7 mm. in thickness.

Paint.—Three limonite fragments and four burned limestone fragments were collected. All are probably of local origin, and probably served as sources of yellow and white paint.

Unworked stone.—There were 327 irregularly shaped flakes of chert, lacking any traces of secondary chipping, recovered at the site. Gray Flint Hills chert is the predominant material, although tan and white cherts are also represented.

CULTURAL AFFILIATION

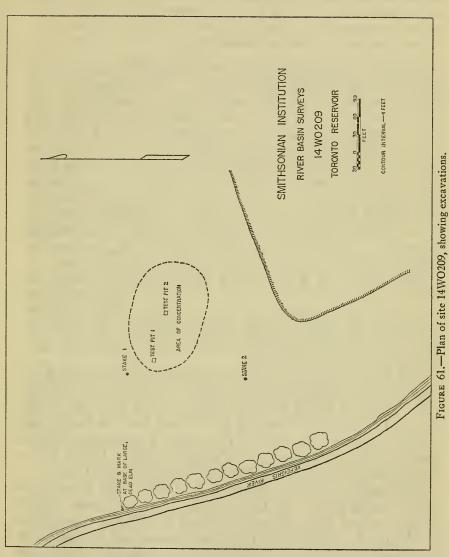
Potsherds with dentate- and rocker-stamping and large, expandingstem projectile points indicate an identification with Kansas City Hopewell as defined by Wedel (1943). Since no cultural stratification could be discovered and the artifacts appear to be culturally homogeneous, it is assumed that the site has but one component. Therefore, specimens from the surface were grouped with those from the excavations for descriptive purposes.

SITE 14WO209

This site is located on a slight rise on the northeast side of the Verdigris River (fig. 59). It covers an area approximately 1,100 feet in length (NW-SE) by 300 feet in width (NE-SW). A slightly heavier concentration of material is found at the southeast end of the site in an area 200 feet by 130 feet. Any surface features that may once have been present have been destroyed by cultivation (fig. 61).

EXCAVATIONS

Two 5-foot-square test pits were laid out in the area of greatest surface concentration. The first of these was excavated to a depth of 1.0 foot, the second to a depth of 0.7 foot, at which point work was



suspended at the insistence of the owner of the site, who feared that his machinery might become mired in the pits during farming operations. It appeared, however, that at this depth the occupation layer had already been passed, as no artifacts had been recoved below a depth of 0.5 foot in either pit. Potsherds and flint chips were recovered in both pits to a depth of 0.5 foot from the surface.

SPECIMEN DESCRIPTIONS

Rim sherds.—Three rim sherds were recovered, all apparently from vessels of a cord-marked Aksarben type. The first bears vertical, cord-marked lines on the outer surface and has a rounded lip. The width of the lower rim is much greater than that at the lip, indicating that the fragment was once part of a collared rim (pl. 51, m). The second rim is also cord marked on the outer surface, but the cord marks have been wiped away for a distance of 10 mm. below the top of the lip. The lip is rounded and the rim is straight or very slightly insloping (pl. 51, o). The third rim sherd is similar to the second in most respects, but seems to have come from a much smaller vessel (pl. 51, n). In color the sherds grade from buff to gray. The tempering is coarse grit. Lip thickness on all three sherds is 5 mm.; the lower rim thickness is 9 mm. on the first rim and 5 mm. on the other two.

Body sherds.—All of the 114 body sherds recovered represent pottery of the Aksarben Complex. Eighty-four of these show cord marking on the outer surface, twenty-three are smooth, and seven are indeterminate (i.e, split or badly weathered sherds). In color they range from buff through gray to black. Tempering is coarse grit. Thickness ranges from 4 to 12 mm.

Loop handle.—A single pottery loop handle was recovered by Johnson's party from just north of the main concentration area of the site (pl. 51, p). The handle had been fastened to the vessel by drilling holes in the vessel wall, inserting tabs of clay from the handle, and welding the tabs to the inside of the vessel. The smoothed exterior bears a bright red-orange slip, the interior is gray. Coarse grit is the tempering material. The diameter of the handle is 14 mm.

This fragment has been assigned to the Geneseo Red Filmed type (Wedel, 1949, p. 89). In Rice County, in central Kansas, Wedel found sherds of this type associated with Rio Grande Glaze Paint sherds (ca. A.D. 1525 to 1650), and small amounts of European and Southwestern trade goods. Pottery of the Geneseo Red Filmed type is one of the diagnostic traits of the Great Bend Aspect or Paint Creek Culture, which Wedel has tentatively identified with the late prehistoric and early historic Wichita (Wedel, 1942, p. 10).

Projectile points.—Twenty projectile points that were sufficiently complete for classification were recovered. These have been grouped

into six different styles. The first, represented by one incomplete specimen, is large and thick, and has in-sloping shoulders and a slightly expanding stem with a straight base. It is made of red chert and measures 45 mm. in length by 21 mm. maximum width by 10 mm. maximum thickness. Typologically, it would seem to belong to the Archaic Culture (pl. 51, q).

The second style, also Archaic typologically, is represented by two complete points. Both are large and thick, with in-sloping shoulders and contracting stems. The first measures 49 mm. in length, 21 mm. in maximum width, and 11 mm. in maximum thickness. It is made of tan chert (pl. 51, r). The second is 56 mm. in length, 22 mm. in maximum width, and has a maximum thickness of 11 mm. It is made of gray Flint Hills chert (pl. 51, s).

The third style is represented by five incomplete specimens. These points are large, with expanding stems and straight or slightly convex bases. The first measures 25 mm. in width and has a maximum thickness of 8 mm. (pl. 51, t). The second is 27 mm. wide and has a maximum thickness of 11 mm. (pl. 51, t). Both are of gray Flint Hills chert. The third specimen, of gray Flint Hills chert, has a maximum width of 28 mm. and a maximum thickness of 7 mm. The fourth is 21 mm. wide, with a maximum thickness of 5 mm. It is of gray Flint Hills chert that has white banding. The fifth is 27 mm. in maximum width and 5 mm. in maximum thickness, made of gray Flint Hills chert.

The fourth style is represented by one complete point, one reworked point, and three fragmentary specimens. Points of this type are distinguished by their large size and their contracting stems. The complete specimen measures 70 mm. in length, is 23 mm. wide, and has a maximum thickness of 10 mm. (pl. 51, w). Other points of this type are wider, the widest being 33 mm. in maximum width. Three are of tan chert, the other two of gray Flint Hills material (pl. 51, v, x, y).

All of the above are in the "large point" tradition. The two remaining styles are "small point" forms. The fifth style is made up of small, triangular, "late horizon" points. Two specimens are unnotched. They measure 24 and 20 mm. in length, 13 and 14 mm. in width at their bases, and 3 and 5 mm. in maximum thickness, respectively. Materials are white and gray Flint Hills cherts (pl. 51, z, a'). The remaining points are notched. Two of the points have double side notches, one has single side notches, and one (perhaps accidentally) has one side notch and a basal notch. Two are of gray Flint Hills chert, the others are of a pinkish chert. They average 20 mm. in length by 15 mm. maximum width, with a thickness of 3 mm. (pl. 51, b', c', d').

A sixth style, possibly a drill rather than a projectile point, is represented by a single broken specimen. It is slender, with shallow side

notches, and is slightly curved when viewed from the side. It was probably about 33 mm. in length when complete, has a maximum width of 10 mm., and a maximum thickness of 3 mm. It is made of gray Flint Hills chert (pl. 51, e').

Blades.—Four pyriform blades, two nearly complete and two fragmentary, were recovered. All are of gray Flint Hills chert. They vary in width from 22 to 40 mm., and in thickness from 9 to 13 mm. The two nearly complete specimens measure 53 and 59 mm. in length (pl. 51, f').

End scrapers.—Two complete planoconvex end scrapers were recovered. Both are manufactured of gray Flint Hills chert. The first measures 35 by 30 mm. and has a maximum thickness of 7 mm. (pl. 51, h'). The second measures 45 by 30 mm. and has a maximum thickness of 10 mm. (pl. 51, g').

Flake scrapers.—Two artifacts of this description were recovered. The first is made of pink chert and measures 26×20 mm. with a maximum thickness of 4 mm. The second, of tan chert, is 72 mm. long, 27 mm. in width, and 11 mm. thick (pl. 51, j'). Both are ovate in form, flat on one side, worked on the other.

Chopper.—The basal portion of a heavy stone chopper was recovered at the site. It is 70 mm. in width at the point of breakage and has a maximum thickness of 25 mm.

Celts.—Three small celts, similar to each other in shape, but of varied materials, were found at the site. The first and smallest has been chipped from a fragment of dark gray micaceous schist. Its cutting edge is polished from use. It measures 80 mm. in length, 43 mm. in width, and has a maximum thickness of 13 mm. (pl. 51, i'). The second is made of the Cottonwood formation limestone so common in artifacts from this area. It has apparently been cut into shape by an implement of some harder stone. This celt is 100 mm. long, has a maximum width of 46 mm., and a maximum thickness of 27 mm. It seems rather odd to find a celt made of this soft, rather porous stone (hardness 3.5, celestite), yet collections from this area contain celts, boatstones, and even grooved axes fashioned of this material.

The third celt has been chipped from a light tan chert. It is 123 mm. long, has a maximum width of 60 mm., and a maximum thickness of 27 mm. (pl. 51, k').

Manos.—Eight manos, and mano fragments, were recovered. Seven of these are of sandstone, and the smallest specimen is made of micaceous schist. All are subrectangular, with smooth grinding surfaces on the top and bottom and partially smoothed edges and corners. The largest specimen is 153 mm. long, 96 mm. wide, and 40 mm. thick. Six of the others are but slightly smaller than this. The eighth specimen is but 55 mm. long, 50 mm. wide, and 23 mm. thick, and appears to have

been used as a grinding tool for small materials such as medicines or

perfumes.

Three of the larger manos appear to have been used also as cupstones or anvils, as they have paired depressions on the two opposite, flat surfaces. The only complete specimen of this sort measures 117 mm. in length, 55 mm. in width, and is 56 mm. thick. The pecked depressions are 23 mm. in diameter and 4 mm. thick.

Hammerstones.—Three hammerstones were recovered. All are unworked river pebbles of a size to fit conveniently in the hand of the

user, and all show signs of battering on one or more surfaces.

Core.—A pyriform core of gray Flint Hills chert was found at the site and probably represents a piece of material roughly shaped at the quarry for transportation to the site, where it could be made into points, scrapers, etc. It is 102 mm. long, 72 mm. wide, and has a maximum thickness of 35 mm.

Miscellaneous stone artifacts.—In addition to the artifacts described above, there were 28 chipped-stone specimens too fragmentary to classify. One of these seems to represent the end of a small end scraper. Three seem to be portions of flake scrapers, and the remainder may be portions of projectile points or blades. The predominant materials are gray Flint Hills chert, tan chert, and pink chert.

CULTURAL AFFILIATIONS

Although no cultural stratification could be discovered, the artifacts from this site indicate that at least two components are present: Archaic (as defined by Spaulding, 1955, pp. 15–19) and Aksarben.² A single loop-handle fragment may represent the third and most recent component at the site, Great Bend.

SITE 14WO215

This is a small site, limited to a low knoll and an adjacent level area near the Verdigris River (fig. 59). The area has been under cultivation for some time and has also been subjected to continual flooding during periods of high water. Nevertheless, it is still quite rich in surface materials.

EXCAVATIONS

The site was tested by means of two 5-foot-square test pits, excavated in the area of greatest surface concentration. The first pit was excavated to a depth of 2.5 feet, the second to a depth of 2.0 feet. The fill was clay loam at the surface, grading into hard clay at a depth of 1.0 foot. Numerous sandstone blocks were encountered at the top

²The term "Aksarben" is used for the archeological remains which make up the Upper Republican and Nebraska cultures.

of this hard clay. Plow disturbance was evident to a depth of 0.5 foot. The only artifact recovered in the first pit was a cupstone, which appeared at a depth of 1.1 feet in the northwest corner of the square. In the second pit an occupation level was reached at a depth of 1.0 foot and continued to a depth of 1.5 feet. It contained a flake scraper and numerous small chips.

SPECIMEN DESCRIPTIONS

 $Rim\ sherd.$ —Only one rim sherd was recovered from this site (pl. 52, b'). It is, however, a rather unusual specimen, since it seems to have come from a bowl-shaped vessel. The sherd is cord marked on the outer surface, smooth on the inner. It is grit tempered, with a light-gray interior and buff exterior. It is 7 mm. in thickness. The upper surface of the lip and the outer rim, for a distance of 12 mm. below the lip, are decorated with diagonal cord marking. Below this, the cord marking is vertical. At a distance of 18 mm. below the lip edge, there is a very pronounced shoulder. Although rather atypical, this sherd seems to be identifiable as of Aksarben origin.

Body sherds.—Seven cord-marked body sherds and five smoothed body sherds were recovered. The cord-marked body sherds are all of Aksarben types. They range in color from dark gray to orange-buff, with gray interiors. Thickness ranges from 6 to 8 mm. (pl. 52, c').

The smoothed sherds are also grit tempered, but the particles of grit are much larger than in the cord-marked sherds. They vary in surface color from reddish-gray to buff, and interiors are uniformly gray. Thicknesses vary from 5 to 9 mm. One of the sherds bears a decoration of two fine, incised, parallel lines on its outer surface (pl. 52, d').

The smooth, undecorated sherds have been tentatively assigned to the Geneseo Plain type (Wedel, 1949, p. 88). The incised sherd fits no described type known to the writer, although, like the Geneseo sherds, it probably represents a late time period. The incised lines on this sherd are reminiscent of those on sherds of the Oneota Aspect (ca. A.D. 1600–1800).

Projectile points.—A total of 34 projectile points, sufficiently complete to be classified, were recovered. These have been grouped into six categories for descriptive purposes.

The first style is represented by two incomplete specimens. These are rather large, thick, leaf-shaped points, with only a slight indication of a shoulder. The first is made of a brown chert with white inclusions. It measures 22 mm. in width, has a maximum thickness of 11 mm., and when complete was probably 64 mm. long (pl. 52, b). The other point of this type, made of gray Flint Hills chert, has a

maximum width of 20 mm., is 8 mm. thick, and when complete measured approximately 62 mm. in length (pl. 52, a).

The second style, represented by two complete points and four fragments, is of the contracting-stem type generally identified with the Archaic or Early Woodland cultures. The longer of the two specimens is made of tan chert. Its dimensions are: length, 62 mm.; maximum width, 23 mm.; and maximum thickness, 8 mm. (pl. 52, c). The other, apparently a reworked point, is 53 mm. long, with a maximum width of 30 mm. and a maximum thickness of 8 mm. (pl. 52, d). Maximum widths of the other four specimens are 37, 33, 25, and 24 mm.

The third and most numerous style is large, with barbed shoulders and an expanding stem, either straight or convex at the base. Four nearly complete specimens range in length from 56 to 42 mm., while a clearly reworked point is only 30 mm. long. Widths vary between 36 and 22 mm., and maximum thicknesses between 6 and 10 mm. Seven incomplete specimens of this type were also recovered. Materials are tan and gray Flint Hills cherts (pl. 52, e-i).

A fourth style is represented by four nearly complete specimens and one fragment. Here the stems are straight, and the barbed shoulders characteristic of the previous style are absent. Lengths of the four nearly complete specimens are 59, 51, 48, and 38 mm. Widths are 24, 22, 24, and 24 mm. The average maximum thickness is 8 mm. Materials are gray Flint Hills chert, tan chert, and pink chert (pl. 52, k, l).

The fifth style is represented by one complete projectile point and three fragments. These are small, expanding-stem points with barbed shoulders, and resemble those recovered in Plains Woodland sites in Nebraska and Kansas (Kivett, 1952, pl. IX A, Nos. 6, 9, and 10; pl. XVI A, No. 4; 1953, pl. 23 a, bottom row, 3d, 4th, and 5th specimens). Materials are gray and pink cherts. The only complete specimen is 37 mm. long. Widths of the points are 17, 16, 16, and 12 mm. Maximum thicknesses are 4, 4, 4, and 3 mm. (pl. 52, j, m-o).

The sixth style is represented by five complete specimens. This is the familiar "late horizon" triangular style. All lack side notches, but one has a basal notch. Lengths of the specimens vary from 30 to 19 mm.; widths, measured at the base, between 15 and 11 mm. The points average 3.5 mm. in maximum thickness. Materials are gray and cream-colored cherts (pl. 52, p-t).

In addition to these specimens, 30 fragments of projectile points, all in the "large point" tradition, were recovered. Materials employed are gray Flint Hills chert, tan chert, and cream-colored chert.

Knives and blades.—Twenty-seven fragments of knives or blades were recovered at the site. Twenty-three of these were apparently pyriform in shape when complete. The other four were undoubtedly

of the style known as the "Harahey knife." Typically, these Harahey knives are lozenge shaped, with alternate beveling on the upper right and lower left edges, as one views the object from either face (pl. 52, z). Such artifacts are frequently found at Aksarben sites, but are by no means limited to those sites.

One of the pyriform blade fragments is of white chert, five are of tan chert, two are of pink chert, two are of gray-green chert, and eight are of gray Flint Hills chert (pl. $52 \ x, \ y$). Four fragments, apparently representing the bases of blades, are of a reddish-gray jasper, while another is of banded tan chert. The four Harahey knife fragments are of tan chert.

Drill.—One slender, chipped piece apparently represents a section of a drill stem. It is lozenge shaped in cross section, with a width of 10 mm. and a maximum thickness of 7 mm.

Shaft scrapers.—Five artifacts, each distinguished by a semilunar notch on one edge, have been referred to as shaft scrapers. Three of these have small, deep notches, and would have been ideal for shaping arrowshafts with a diameter of 7 or 8 mm. (pl. 52, a'). Two others, with shallower notches, may have served as bowshaft scrapers. Both deep- and shallow-notched specimens are small, ranging in length from 25 to 40 mm. Three are made of light-gray chert, one is of tan chert, and one is of gray Flint Hills chert that has white inclusions.

End scrapers.—A total of 45 end scrapers were recovered, 27 of which are complete and 18 of which are recognizable fragments. The complete specimens range in length from 30 to 72 mm., in maximum width from 20 to 36 mm., and in maximum thickness from 7 to 13 mm. Light gray, tan, and gray Flint Hills cherts are the usual materials (pl. 52, u-w).

Flake scrapers.—Ninety-one flakes with one or more edges bearing secondary chipping were recovered. These vary greatly in size and shape. The materials are tan, white, and gray Flint Hills cherts.

Choppers.—Two choppers, both of gray Flint Hills chert, were recovered. They are ovoid in outline, and show percussion flaking on both faces. They measure 92 and 90 mm. in length, 69 and 68 mm. in maximum width, and 17 and 22 mm. in maximum thickness, respectively. These tools are so alike in material and workmanship that it seems very likely that they were made by the same person.

Miscellaneous worked fragments.—Five small fragments which cannot be assigned to any particular category were recovered. These may be portions of projectile points, knives, blades, or scrapers. All show some evidence of secondary chipping. Materials are tan, brown, white, and gray Flint Hills cherts.

Cores.—Four cores were recovered. These are the irregularly shaped pieces remaining after numerous flakes have been removed

from a large quarry blank. Three are of tan chert and one is of gray Flint Hills material.

Manos.—Four complete manos and one fragmentary specimen were recovered. They are subrectangular, with the upper and lower surfaces worn smooth. Three of the complete specimens are of sandstone, as is the fragment, while the remaining artifact is of limestone.

The three sandstone manos have the following dimensions: lengths, 140, 125, and 72 mm.; widths, 94, 90, and 60 mm.; thicknesses, 55, 41, and 30 mm., respectively. The limestone specimen is 117 mm. long, 94 mm. wide, and 55 mm. thick. All of the specimens show plow scars.

Hoe.—A single hoe or hoe-like implement was found. It is made of a quartzite river pebble, roughly triangular in outline, which has been sharpened at the broad end by percussion flaking. It is 108 mm. in length, has a maximum width of 66 mm., measured at the broad end, and a maximum thickness of 32 mm., measured at the narrow end.

Celt.—A single celt was recovered. It is made of Cottonwood limestone, a rather poor material for a cutting tool, one would think, because of its softness. The celt is typical in shape of those pecked from harder material. It is 83 mm. long, has a maximum width of 51 mm., measured at the blade end, and a maximum thickness of 23 mm., measured at the poll.

Unidentified stone objects.—Two pieces of worked siliceous hematite were recovered. Both appear to be too hard to have served as sources of paint, although it is difficult to conceive any other use for them. Perhaps they were rubbed on some abrasive surface to secure the desired pigment. One measures 27 mm. in length, 23 mm. in width, and 9 mm. in thickness. The other is 22 mm. long, 10 mm. wide, and 4 mm. thick.

Unworked stone.—A small piece of micaceous schist found at the site was probably brought there by an individual who was attracted by its sparkle and texture. It is 43 mm. long, 31 mm. wide, and 8 mm. thick.

CULTURAL AFFILIATIONS

No cultural stratification could be distinguished at the site, since all of the diagnostic artifacts were surface finds. On the basis of typology, three components may be distinguished: Archaic, Aksarben, and Great Bend.

THE WALLEYE ROCKSHELTER (14WO222)

This site is a small rockshelter overlooking Finger Creek, which enters the Verdigris from the north (fig. 59). Several rather striking petroglyphs are present on a fallen slab in front of the shelter (pl. 53). A narrow occupation area about 10 feet in width and 40 feet in length

is located immediately below the bluff overhang. The fill of the occupation area is a rich humus mixed with fallen sandstone fragments from the bluff. The area has been disturbed by rodent activity, picnickers, and the activities of local enthusiasts who believe that the petroglyphs are a treasure map. For this reason, no cultural stratification could be distinguished.

EXCAVATIONS

The entire area beneath the bluff overhang was laid out in 5-foot squares (fig. 62). Each of these squares was carried down to bedrock, maintaining arbitrary 0.5-foot levels during the excavation. A

total of 13 squares was excavated.

The 0-foot to 0.5-foot level yielded the following artifacts: Two small triangular points; a large expanding-stem point; the tip of another point or blade; a slender drill; portions of three end scrapers; two flake scrapers; three cord-marked, grit-tempered potsherds of Aksarben affiliation; one thick, plain, grit-tempered sherd; one sand-stone shaft smoother; one cupstone; one stone hoe; one hammerstone; one core; and one plum seed.

The 0.5-foot to 1.0-foot level yielded the following: One large expanding-stem point; two blade or point fragments; one Aksarben sherd; one shell-tempered sherd; and one fragmentary limestone celt

or hoe.

The 1.0-foot to 1.5-foot level yielded the base of a large, expandingstem point; the tip of a large blade; a large, smooth, shell-tempered sherd; and a piece of charred vegetal material.

The 1.5-foot to 2.0-foot level yielded the tip of a large point or blade and a complete point of the small, triangular, "late horizon" type.

The 2.0-foot to 2.5-foot level, present in only three of the squares, yielded only one artifact, a modified flake. Charred wood also appeared in this level.

Unworked flakes, animal bone, and other refuse were apparent at

all levels.

PETROGLYPHS

Several petroglyphs, both incised and pecked, were found on a large sandstone slab which once formed a part of the overhang of the shelter. From the orientation of the petroglyphs it seems evident that they were made at a time before this slab had broken loose from the bluff face. If the slab were restored to its original position, the majority of the figures would be upright and on the outer face of the overhang, while one of the figures (pl. 53, a, b), a warrior with a bow and arrow, would be on the undersurface.

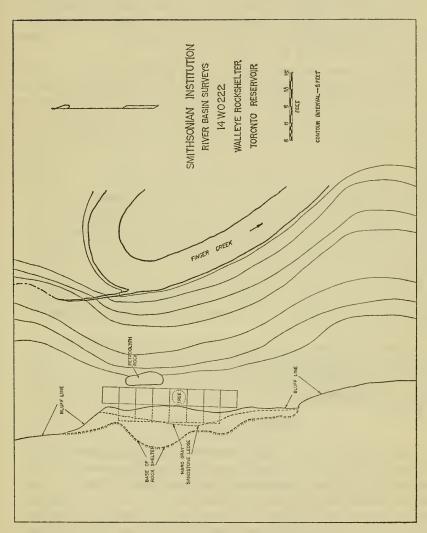


FIGURE 62.—Plan of site 14WO222, showing excavations.

Although the figures are highly conventionalized, the work is skillfully executed, and seems to conform to a definite aboriginal art style. One of the figures (pl. 53, c, extreme left, and f) has been painted with a weather-resistant red paint, still visible after many years of exposure to the elements. Three of the incised drawings are anthropomorphic, including the painted figure and the archer mentioned above. A fourth represents a man mounted on a horse (pl. 53, e). In addition, there are pecked representations of cervid (deer and elk) hoofprints (pl. 53, e-e).

Details of dress and adornment do not permit definite identification of the human figures as to tribal group. The roached hairdress was favored by many tribes which frequented the area, including the Kansa, Osage, and Wichita. The faces of two of the figures, the "painted man" and the "archer," have lines about the eyes and on the chin, and triangular figures on the breast that might represent tattoo marks (pl. 53, a-c, e). This suggests that the Wichita are depicted, since members of this tribe were famous for their facial and body tattooing (Mooney, 1912, p. 947). Moreover, Bienville mentions a tattoo design identical with that of the "painted man" which was used by the Nakasa (a Caddoan group): "all the savages here have a circle tattooed around the eyes and on the nose and three lines on the chin." (MS. quoted by Swanton, 1942, p. 143.)

The bow and arrow carried by the "archer" (pl. 53, a, b) indicates that this weapon had not yet been supplanted by the rifle at the time the petroglyphs were made, while the horse indicates a date sometime after about 1750 for the work.

Numerous grooves, apparently made by sharpening wooden or bone tools on the sandstone, appear at the south end of the slab. Two isolated grooves of this sort are also present between two of the anthropomorphic petroglyphs, the "painted man" and his neighbor (pl. 53, c).

SPECIMEN DESCRIPTIONS

Body sherds.—Seven body sherds were recovered from this site. Four are cord marked, with grit tempering; two are smooth, with shell tempering; and one is smooth with grit tempering. The four cord-marked sherds are typical of Aksarben sites (pl. 52, e', g'). They have buff exteriors and dark gray interiors. In thickness they range from 5 to 7 mm. Three of these were found in the 0-foot to 0.5-foot level, and one in the 0.5-foot to 1.0-foot level.

The two shell-tempered sherds (pl. 52, f') vary in thickness from 5 to 8 mm. They are buff on the exterior surfaces, with interiors of dark gray to buff, flecked with white from the tempering material. In some places the tempering has leached away, leaving a pitted sur-

face. One of these sherds was found in the 0.5-foot to 1.0-foot level, the other in the 1.0-foot to 1.5-foot level. These sherds have been tentatively identified with the Cowley Plain type (Wedel, 1949, p.

87).

The single smooth, grit-tempered sherd is light buff on its exterior surface, gray on the interior. Its thickness is 8.5 mm. The outer surface of this sherd seems to have been wiped with a bunch of grass when the vessel was in a "leather" state. It was recovered in the 0-foot to 0.5-foot level of the site. It has been tentatively identified with the Geneseo Plain type (Wedel, 1949, p. 88).

Projectile points.—Five complete projectile points and three fragments were recovered at the shelter. These are readily divisible into two groups on the basis of size. Two of the complete points and the three fragments are "large point" styles, while the remaining specimens are "small point" forms. All are manufactured of gray Flint Hills chert.

The largest of the projectile points (pl. 52, m') has an expanding stem with a convex base. It is 50 mm, in length, has a maximum width of 36 mm, and a maximum thickness of 9 mm. This projectile point was found in the 0-foot to 0.5-foot level. The second large projectile point (pl. 52, h') also has an expanding stem, but the base is concave. The shoulders, in the form of barbs, are carried back from the notches to the level of the base of the stem. This point style seems to be quite rare in this section of the country, judging from local collections. It is 39 mm, in length, has a maximum width of 30 mm, and a maximum thickness of 7 mm. It was recovered in the 0.5-foot to 1.0-foot level.

One of the small points is of the plain, triangular, unnotched variety. It is 20 mm. in length, has a maximum width of 13 mm., and a maximum thickness of 3 mm. (pl. 52, i'). Another is shouldered and has a straight stem with a convex base. It is 17 mm. in length, has a maximum width of 12 mm., and a maximum thickness of 3 mm. (pl. 52, k'). Both of these were recovered in the 0-foot to 0.5-foot level. A third small projectile point, recovered in the 1.5-foot to 2.0-foot level, has side notches and a basal notch. It is 20 mm. long and has a maximum width of 12 mm., with a maximum thickness of 3.5 mm. (pl. 52, j').

Drill.—A beautifully chipped drill of pink and tan chert was recovered in the 0-foot to 0.5-foot level. It is 61 mm. in length, has a maximum width of 13 mm., and a maximum thickness of 8 mm. (pl.

52, l').

End scrapers.—Fragments of three end scrapers were recovered, all in the 0-foot to 0.5-foot level. An almost complete specimen measures 40 mm. in length, has a maximum width of 20 mm., and a maximum

mum thickness of 6 mm. This specimen is made of pink chert, the other two are of light-gray chert (pl. 52, n').

Flake scrapers.—Two artifacts of this type were recovered, both in the uppermost level. The first has three edges that show secondary chipping. It measures 60 mm. by 30 mm., with a maximum thickness of 8 mm. The second also has three working edges. It measures 57 mm. in length by 35 mm. maximum width, with a maximum thickness of 7 mm. Both are made of gray Flint Hills chert.

Sharpening tool.—A sandstone sharpening tool, probably employed to sharpen and smooth wooden, bone, and antler implements, was found in the uppermost level of the site. It has smoothed faces on opposite sides, and a narrow groove toward one end. It is 74 mm. long, has a maximum width of 40 mm., and a maximum thickness of 11 mm.

Cupstone.—A single cupstone, made of reddish sandstone, was found in the 0-foot to 0.5-foot level. It is irregular in shape, measuring 85 mm. by 85 mm., with a maximum thickness of 30 mm. On one face there is a circular, pecked depression, 26 mm. in diameter and 5 mm. in maximum depth (pl. 52, o').

Hoes.—One complete hoe and a fragment that apparently represents the blade of another were recovered. The complete hoe is made of a grayish-green indurated sandstone. The broad edge of the tool has been sharpened by the removal of several large percussion flakes. The pointed end could have been hafted to a wooden handle. This object measures 160 mm. in length, 63 mm. in width at the widest part, and is 19 mm. thick. It was recovered in the 0-foot to 0.5-foot level (pl. 52, p').

The fragment is made of Cottonwood limestone. It is 56 mm. wide at the point of breakage and has a maximum thickness of 15 mm. It was recovered in the 0.5-foot to 1.0-foot level.

Hammerstone.—A single hammerstone, consisting of a river pebble with signs of battering on several faces, was recovered in the 0-foot to 0.5-foot level. It is 50 mm. in length and 35 mm. in diameter at the center.

Core.—A gray chert core was recovered in the 0-foot to 0.5-foot level. It is 40 mm. in length, 32 mm. in width, and has a maximum thickness of 37 mm.

CULTURAL AFFILIATIONS

At least three, and perhaps four, components are present at this site. The petroglyphs represent the latest, and can be attributed to some historic tribe, since one of them depicts a man mounted on a horse. Smooth shell and grit-tempered sherds identify a component of the Great Bend Aspect. These sherds may well be associated with the

petroglyphs, as Great Bend materials often occur with European trade goods. Thin, cord-marked pottery identifies the next-oldest component, Aksarben. Large, expanding-stem projectile points may indicate a still earlier Woodland or Archaic occupation.

DRY CREEK ROCKSHELTER (14WO224)

This is a fairly large rockshelter in the valley of Dry Creek (fig. 59). This site, as well as site 14WO226, is outside the reservoir area proper, but due to potential destruction by picnickers, was considered as a part of the salvage project at the time of the 1957 excavations in the Toronto Reservoir area. Low hills with grass cover and some scrub pine and blackjack oak surround it. The area of occupation consists of the entire floor of the shelter. Several petroglyphs are to be seen on a slab of rock toward the front of the shelter (pl. 55, a). The site is quite disturbed, as it has been a favorite picnic spot for local people since at least 1880. Apparently, many petroglyphs once present in the shelter have been completely obliterated by initials, dates, and other personal memorials left by visitors.

Andreas' "History of the State of Kansas," published in 1883, mentions the shelter and some of the petroglyphs visible at that time. Under the heading "A Prehistoric Cave," appears the following description:

This cave is situated about twelve miles north of Toronto, on Section 13, Township 24, Range 14. Its mouth is about fifty feet wide and ten feet high, and the cave extends back about twenty feet. In the mouth of the cave lies a rock about nine feet long by six feet wide, the surface of which is nearly horizontal, the rock having evidently fallen from the roof of the cavern. On the surface of this rock are cut numerous figures of various sizes and shapes, some of which are indescribable. No system of regularity was observed by the inscribers, but the different figures and groups of incisions are scattered promiscuously, often overlapping and interlacing each other, as if done more for pastime than for the purpose of leaving any record of events then occurring, to be read by future generations. Some of the figures represent the human body, others parts of the body, as the head, with a small hat on, and marks down the chin, which may have been meant to represent the beard. One may have been designed to represent a little idol, another a bird's foot, another looks like a capital A, etc.

Great interest is manifested in them by the people of Woodson County which is doubtless altogether owing to the fact of their mysteriousness. The same interest will probably always attach to them. There is but little reason to hope that they will be so deciphered as to throw any light on the history of the past.

These tracings, or figures, or hieroglyphics, as some call them, were discovered about May 15, 1858, by Esquire Robert Daly, while out on a private hunting expedition. At the time of discovery, they were covered over with dirt and debris, and partially overgrown with moss. Mr. Daly, who was one of the first settlers in this part of the county, has resided in the vicinity ever since, and now lives about one and a half miles south of this prehistoric cave. (Andreas, 1883, p. 1190.)

EXCAVATIONS

Eleven 5-foot-square test pits were excavated in the floor of the cave (fig. 63). Each of these was carried down to bedrock. Arbitrary 0.5-foot levels were maintained throughout the work (pl. 54, a). It was found that the floor fill had been badly disturbed to a depth of from 0.7 foot to 1.1 feet. Since no diagnostic artifacts were recovered below this level, no cultural stratification could be obtained at the site.

The fill is not more than 4.5 feet at the maximum. It consists of organic material combined with roof fall. A section from the deepest part of the fill, which is toward the front of the shelter and in the center, revealed five layers. The top stratum, which had an average thickness of 0.3 foot, consisted of a dark clay-humus. Underlying this was a layer of light-yellow sandy soil with an average thickness of 0.6 foot. This layer was underlain by a very thin stratum of light-brown sandy soil, 0.2 foot thick. The fourth layer consisted of orange-red sand with thin, angular fragments of sandstone. It was 0.6 foot thick. The fifth layer was gray clay, containing large fragments of slightly decomposed sandstone and small lenses of organic humus with a clay admixture. At a depth of 1.3 feet the color of the clay changed to a deep gray-blue shade.

PETROGLYPHS

Of the several petroglyphs mentioned in the Andreas account, only two major examples remain intact. The first of these occurs on the upper surface of a large slab, undoubtedly the same one described in the Andreas account. It is incised in the rock and is apparently intended to represent a horse, since the tail is quite long (pl. 55, a). Below the head of the creature, which is square rather than elongated, there is a line through the neck. A bilobed arrow is incised above the horse's back. The treatment of this horse reminds one of the representations of the mythical Underwater Panther in Plains and Woodland Indian song pictographs. Here such a line through the neck indicates that the creature is emerging from beneath the earth (James, 1956, pp. 345–346).

The second petroglyph occurs on the side of a large boulder a few feet south of that bearing the horse design. It seems to be a representation of some growing plant, such as corn, or grass (pl. 55, b). Because this petroglyph is so different in style from the others and from those at other sites in the area, it may well be spurious. On the other hand, it is scarcely the sort of thing a White picnicker might dash off on a Sunday afternoon. No tracing was made of this petroglyph because of the roughness of the stone on which it is inscribed.

Of those petroglyphs described in the Andreas account that have since been destroyed, one seems to merit special mention. This is the

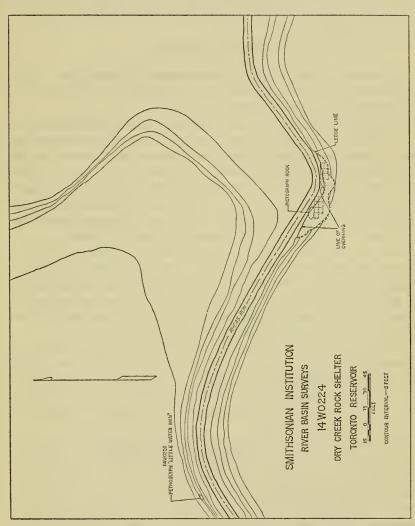


FIGURE 63.—Plan of site 14WO224, showing excavations.

representation of the human head "with a small hat on, and marks down the chin." It sounds very much like a description a Victorian scholar might have made of a pictograph similar to those at the Walleye Rockshelter. The "small hat" may very well have been the representation of the roach hairdress and the marks on the chin, of tattooing. If this were so, this would tend to connect the two shelters and also to correlate the petroglyphs with the Great Bend sherds that are present in both.

SPECIMEN DESCRIPTIONS

Rim sherds.—Five rim sherds were recovered at the shelter. Three of these are of Aksarben affiliation, one is apparently of Great Bend

affiliation, and one is of an indeterminate type.

One of the Aksarben rims is quite large (82 by 66 mm.) and represents the rim, neck, and a considerable portion of the body of the vessel. The rim is slightly flaring and undecorated except for the cord marking, and the lip is rounded. The exterior is buff in color; the interior is dark gray. Tempering consists of fine grit (pl. 54, t). The other two Aksarben sherds are similar, except that they seem to be straighter than the large rim and are gray on their exterior surfaces. rather than buff. The thickness of all three sherds is 5 mm.

The Great Bend rim sherd is straight, and tapers from a thickness of 7 mm. at the lip to 10 mm. at a point 25 mm. below the lip. Although no tempering material is visible, numerous small holes indicate that shell temper was employed. The sherd is brown on its exterior surface and dark gray on the interior (pl. 54, s). It has been assigned to the Cowley Plain type (Wedel, 1949, p. 87).

The remaining rim sherd is straight, with a rounded lip. The sherd has been polished on the outer surface. It is a light-brown color throughout. No tempering material can be discerned. The sherd is 4 mm. thick. It does not seem to belong to any ceramic type known in the Central Plains, and may be from a trade vessel originating in the Caddoan area to the southeast.

Body sherds.—Sixty-six Aksarben sherds, one Great Bend sherd, and one polished brown sherd of indeterminate affiliation were recovered. The Aksarben sherds are grit tempered, cord marked on the outer surface, smoothed on the inner surface, and vary in thickness from 6 to 9 mm. In color they vary from buff to dark gray, with occasional firing clouds. On some sherds the cord marking has been almost completely smoothed away.

The Great Bend sherd is shell tempered and smoothed, but not polished, on both the inner and outer surfaces. It is brownish gray in color and is 6 mm. thick. It has been assigned to the Cowley Plain type (Wedel, 1949, p. 87).

The polished sherd is brown in color throughout. The nature of the tempering material, if any, cannot be ascertained. It is polished on the outer surface and smooth, but unpolished, on the inner surface. Its thickness is 5 mm.

Projectile points.—The 13 projectile points from the shelter fall into three distinct groups. The first, represented by two fragments, is in the "large point" tradition (pl. 54, g, h). These points have expanding stems. One has a convex base; the base of the other is straight. Maximum widths of the two points are 31 and 30 mm.; maximum thicknesses are 9 and 7 mm., respectively. The second point shows evidence of attempted rechipping before abandonment. Both points are made of gray Flint Hills chert that has white inclusions.

The second style is represented by two specimens. These points are small, and resemble those recovered in Plains Woodland sites in Nebraska and Kansas. Points of this style were also recovered at sites 14WO215, 14GR210, and 14GR216. The first, nearly complete, has an expanding stem with a concave base. It measures 30 mm. in length by 12 mm. in width, and is 3 mm. thick (pl. 54, e). The other has an expanding stem with a straight base. Its edges are serrated. It is 13 mm. in width and 3 mm. thick (pl. 54, f). The first is made of gray Flint Hills chert, the second of tan chert.

The remaining group is made up of nine points, two of which are complete. They are in the small, triangular, "late horizon" style (pl. 54, c, d). All are unnotched. The two complete specimens measure 19 and 24 mm. in length by 11 and 15 mm. in maximum width, with maximum thicknesses of 2 and 3 mm., respectively. Four of the points are of gray Flint Hills chert, three of cream-colored chert, one of pink chert, and one of brown jasper.

In addition to the above specimens, eight additional projectile point fragments, not complete enough for meaningful description, were recovered. Four of these seem to have been in the "large point" tradition, the remainder of the "small point" type. The materials are tan and gray Flint Hills cherts.

Blades.—One complete and one fragmentary blade were recovered. The complete blade is small, triangular in shape, and only 45 mm. long. It has a maximum width of 23 mm. and a maximum thickness of 7 mm. (pl. 54, l). The large blade appears to have been slightly wider in the midsection than at the base. The maximum width of the fragment, measured at the point of breakage, is 47 mm. Width at the base is 34 mm., and the maximum thickness is 5 mm. (pl. 54, o).

Knives.—Fragments of two lozenge-shaped, alternately beveled, Harahey knives were recovered at the shelter. The more complete specimen is made of light-gray chert, the other from a dark reddishgray chert (pl. 54, b).

Flake knives.—Two of these artifacts, which seem to represent a rather rare type in this area, were found. Both have been made from long lamellar flakes, rectanguloid in outline, and with a prominent dorsal ridge (pl. 54, k). One has been retouched with secondary chipping along one cutting edge, the other has been sharpened along both sides. The first specimen, of gray chert, measures 60 mm. in length by 17 mm. maximum width. It has a maximum thickness of 4 mm. The other is made of tan chert. It is 61 mm. long, has a maximum width of 17 mm. and a maximum thickness of 8 mm.

Drill.—A single fragmentary drill was found at the shelter. It is of the expanding-base type, and made of gray Flint Hills chert. The base is 20 mm. wide and the blade is 6 mm. wide at the point of breakage. Maximum thickness of the base is 3.5 mm. and maximum thickness of the blade is 2.5 mm. (pl. 54, m).

End scrapers.—Fifteen artifacts of this type were found, representing ten complete scrapers and five fragments. Workmanship varies from fine to exceedingly crude. All of the scrapers are subtriangular in shape. The complete specimens range in length from 46 mm. to 25 mm., and in maximum width from 27 to 15 mm. The maximum thickness of the largest is 14 mm., that of the smallest is 5 mm. Materials employed are tan jasper, a translucent brown chalcedony, and white, pink, and gray Flint Hills cherts (pl. 54, i, j, n).

Flake scrapers.—Thirty-eight flake scrapers were recovered. They exhibit no uniformity in size or shape and are distinguished merely by one or more edges that show secondary chipping. Materials are cream-colored, tan, pink, and light and dark gray cherts.

Choppers.—Four choppers were recovered at the site. These are large, heavy pieces of gray Flint Hills chert worked to an edge by percussion flaking on both faces. Though quite irregular, they tend to be ovoid in shape. The largest specimen is 92 mm. long and has a maximum thickness of 22 mm. The smallest is 49 mm. long and has a maximum thickness of 14 mm.

Shaft smoother.—The only shaft smoother recovered is made of sandstone (pl. 54, g). It bears a single straight groove along one face that was very likely employed to smooth arrowshafts. It measures 77 mm. in length by 38 mm. in width and is 27 mm. thick. The groove would accommodate a shaft 7 mm. in diameter.

Sharpening stone.—This specimen is similar to that just described, but has semiconical grooves on three faces that seem to have been used to sharpen wooden, bone, or antler tools. It is of sandstone and measures 57 mm. in length by 20 mm. in width and has a maximum thickness of 18 mm.

Bone needles.—Two bone needles were recovered in the shelter. The first represents the tip and a portion of the shank. It has been

worked from a section of mammal long bone. It is 43 mm. in length and 3.5 mm. in diameter (pl. 54, p). The second fragment represents a part of the shank of a much larger object, with a diameter of 7 mm. It has also been worked from a section of mammal, probably deer, leg bone.

Bone awls.—Three bone awls were recovered. All are made from mammal long bones. These objects differ from the needles just described in that their shanks are much wider than their points. Lengths of the three objects are 55 mm., 52 mm., and 33 mm. Maximum widths are 14 mm., 13 mm., and 10 mm.

Bone bead.—A tubular, bone bead is made from a section of the long bone of some small bird or mammal. It is 41 mm. in length and

8 mm. in diameter.

Miscellaneous worked bone.—Three pieces of bone, bearing recognizable tool marks, were recovered. They have no recognizable form and are probably scraps left after the manufacture of other objects.

Metal objects.—Two metal objects were recovered in the shelter fill. One is a fragment of a small iron kettle (pl. 54, r). It has a rather elaborate design on its outer surface and on the inner surface a raised numeral "2". The second piece seems to be part of the handle of a brass spoon. Both objects may be assigned to either the historic Indian occupation of the site or to subsequent use of the shelter by White picnickers.

CULTURAL AFFILIATIONS

At least two, and perhaps three, components are represented at the site: Aksarben, Great Bend, and historic Indian. The first two are identified by ceramic materials. The last, which may prove to be identical with Great Bend, is identified by the petroglyph of a horse.

THE OUTLAW ROCKSHELTER (14WO225)

This site is a very small rockshelter with a petroglyph on the rear wall. The name derives from a local tradition that this shelter was used by one of the Dalton gang or Jesse James as a hideout. The shelter is very shallow, low-ceilinged, and damp.

The petroglyph is possibly a representation of an Indian dwelling covered with grass thatching, pieces of bark, or hides. According to local tradition, the initials "N.C." were added by a man named Norman Curtis, about 30 years ago, "to fool people" (pl. 55, c).

LITTLE-WATER-MAN PETROGLYPH (14WO226)

This site consists of a single anthropomorphic petroglyph deeply incised in the rocky outcrop along Dry Creek about 300 feet upstream from the Dry Creek Rockshelter (14WO224).

The name of the petroglyph was given by Mr. D. Wm. Chatfield, a member of the 1957 Smithsonian party, who discovered and reported it. According to Chatfield, who is an Ojibwa Indian of Cass Lake, Minn., the pictograph closely resembles Ojibwa drawings of a supernatural being called the "Little-water-man." The figure holds an object, perhaps a banner, in his left hand (pl. 55, d, e).

THE POSSUM POINT SITE (14WO228)

This is a small occupation site which was apparently used for only a short time. It is located on a series of small, low knolls, bounded on the northeast and west by Finger Creek and by scrub growth and sandstone outcrops on the south (fig. 59). The area of occupation is approximately 1 acre in extent, and there seems to be a slightly greater concentration of material at the west end of the site (fig. 64). The site area has apparently been under cultivation for some time, and no surface features were visible.

The topsoil layer, a dark, sandy loam, is from 0.3 to 0.4 foot in depth (pl. 56, a). Beneath this is a lighter-colored soil, perhaps an old erosion surface, of light-brown to yellow soil, probably derived from sandstone, which is from 1.5 to 2.0 feet in depth. A hard clay is found below this, with sandstone blocks at the top. There is evidence of plow disturbance to a depth of 0.3 foot.

EXCAVATIONS

A test trench was laid out in the area of greatest surface concentration. This trench was 20 feet long and 5 feet wide, divided into four 5-foot squares. Later, following out the area of surface concentration, two additional squares were excavated to the east of this trench and adjoining it.

Heavy orange-buff potsherds, projectile points, and chips were recovered from the surface to a depth of 0.5 foot, where they thinned out and disappeared. No cultural stratification was found at the site.

SPECIMEN DESCRIPTIONS

Rim sherds.—Seven rim sherds were recovered at the site. They represent at least four different vessels. All have been assigned to the Geneseo Plain type, although they differ slightly in color and seem to be, on the average, slightly thicker than those described by Wedel. Tempering material consists of large sand particles, ranging from 1 to 3 mm. in diameter. Hardness varies between 3.5 (celestite) and 4 (fluorite). The core color is buff to slate-gray, the exteriors orange buff to light gray or brown. There are occasional firing clouds. Sur-

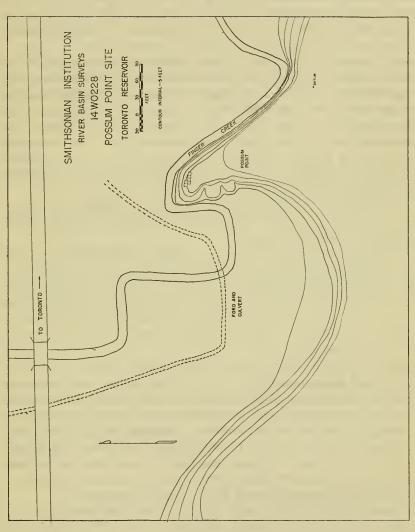


FIGURE 64.—Plan of site 14W0228, showing excavations.

faces are generally smooth. A few sherds show evidence of having been wiped with grass before firing.

Rims are straight or slightly flaring. The lip is usually rounded, but in one example is flattened. Shallow, vertical indentations are present on the outer lip of five of the sherds (pl. 56, g, h, j, k); the other two are undecorated (p. 56, i). One of the plain sherds tapers from a thickness of only 4 mm. at the lip to a thickness of 10 mm. at a point 50 mm. below the lip. The others have a more-or-less uniform thickness of from 7 to 9 mm.

Body sherds.—A total of 55 body sherds was recovered, all either on the surface or in the 0-foot to 0.5-foot level. In thickness they range from 6 to 15 mm., averaging about 9 mm. It is likely that the thicker sherds are from the bottoms of the vessels. All but one of these sherds are undecorated. The decorated sherd displays two horizontal bands, 25 mm. apart, on its outer surface. The decoration consists of a shallow incised, herringbone pattern. An identical decoration is found on a sherd of the Neosho Focus of Oklahoma figured by Bell and Baerreis (1951, pl. 13, 1).

Projectile points.—Four projectile points were found at the site. Three of these are in the "large point" tradition, while the fourth is a small "late horizon" form.

The only complete large point is a rather blunt specimen (pl. 56, d). The stem is of the expanding type and has a convex base. It is 49 mm. long, with a maximum width of 34 mm. and a maximum thickness of 8 mm. It is made of cream-colored chert. Another of the large points (pl. 56, e), complete except for the tip, is in the same style, though not as blunt. It has a maximum width of 33 mm. and a maximum thickness of 7 mm. When complete, it was probably about 60 mm. long. This point is made of gray Flint Hills chert. The third large point lacks most of the stem (pl. 56, e), but enough remains to indicate that it was of the same type as the preceding ones. It has a maximum width of 24 mm., a maximum thickness of 7 mm., and was probably 35 mm. long when complete. It is made of light-gray chert.

The small point (pl. 56, b) is triangular, unnotched, and slightly concave at the base. It is 29 mm. long, 13 mm. wide at the base, and has a maximum thickness of 3 mm. Its material is the same cream-colored chert as the first large point described above.

Blade.—The base of a long, chipped blade was recovered. It is made of a pinkish-gray chert. Its base is rounded, and the piece is worked on both sides. It has a maximum width of 41 mm., measured at the point of breakage, and a maximum thickness of 10 mm.

Abrader.—A fragment of a sandstone abrader was found on the surface of the site. Both ends are missing. It is rectangular in cross section and measures 35 mm. by 30 mm.

Cupstone.—A single cupstone, with pits on opposite faces, was found at the site. The material is a reddish sandstone. It is 104 mm. in length, with a maximum width of 63 mm. and an average thickness of 33 mm. The two pits measured 31 and 20 mm. in diameter and are pecked to depths of 8 and 4 mm., respectively (pl. 56, f).

Hoe.—A rather crude hoe, made of Cottonwood limestone, was recovered. It is flat on one surface, rounded on the other, and has been sharpened at one end. It is 154 mm. in length, 70 mm. in width, and has a maximum thickness of 24 mm.

Flake.—A very large gray chert flake was found on the surface of the site. One edge shows some secondary chipping, and perhaps the piece served as a scraper. It is 94 mm. long, has a maximum width of 77 mm., and a maximum thickness of 23 mm.

CULTURAL AFFILIATIONS

Heavy orange-buff potsherds and small triangular projectile points identify this site with the Great Bend Aspect, previously designated the Paint Creek Culture, and hitherto known only from central Kansas (Wedel, 1940, pp. 332–334; 1942, p. 10; 1949, pp. 86–90; Smith, 1949, pp. 292–300). As noted earlier in this paper, this may represent the late prehistoric and early historic Wichita tribe. Apparently very closely related is the Neosho Focus of northeastern Oklahoma (Bell and Baerreis, 1951, pp. 71–75). Possibly a second and much earlier Woodland or Archaic Component is represented by the large expanding-stem projectile points found at the site.

SITE 14GR210

This site is located on a slight rise on the south side of Walnut Creek, one of the main tributaries of the Verdigris in this area (fig. 59). The area of occupation is quite extensive, measuring approximately 1,000 feet in length (NW-SE) by 300 feet in width (NE-SW). The site was under cultivation in 1957 and has been for a number of years (pl. 57, a).

EXCAVATIONS

The site was tested by means of four 5-foot-square test pits, which were placed in areas of greatest surface concentration (fig. 65). The first two of these were excavated to a depth of 3.0 feet, the other two to a depth of 2.5 feet. Results were disappointing. The only artifact recovered from any of these pits was a fragmentary projectile point in the 0-foot to 0.5-foot level of test pit 2. The fill was a thin layer of clay-loam topsoil which graded into a heavy clay at depths varying from 0.3 to 0.7 foot.

SPECIMEN DESCRIPTIONS

Projectile points.—A total of 13 projectile points sufficiently complete to permit classification and fragments of 18 others were recovered. The more complete specimens fall into three styles, two of the "large point" tradition and one of the "small point" tradition.

The first style is represented by two points, one of which is complete (pl. 57, c, h). These points have contracting stems and are quite thick. The complete specimen is 61 mm. in length. Maximum widths of the points are 25 and 27 mm., and their maximum thicknesses 12 and 9 mm. Both are made of gray Flint Hills chert.

The second style is represented by nine fragmentary specimens (pl. 57, d, g). These points have expanding stems and pronounced, sometimes barbed, shoulders. Three of the points have convex bases, two have straight bases, and two have concave bases. The bases are missing from the remaining examples. Lengths of the two nearly complete specimens are 40 and 30 mm., widths 28 and 24 mm., and maximum thicknesses 7 and 4 mm., respectively. One of the fragments represents a point much larger than the rest, perhaps a knife or spearpoint rather than a projectile point (pl. 57, i). It is 43 mm. in width and probably measured at least 95 mm. in length when complete. Materials are white, tan, pink, and gray cherts. The large point is of gray Flint Hills chert.

The third point style is represented by only two specimens (pl. 57, e, f). Both have expanding stems with serrated edges. The complete specimen measures 23 mm. in length, and is 12 mm. wide at the base, with a maximum thickness of 4 mm. It is made of tan chert. The second specimen, a fragment, is 2 mm. thick. It is of gray Flint Hills chert. As noted elsewhere in this paper, points of this style have been recovered in Plains Woodland sites in Nebraska and Kansas.

Blades.—Fragments of eight blades were recovered. Although none is sufficiently complete to indicate the style, it is possible that they may have been pyriform in shape. White, cream-colored, tan, and gray Flint Hills cherts are the materials.

Knife.—One nearly complete beveled knife was recovered (pl. 57, b). It is straight along one edge, shouldered on the other. The straight edge has been chipped from one side of the piece, the shouldered edge from the other. The stem may have been utilized for hafting. The knife measures 54 mm. in length, has a maximum width of 17 mm., and a maximum thickness of 6 mm.

End scrapers.—Seven end scrapers were found. They are all of the familiar planoconvex type, with a rather abruptly chipped edge at the thick end. Three are of cream-colored chert and four are of gray Flint Hills chert. Lengths vary from 40 to 68 mm., widths from 28 to 48 mm., and maximum thicknesses from 11 to 16 mm.

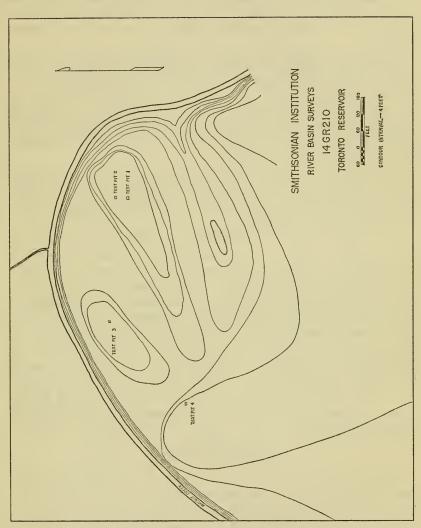


FIGURE 65.—Plan of site 14GR210, showing excavations.

Flake scrapers.—There were 18 objects of this sort found, all with one or more edges showing secondary chipping. They exhibit no uniformity in either size or shape. Materials are tan and gray Flint Hills cherts (pl. 57, j-l).

Chopper.—One heavy chopper, manufactured of gray Flint Hills chert with white inclusions, was found. It is pyriform in shape, and shows no evidence of secondary chipping. It measures 118 mm. in length and has a maximum width of 65 mm. and a maximum thickness of 35 mm.

Manos.—Seven manos were found at the site (pl. 57, m). All are made of local sandstone. Six have two abrading surfaces, the remaining specimen only one. The bifacial specimens are subrectangular in shape, while the unifacial specimen is loaf shaped. Lengths of the complete specimens vary from 15 to 83 mm., widths from 76 to 104 mm., and thicknesses from 39 to 50 mm. The unifacial specimen has a maximum thickness of 83 mm.

Hammerstones.—Three hammerstones, two made from river pebbles and one from gray Flint Hills chert, were recovered. All are of a size to fit conveniently in the hand, and all show evidence of battering on at least two surfaces.

Unidentified objects.—Two unidentified objects may be manos or abrading tools. Both are made of Cottonwood limestone. One is rectangular when viewed from above, with the outline of a parallelogram when viewed from the side. It is 148 mm. in length, 75 mm. in width, and 23 mm. thick. The other piece is wedge shaped if viewed from the side, ovoid if viewed from above. It has a sharp edge at one end, perhaps used for cutting. It measures 87 mm. in length and 73 mm. in width, and has a maximum thickness of 22 mm.

Hematite.—Two pieces of soft hematite show evidence of having been rubbed to produce paint. The smaller of the two pieces has been rubbed on three surfaces. The pieces measure 62 and 31 mm. in length, 52 and 30 mm. in width, and 29 and 9 mm. in maximum thickness, respectively.

CULTURAL AFFILIATION

Artifacts recovered from the site suggest that it was occupied during the Archaic period. Projectile points and blade fragments from 14GR210 bear a closer resemblance to artifacts of the Archaic of the Southeast than to those of a corresponding time period further north and west in the Plains.

SITE 14GR216

This is a rather extensive site located on a slight rise on the west side of the Verdigris River (fig. 59). Brazell Creek flows into the Verdigris River just north of the site on the opposite side of the river. The area of occupation is approximately 1,000 feet in length (NW-SE) by 350 feet in width (NE-SW). There seems to be a greater concentration of artifacts at the northwest end of the site (fig. 66). Although the site has been plowed for some time, it is nevertheless quite rich in surface materials.

EXCAVATIONS

A trench 65 feet in length and 5 feet in width was run through the area of greatest surface concentration at the north end of the site. This was marked off into thirteen 5-foot squares. Near the center of this trench, part of a circular hearth was uncovered at a depth of 0.5 foot (pl. 58, α). The trench was then widened to 15 feet in this area in order to expose the remainder of the hearth and to locate possible post molds or other features. Although this widened section, 15 feet square, was shaved down to a depth of 2.5 feet, no additional features were discovered. The remainder of the trench was excavated to a depth of 1.5 feet. Since no cultural stratification could be found, material from the surface of the site has been grouped with that from the excavations for purposes of description.

FEATURES

Hearth.—At a depth of 0.5 foot from the surface, a circular hearth was discovered. It measured 2.0 feet in diameter and had a maximum depth of 0.3 foot at the center. The fill was white ash with occasional lumps of charcoal. Beneath the hearth was a lens of burned earth approximately 0.5 foot in thickness at the center and tapering to 0.2 or 0.3 foot at the outer perimeters. The hearth was lined with limestone slabs, some of which were set on edge, while others were laid flat.

Although flecks of charcoal and bits of burned earth appeared throughout the test trench at approximately the same level as the hearth, no additional features appeared. If this hearth was the central fireplace of a dwelling, the structure must have been of a rather temporary sort.

Associated with this hearth were three artifacts: a bone awl, a section of antler (possibly a flint-working tool), and a small bone bead. All of these objects seem to have been preserved by the ash of the hearth, and were the only objects of bone or antler secured at the site.

SPECIMEN DESCRIPTIONS

Rim sherds.—The three rim sherds recovered were apparently from vessels of Aksarben affiliation. They are tempered with fine grit.

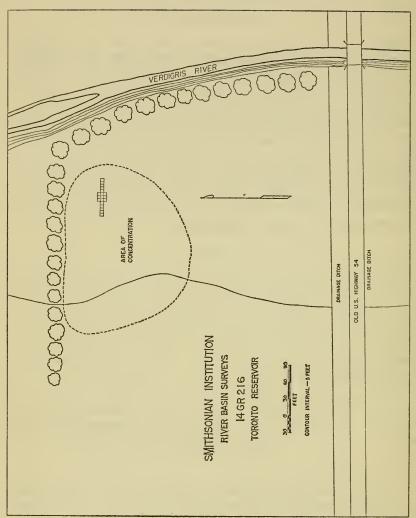


FIGURE 66.—Plan of site 14GR216, showing excavations.

The first is large enough to indicate that it came from a vessel with a constricted neck (pl. 58, o). The rim is straight, with a flat lip. The outer surface bears vertical cord impressions, the inner surface is smooth. The color is dark brown throughout. Thickness is 5 mm. at the lip and 8 mm. at the point of breakage. The second sherd is also straight, with a rounded lip (pl. 58, n). Decoration consists of a series of parallel, horizontal, incised lines and notching on the outside of the lip. The color is dark brown throughout. The lip thickness is 3 mm. and the lower rim thickness, at the point of breakage, is 4 mm. The third rim is too fragmentary to be described meaningfully. It is orange buff in color on its exterior surface, dark brown on the interior.

Body sherds.—A total of 15 body sherds was recovered. Five of these are much thicker than the rest and have coarser cord marking. They have been assigned to the Plains Woodland component of the site. The remainder are of the Aksarben Complex.

The five Woodland sherds are grit tempered, cord marked on the outer surface, and smooth on the inner surface. They have buff exteriors, with blue-gray interiors flecked with white specks. These specks are probably the remains of small fossils present in the clay at the time it was secured, although at first glance they might be taken for tempering material. Thicknesses of the sherds vary between 8 and 9 mm. (pl. 58, r, s).

The Aksarben sherds are also grit tempered. In color they vary from buff to black. They are cord marked on the outer surface, smooth on the inner. Thicknesses range from 4 to 7 mm. (pl. 58, p, q).

Projectile points.—Twenty-two projectile points sufficiently complete for classification were recovered at the site, as well as twenty-five unclassifiable fragments, such as tips or the section between the tip and the shoulders. Those points that are classifiable fall into five distinct styles.

The first style, represented by six specimens, is a large, thick form that has been assigned to the Archaic component of the site (pl. 58, b-d). Shoulders are not pronounced and stems are contracting, straight, or slightly convex at the base. The only complete specimen is of tan chert. It is 50 mm. long, with a maximum width of 23 mm. and a maximum thickness of 8 mm. Maximum widths of the other points are 19, 18, 21, 30, and 29 mm., and maximum thicknesses range between 7 and 9 mm. Materials are dark gray chert and tan chert.

Points of the second style, represented by 10 specimens, have straight stems and definite shoulders, sometimes terminating in barbs (pl. 58, e, f). The three complete specimens measure 58, 55, and 43 mm. in length. Maximum widths vary between 20 and 32

mm., and maximum thicknesses between 3 and 8 mm. Materials are white, tan, and gray cherts, and quartzite.

The third style is represented by a single complete specimen (pl. 58, g). This point has an expanding stem with a convex base. It is 47 mm. long, has a maximum width of 22 mm., and a maximum thickness of 7 mm. The material is tan chert.

The fourth style is represented by two specimens, one of which is incomplete (pl. 58, h, i). These points are small, with expanding stems and either straight or convex bases. The incomplete specimen has a serrated blade. Length of the complete point is 20 mm., and its maximum width 11 mm. The serrated point is 9 mm. wide. Both points have maximum thicknesses of 3 mm. Materials are gray Flint Hills chert and tan chert. These two points may, with some assurance, be assigned to the Plains Woodland component of the site, and suggest an identity with the Keith Focus (Marvin F. Kivett, personal communication, 1957).

The fifth style, represented by three specimens, is the "late horizon" triangular form (pl. 58, j-l). Two of the points are unnotched, while a third, probably a reworked specimen, has four side notches, two to a side, plus a basal notch. Length of the only complete unnotched point is 16 mm., and its maximum width is 9 mm. It is 2 mm. thick. The incomplete unnotched point is 15 mm. wide at the base and 4 mm. thick. The notched specimen is 14 mm. long, 16 mm. wide at the base, and 2 mm. thick. Materials of these points are tan and gray

cherts.

Spatulate object.—This small object, which may be a knife, is manufactured of gray Flint Hills chert. The base is rounded, but the exact shape of the complete specimen is not known, since a large portion of the tip is missing. It is very neatly flaked, has a maximum width of 17 mm. and a maximum thickness of 3 mm.

Blades.—Portions of 14 blades were recovered. Judging from the larger fragments, they were pyriform in shape. Maximum widths range between 26 and 37 mm., thicknesses between 9 and 15 mm. Materials are cream-colored, tan, and gray Flint Hills cherts (pl. 58, v).

Turtleback scrapers.—Four objects of this sort were recovered. Two are flat on one side and rounded by chipping on the upper surface. The other two have been chipped on both faces, but are much flatter on one face than on the other. The first specimen measures 54 mm. in length, has a maximum width of 30 mm., and a maximum thickness of 12 mm. The second (pl. 58, u), a fragment from one end of a scraper, has a maximum width of 18 mm. and a maximum thickness of 7 mm. They are of tan and cream-colored cherts, respectively. The larger of the bifacial specimens is 50 mm. in length, 41 mm. in

width, and has a maximum thickness of 20 mm. It is manufactured of gray-brown chert. The smaller specimen is 68 mm. in length, 26 mm. in width, and has a maximum thickness of 16 mm. It is of tanchert.

Flake scrapers.—Fourteen artifacts of this description were found at the site. They are distinguished by one or more edges that show secondary chipping. There seems to be no uniformity in size or shape. Materials employed are tan and gray chert and, in one instance, red jasper.

Choppers.—Eight specimens assigned to this category were recovered at the site. Six are of tan chert and two of gray Flint Hills material. They tend to be ovoid in shape and are worked to a cutting edge by percussion flaking on two faces. The largest specimen is 83 mm. in length and 20 mm. in maximum thickness. The smallest is 50 mm. long and has a maximum thickness of 13 mm.

Celt.—One celt was recovered. It is made of Cottonwood limestone and measures 94 mm. in length, 52 mm. in width, and 17 mm. in thickness. The bit shows considerable wear.

Ax.—One chipped ax of Cottonwood limestone was recovered. It was apparently double-bitted originally, but one end has been broken off. The bit measures 97 mm. in width, the groove 74 mm. It has a maximum thickness of 31 mm. (pl. 58, w).

Pick.—The site yielded one pick, also made of Cottonwood limestone. The bit is slightly curved. The pick is 114 mm. in length, has a maximum width of 69 mm., and a maximum thickness of 35 mm.

Manos.—Seven manos were recovered, six of which were fragments. The fragments are all of sandstone. When complete, the sandstone manos were probably subrectangular in shape, with two smooth grinding surfaces. The only complete specimen is of Cottonwood limestone. It has the outline of a parallelogram when viewed from above. It is 133 mm. long, 59 mm. wide, and 23 mm. thick.

Cupstone.—A single cupstone was recovered (pl. 58, t). When complete it was apparently ovoid, with two smooth faces on opposite sides. In the center of each of these faces is a small depression. The piece measures 74 mm. in diameter and has an average thickness of 43 mm. The depressions are 22 and 27 mm. in diameter, and 3 and 4 mm. in depth.

Hammerstones.—Four battered hammerstones were recovered. Three are of tan jasper, one of reddish-brown jasper. They are of a size to fit conveniently in the hand and show no evidence of artificial shaping.

Core.—Only one core was recovered. It is made of a rather granular gray chert.

Paint.—The site yielded two paint stones. One is yellow limonite, the other reddish-brown hematite. Both have been rubbed and scratched to secure pigment. The limonite specimen is 32 mm. in length and the hematite specimen is 24 mm. in length.

Awl.—A single bone awl, worked from a deer metapodial, was recovered (pl. 58, m). It rested on the surface of the hearth, Feature

1. It is 74 mm. long and has a maximum width of 15 mm.

Flaking tool.—A section of antler, possibly a flaking tool, in a very poor state of preservation, was also found on top of the hearth. It measured 90 mm. in length and 15 mm. in diameter. The specimen crumbled when removal was attempted.

Bone bead.—A small tube of bird or small mammal bone was probably used as a bead. It is 15 mm. long and 3.5 mm. in diameter. This, too, was recovered in the hearth ash.

CULTURAL AFFILIATIONS

On the basis of typology, three components have been isolated at this site. In probable order of sequence, late to early, they are: Aksarben; Plains Woodland, perhaps the Keith Focus of the Orleans Aspect; and Archaic.

SUMMARY AND CONCLUSIONS

The archeological investigations at the 10 sites in the Toronto Reservoir area that have been reported in this paper reveal an aboriginal occupation of the locality beginning about 5000 B.C. and extending into the historic period. Although no Paleo-Indian material was recovered by the 1957 party, the presence of many Paleo-Indian points in local collections indicates that worthwhile sites of this period may be present somewhere in the vicinity.

The materials described are attributable to five cultural groupings,

each on a slightly different time level, as follows:

(1) The Archaic Culture (ca. 5000 B.C. to 200 B.C.) is represented by site 14GR210 and by components at 14WO209, 14WO215, the Walleye Rockshelter (14WO222), the Dry Creek Rockshelter (14WO224), and 14GR216, with a possible representation at the Possum Point site (14WO228). At the multicomponent sites the Archaic components have been defined on admittedly shaky evidence, namely by the presence of large projectile points and by the absence of ceramic materials that would identify these points with the cultural complexes. At 14GR210, which appears to be predominantly Archaic, large unnotched and side-notched points are accompanied by large chipped blades, a beveled knife, end scrapers, flake scrapers, a chopper, and manos. The inventory suggests that these people were hunters and gatherers of

wild food. They lacked horticulture, as well as the bow and arrow and the ceramic arts.

- (2) The Kansas City Hopewell Culture (ca. 200 B.C.-A.D. 500) is represented by one site, 14WO203. It is identified by smoothed, grittempered pottery, decorated with dentate- and rocker-stamping, together with large, expanding-stem projectile points, drills, gravers, pyriform blades, and scrapers, flake scrapers, choppers, and pieces of worked hematite. The Kansas City Hopewell people practiced maize horticulture and made pottery but were apparently not familiar with the bow and arrow. Settlements were larger and more permanent than in Archaic times.
- (3) The Plains Woodland Culture (ca. A.D. 500–900) is represented at one multicomponent site, 14GR216, where it was identified by five thick, cord-marked, grit-tempered sherds. Small expanding-stem points, with or without serrated blades, are also assignable to this component of the site, and suggest specific identification with the Keith Focus of the Orleans Aspect. Since 14GR216 is an unstratified multicomponent site, it is not known which of the other artifacts recovered, such as scrapers, choppers, manos, etc., should be assigned to the Plains Woodland component.

The Plains Woodland people (representing the Middle Woodland time level) possessed a culture very similar to that of the Kansas City Hopewell groups, and the artifacts of the two cultures show a close relationship. Like the Hopewell people, the Plains Woodland groups practiced horticulture, supplementing the food secured in this manner with wild vegetal products and game. The presence of both large and small projectile points at Plains Woodland sites indicates that both the bow and arrow and the atlatl were in use.

- (4) Components assignable to the Aksarben Aspect (ca. A.D. 1100–1500) were present at five sites, all of which had more than one component. These are: 14WO209, 14WO215, the Walleye Rockshelter (14WO222), the Dry Creek Rockshelter (14WO224), and 14GR216. The Aksarben components are identified by moderately thin, cord-marked, grit-tempered pottery with either plain flaring or incised collared rims. At site 14GR216 the small side-notched and unnotched projectile points can be assigned to this component, which is the latest occupation present there. The Aksarben people, like the Kansas City Hopewell and Plains Woodland folk, were dependent upon hunting, gathering, and maize horticulture. Villages tended to be larger and more numerous than in earlier periods. Apparently the bow and arrow had completely supplanted the atlatl.
- (5) Four sites had components of the *Great Bend Aspect* (ca. AD. 1500-1700). These are: 14WO215; the Walleye Rockshelter (14WO 222); the Dry Creek Rockshelter (14WO224); and the Possum Point

site (14WO228), with a possible component at 14WO209. The Possum Point site seems to be predominantly Great Bend. Components of this aspect were identified by heavy, smooth, grit- or shell-tempered pottery, gray, buff, or orange-buff in color. The presence of this material in the Toronto Reservoir area extends the known distribution of this aspect, hitherto known only from sites in Central Kansas.

The Great Bend people continued the hunting, gathering, and maize horticulture subsistence pattern established and developed in the area by the earlier Kansas City Hopewell, Plains Woodland, and Aksarben people. Great Bend sites are apparently smaller than those of the Aksarben Aspect, a fact which may reflect the unstable conditions that seem to have characterized this area in early historic times.

APPENDIX
TABULATION OF TORONTO RESERVOIR SITES

Site	Type	Culture	Fieldwork
14GR1	Minor camp	?	Visited.
14GR2	Minor village	Upper Republican	Do.
14GR3	Minor camp	?	Do.
14GR201	do	?	Do.
14GR202	Village-camp	Kansas City Hopewell	Do.
	1	and Keith Focus.	
14GR203	Minor camp	?	Do.
14GR204	do	?	Do.
14GR205	Village	Upper Republican	Do.
14GR206	Minor camp	?	Do.
14GR207	do	?	Do.
14GR208	do	?	Do.
14GR209	Village (?)	?	Tested in 1956.
14GR210	Major camp	Archaic Complex	Tested in 1957.
14GR211	Minor camp	?	Visited.
14GR212	Village (?)	Kansas City Hopewell	Do.
14GR213	Minor camp	?	Do.
14GR214	do	?	Do.
14GR215	do	?	Do.
14GR216	Village-camp	Aksarben, Keith Focus, and Archaic.	Excavated in 1957.
14GR217	Minor camp	Keith Focus	Visited.
14GR218	do	?	Do.
14GR219	Minor village	Woodland and a later component.	Do.
14GR220	Minor camp	?	Do.
14GR221	do	Woodland	Do.
14WO1	do	do	Tested in 1956.
14WO2	do	?	Visited.
14WO201	do	?	Do.
14WO202	do	?	Do.

TABULATION OF TORONTO RESERVOIR SITES—Continued

Site	Type	Culture	Fieldwork	
14WO203	Village	Kansas City Hopewell	Tested in 1956 and 1957.	
14WO204	Rockshelter	?	Visited.	
14WO205	Minor camp	?	Do.	
14WO206	do	?	Do.	
14WO207	do	?	Do.	
14WO208	do	?	Do.	
14WO209	Village-camp	Aksarben and Archaic_	Tested in 1957.	
14WO210	Minor camp	?	Visited.	
14WO211	do	?	Do.	
14WO212	do	?	Do.	
14WO213	do	Woodland	Do.	
14WO214	do	?	Do.	
14WO215	Village-camp	Great Bend, Aksarben, and Archaic.	Tested in 1957.	
14WO216	Minor camp	?	Visited.	
14WO217	Mound	?	Do.	
14WO218	Minor camp	?	Do.	
14WO219	Village	?	Do.	
14WO220	Minor camp	?	Do.	
14WO221	do	?	Do.	
14WO222	Rockshelter	Historic, Great Bend, Aksarben, and Archaic.	Excavated in 1957.	
14WO223	Village	?	Visited.	
14WO224	Rockshelter	Historic, Great Bend, and Aksarben.	Excavated in 1957.	
14WO225	do	?	Recorded in 1957.	
14WO226	Petroglyph	?	Recorded in 1957.	
14WO227	Village	Aksarben	Visited.	
14WO228	do	Great Bend, Archaic	Tested in 1957.	
14WO229	Historic Fort	White (Fort Belmont)	Visited.	
14WO230	Minor camp	?	Do.	
14WO231	do	?	Do.	
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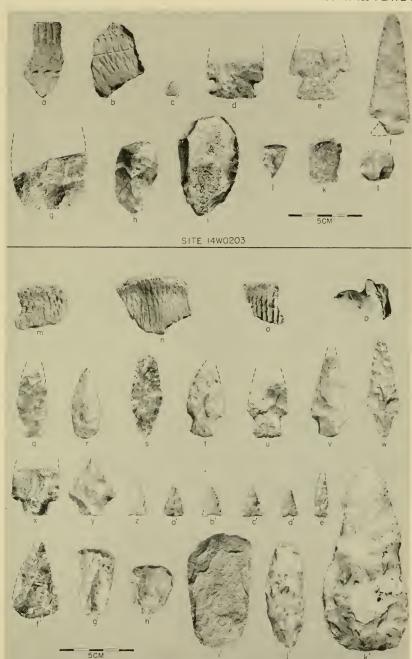
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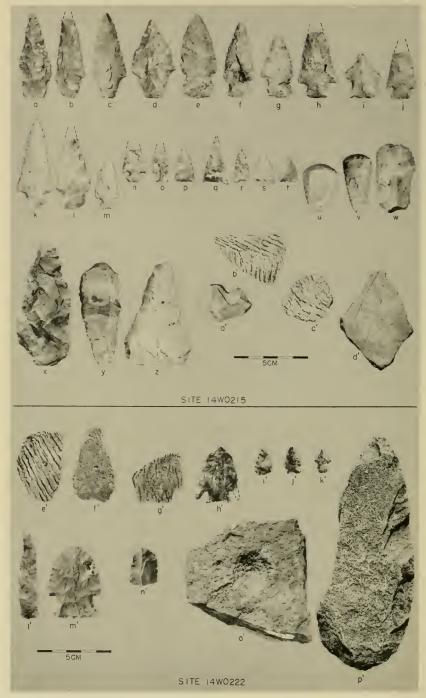
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Artifacts from site 14WO203, Toronto Reservoir, Kansas. a, b, Dentate-stamped rim sherds; e-f, projectile points; g, basal fragment of large blade; h-l, end scrapers. Artifacts from site 14WO209, Toronto Reservoir, Kansas. m-o, Cord-marked rim sherds; p, pottery vessel loop handle; q-e', projectile points; f', small blade; g', h', j', scrapers; i', h', chipped stone celts.

SITE 14W0209



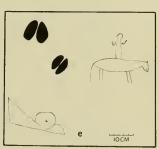
Artifacts from site 14WO215, Toronto Reservoir, Kansas. a-t, projectile points; u-w, end scrapers; x-z, blades; a', spokeshave; b'-d'; potsherds. Artifacts from Walleye Rockshelter (14WO222), Toronto Reservoir, Kansas. e'-g', potsherds; h'-k', projectile points; l', drill; m', projectile point; n', end scraper; o', cupstone or anvil; p', hoe.





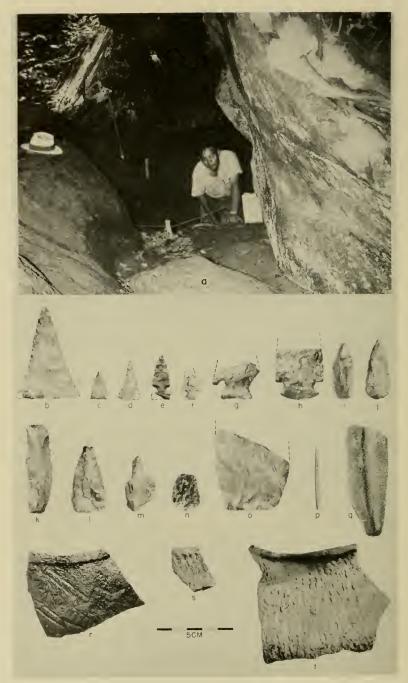








Petroglyphs from Walleye Rockshelter (14WO222), Toronto Reservoir, Kansas. a, b, Photograph and drawing of human figure; c-f, photograph and drawings of several petroglyphs of human figures. f, Like the others, this is incised and pecked into the stone, but it is also painted over in red.



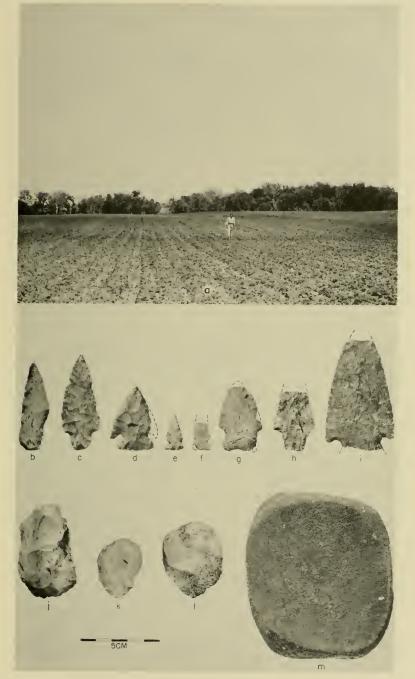
Dry Creek Rockshelter, site 14WO224, Toronto Reservoir, Kansas. *Upper*, view of excavator at work in Rockshelter; a, "Harahey" blade. *Lower*, Artifacts from the Dry Creek Rockshelter. b-h, Projectile points; i-j and n, end scrapers; k, flake knife; l, o, blades; m, drill; p, bone needle; q, shaft smoother; r, iron kettle fragment; s-t, Aksarben rim sherds.



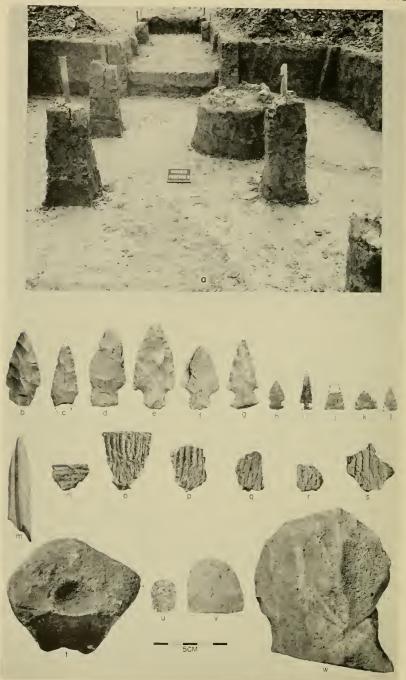
a, b, Photographs of petroglyphs on large roof rock at the Dry Creek Rockshelter (14WO224); c, petroglyph at the Outlaw Rockshelter (14WO225); d e photograph and drawing of "Little-Water-Man" petroglyph at site 14WO226



Possum Point site (14WO228) Toronto Reservoir, Kansas. a, Initial excavations underway; b-e, projectile points; f, cupstone; g-k, rim sherds.



Site 14GR210, Toronto Reservoir, Kansas. a, View of site; b, knife; c-i, projectile points; j-l, flake scrapers; m, mano.



Site 14GR216, Toronto Reservoir, Kansas. a, View of a portion of the excavated area showing hearth in place in right center; b-l, projectile points; m, bone awl; n-s, potsherds; t, cupstones; u, scraper; v, blade; w, ax.

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