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Archives of Archaeology
No. 1

A REPORT ON A BLUFF SHELTER IN NORTHEASTERN OKLAHOMA (DI–47)

David A. Baerreis
and
Joan E. Freeman

With an Appendix on Plant Material by
John T. Curtis
and an Appendix on Skeletal Material by
Aaron Elkins

1959

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PREFACE

This report on D1-47, a bluff shelter in northeastern Oklahoma, is one of a series of reports on sites in Delaware County currently being prepared by the staff and graduate students of the Department of Anthropology, University of Wisconsin. An extensive series of sites were excavated between 1937 and 1940 by means of a Work Projects Administration archaeological program sponsored by the University of Oklahoma prior to the inundation of much of the river valley land by the construction of a dam on Grand River. Cultural remains, human skeletal material and evidence concerning the nature of the fauna and flora were recovered from about 75 sites in a limited sector of the Grand and Elk Rivers. The lack of a provision in the original WPA program for concurrent analysis of the archaeological materials and the disruption caused by the onset of World War II resulted in the fact that only a few reports were published on this extensive body of data. The excavated materials, still largely uncataloged, have rested upon the shelves of the storage rooms of the Stovall Museum of the University of Oklahoma and as a weight upon the conscience of at least one of the archaeologists involved in the original excavations. The artifactual materials represent an extremely significant body of data, recovered at the cost of many thousands of dollars of Federal funds, yet they are data that will decrease in value as time passes. The sites were excavated under considerable time pressure with the result that field notes are not as extensive as might be desired. If errors in the interpretation of the material have been committed, we hope there is still time for them to be corrected, but certainly this cannot be done twenty years from now.

The nature and availability of this large body of data from Delaware County suggested that it could be used as a vehicle for the investigation of the interrelations between biological and cultural change within this

restricted area of eastern Oklahoma. Preliminary appraisals of the cultural data indicate a shift from a hunting-gathering economy to one having primary dependence upon maize agriculture as well as a shift in the importance of shell fish, small mammals, large mammals (bison), etc., in the diet of the resident populations. The impact of such dietary shifts upon the biological characteristics of the human population was thought to be of importance in an analysis of one aspect of micro-evolution in a human population. In view of this, and a series of collateral problems, application was made to the National Science Foundation for funds to aid in the analysis of the material by David A. Baerreis and William S. Laughlin of the Department of Anthropology, University of Wisconsin and William G. Reeder of the Department of Zoology of the same institution. Generous support has been provided for a two year period which has been supplemented by funds from the Research Committee of the Graduate School, University of Wisconsin. Miss Joan E. Freeman has also been aided, during part of the period in which the analysis of D1-47 was conducted, by the Alice L. Beeman Fellowship granted by the American Association of University Women. Without this extensive aid, which is deeply appreciated, a project of this magnitude could not have been undertaken.

The generous assistance and cooperation of the staff members of the Stovall Museum of the University of Oklahoma and particularly of Dr. Robert E. Bell of the Department of Anthropology in loaning the specimens and packing them for shipment to Madison, has done much to further the progress of the work. Dr. John T. Curtis, Dr. Grant Cottam and Dr. Jonathan D. Sauer of the Department of Botany, University of Wisconsin, are our key resource in the identification of plant materials. Dr. Curtis has prepared the brief appendix on plant materials from D1-47 attached to this report.

The analysis of the skeletal material from D1-47 by Mr. Aaron Elkins, also attached as an appendix to this report, was prepared under the supervision of Dr. William S. Laughlin.

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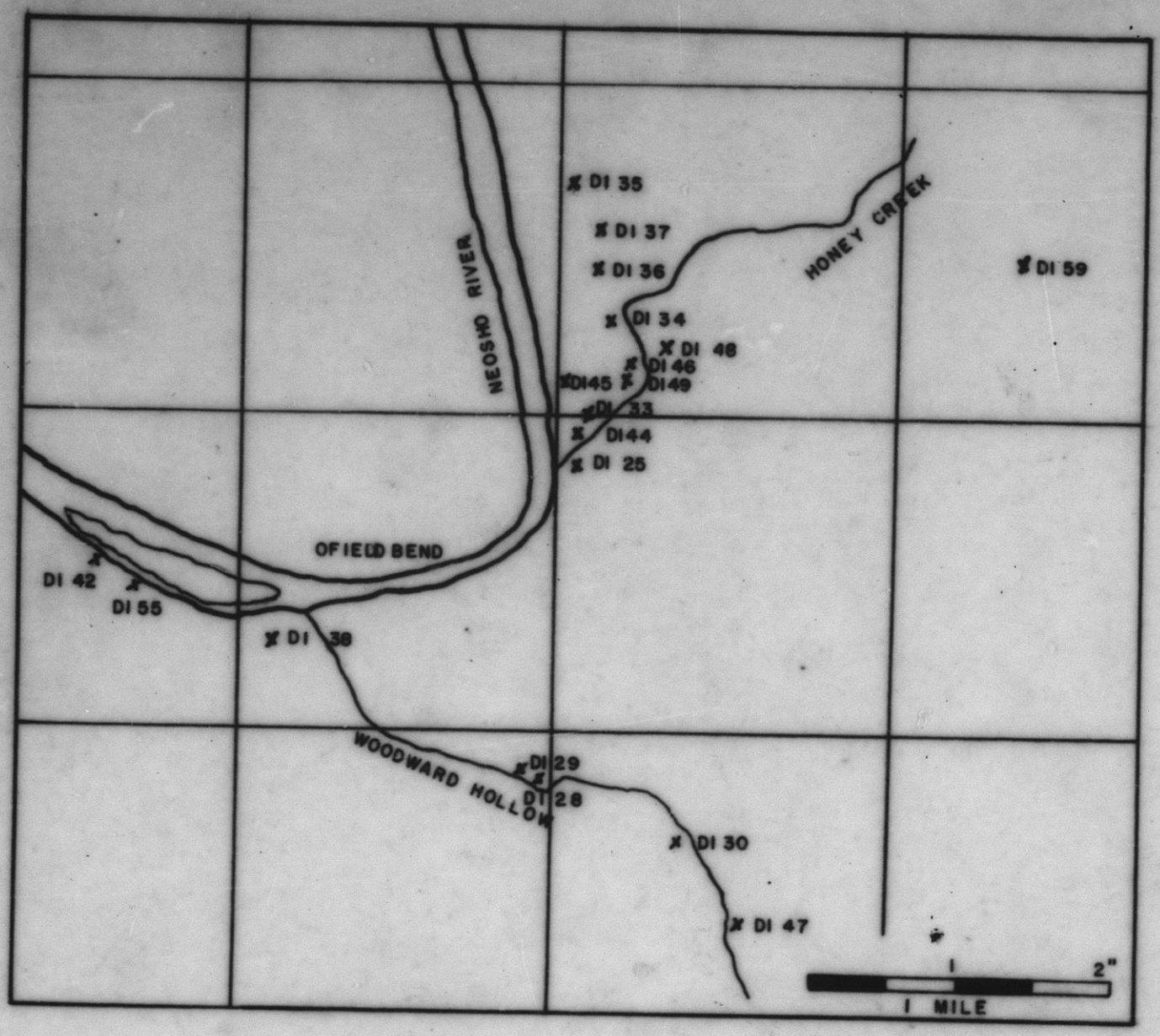
I. INTRODUCTION

Site Location

The bluff shelter, D1-47, was located on the east side of Woodward Hollow, a narrow valley in the highly dissected margin of the Ozark uplift which flanked the meandering Neosho River southwest of Grove in Delaware County, Oklahoma, prior to the construction of a dam which inundated this portion of the river. The stream in the hollow, only a few miles in length, had its origin in flat, prairie terrain at an elevation of about 905 feet above sea level and descended quickly to its juncture with Neosho River at Ofield Bend where its elevation was below 700 feet.

D1-47 is the most southeasterly of a group of four caves and bluff shelters located in the hollow, each of the other three sites (D1-28, D1-29 and D1-30) having generally similar cultural remains. At the mouth of the hollow was located D1-38 (D1EvIII) a stratified midden deposit containing a basal deposit of Archaic affiliation (Baerreis, 1951:7-29) while the upper section of the deposit contained materials of Woodland and Neosho Focus affiliation. A similar sequence of cultures was found at two bluff shelters on the Neosho River (D1-42 and D1-55) located a short distance below the mouth of Woodward Hollow (Hall, 1951; Wittry, 1952; Baerreis, Wittry and Hall, 1956). A short distance to the northeast of this site concentration, was another series of sites located at the mouth of Honey Creek. These sites span a long occupation sequence from Archaic to late prehistoric times but complete details on individual sites are not yet published although a general summary has appeared (Bell and Baerreis, 1951). Of particular importance is the presence in this group of the largest Hopewellian villages in the county (Ibid: 27-33; Baerreis, 1954). The general location of the site area and the site distribution is shown in Map 1.



Map 1. Excavated sites in vicinity of D1-47.

Excavation Procedure

The rock shelter, facing the west side of Woodward Hollow, had a deposit over ninety feet in length and thirty feet in width. The grid system used for horizontal excavation control was established according to the usual procedure of the WPA program. Three alleys, labeled 0, 1, and 2, were oriented 35 degrees east of north to conform with the rear wall of the shelter. Stakes placed at ten foot intervals along each alley formed the basic grid of squares. The stakes were numbered, beginning at the south end of the shelter, by a combination of alley number (the north-south stakes) and row number (the east-west stakes), the row number being placed first. Thus the stakes in the westernmost row were numbered 0:1, 0:2, 0:3, 0:4, etc., and those in the next row 1:1, 1:2, 1:3, 1:4, etc. The number of the stake in the southwestern corner of the square was given as a designation of the square itself. The location of a feature was recorded by measuring north and east to the center of the feature from the stake in the southwest corner of the square.

Since the initial test pits inserted in the deposit failed to reveal evidence of stratification of a form that could be detected by soil zones of different color or texture, the deposit was excavated in arbitrary, horizontal four inch levels. The deposit in each four inch level was loosened with a trowel (or small pick where the soil was compacted) and shoveled into a screen with a one quarter inch mesh. All material from each square and four inch level was kept and bagged as a unit. All animal bone fragments, mussel shells and artifacts were saved and subsequently have been catalogued in connection with the present analysis and used in this study.

The surface of the deposit at the time of excavation was not level. The most nearly level section consisted of squares 2:1 through 2:6 and 1:1

through 1:6. As the depth of the deposit became evident, four additional squares (1:7, 1:8, 2:7, 2:8) were added on the north end of the grid to permit excavation of a section of the deposit of much greater elevation. At this point the height of the deposit was greater as a result of accumulation of debris from the top of the bluff since the overhang was not as great at this point as it was near the center of the shelter. Similarly, one additional square (2:1-South) was added at the south end of the shelter which had similar surface characteristics.

Toward the outer section of the deposit, an elevated ridge of earth (see Figure 1) conformed in position to the maximal extent of the overhang. The ridge clearly represented an accumulation of debris in large part built up by the fall of material from over the edge of the bluff. Beyond this ridge the deposit sloped sharply to the bottom of the valley floor many feet below. It seemed clear that this outer deposit could not be expected to contain horizontal strata that would reveal a cultural sequence because of the sharp dip to the deposit and the slides and disturbance that must have been of frequent occurrence in this area. Given the press of time involved in the local salvage archaeology, we would not have attempted to excavate this section of the deposit had it not become clear that the inner deposit exceeded several feet in thickness. In this situation the fall of material from the outer ridge could easily contaminate the inner squares. The grid of ten foot squares was therefore extended to the west and this series of squares numbered 0:1 through 0:8. In the excavation of this row the top 2.5 feet of the deposit was removed as a unit and at deeper levels each four inch level was given the same level number as the corresponding square of the adjacent 1:1 through 1:8 squares. As was indicated above, it was not anticipated that the 0 row would provide controlled stratigraphic data.

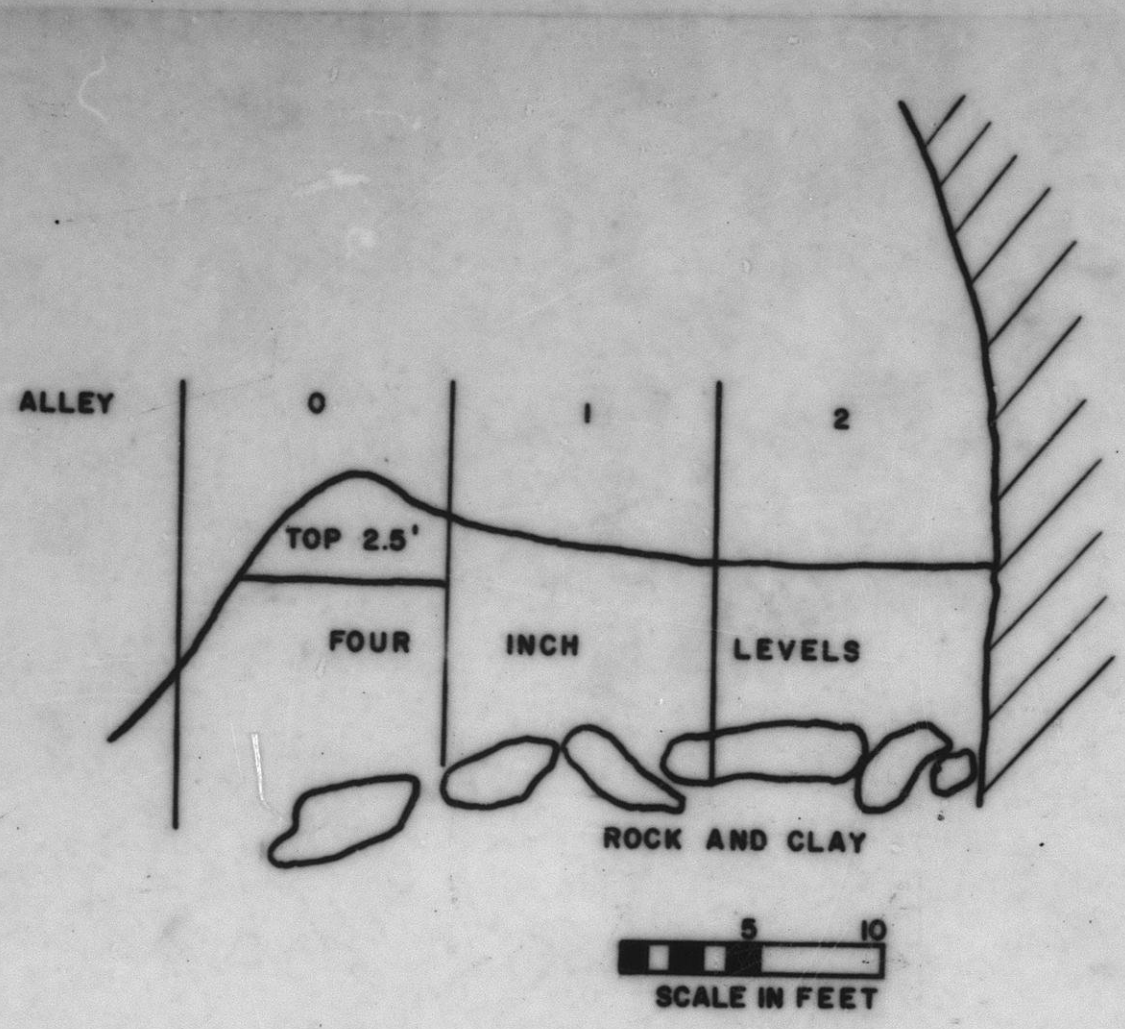


Figure 1. Schematic profile of site. The outer row of squares (0:1, 0:2, etc.) had the steeply sloping surface indicated to the left. The inner row of squares (2:1, 2:2, etc.) was adjacent to the bluff wall indicated by hatching. The deposit was excavated in four inch levels to the area of rock and clay except for the section labeled top 2.5' in the outer row.

Its excavation was a matter of convenience to give added precision to the remainder of the excavation. The placement and numbering of the squares is given in Figure 2.

In squares 1:1 and 1:2 (to illustrate the nature of the deposit in the central section of the deposit through squares 1:6 and 2:6), a deposit of generally homogenous composition was present through levels 1 to 17. The deposit was a uniformly dark color with occasional zones of ash concentration. Mixed with the dark soil and ash were angular rocks of varied sizes, evidently largely derived from the rock wall of the shelter, as well as bone and shell refuse and occasional artifactual material. Beginning at levels 18 and 19 in 1:1 and 1:2 large masses of rock were encountered. The deposit toward the rear wall of the shelter was slightly deeper, bone refuse and artifactual material continuing to level 19. Although excavations were continued to approximately two feet below the last evidence of occupation (to level 24) by removing smaller rocks and excavating between the larger ones, the remainder of the deposit was sterile.

In the extension of the grid to the south which permitted the excavation of an additional ten foot square, cultural material was confined to a proportionately thin mantle. Square 2:1 South had artifacts and bone refuse in limited quantities through level 7 but only a sterile rocky deposit below this point. The extension of the excavations on the north end resulted in the discovery of material to a depth of level 11 but again it was clear the occupation was largely confined to the central part of the shelter. The 0 row was in general sterile below level 12 although in limited areas (e.g., 0:6, levels 17-19) some material was found. These specimens would appear to have slid to deeper (horizontal) levels along the sloping talus front of the deposit and there is no assurance that any substantial age is indicated.

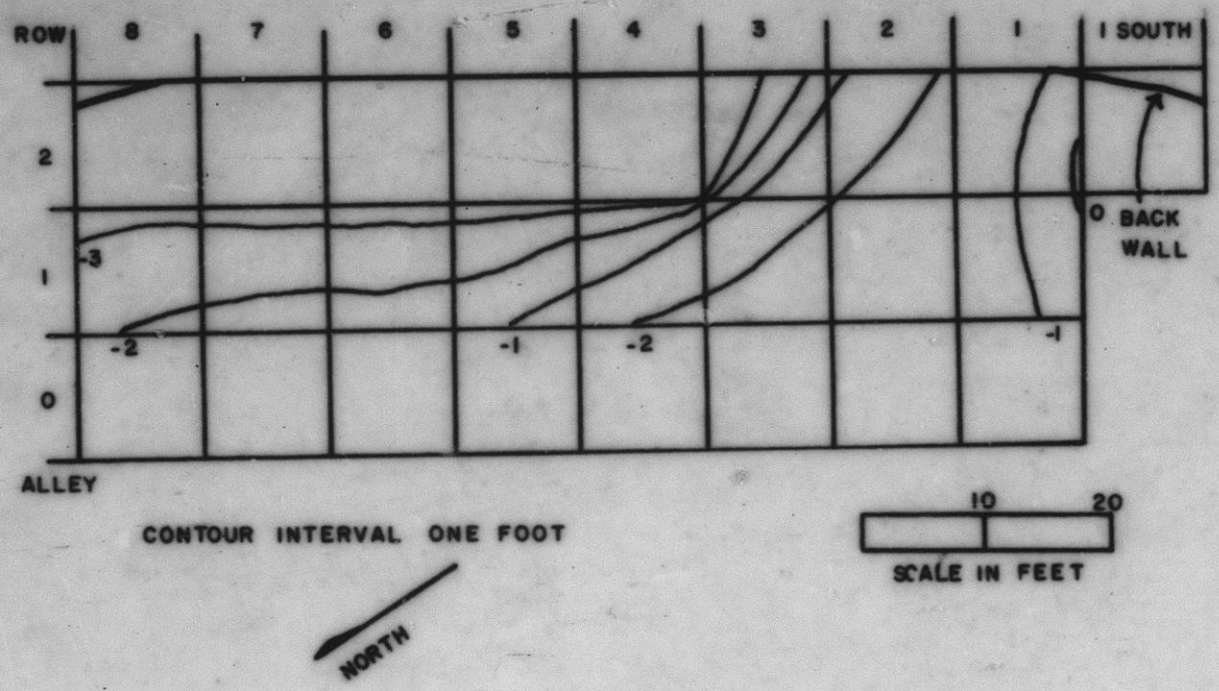


Figure 2. Grid of excavated squares at D1-47. Contours based on surface readings at stakes of two rows of inner squares are added to diagram.

It should be clear from the above discussion that a given level in one square need not correlate with the same numbered level in another square. Due to the irregularities in the deposit, it is possible that a complicated pattern of deposition or accumulation of the materials may have taken place. The absence of soil lines or other clues made it impossible to find natural zones to which the excavation might have conformed. In this situation it is essential to follow a pattern of analysis in which the sequence of deposits, or changing materials, in each square is first studied. Then on the basis of the cultural changes revealed, correlations between zones in different squares can be made.

Features Recorded in Excavation

Two burials and three ash beds were located in the course of the excavation of the shelter and given feature numbers. Each is described individually below.

Burial 1. This burial, located primarily in square 2:2, consisted of the primary inhumation of at least six individuals who were compressed into an area four by five feet in maximum dimensions at a depth of 3.85 feet below the surface. The center of the burial was 6.66 feet north and 1.83 feet east of stake 2:2. The compression of this large a number of individuals into such a small area is due to their having been tightly squeezed into a space between a large rock (Figure 3 shows this rock before it was removed from the area) and the wall of the overhang. As a result, individuals were partially overlapping upon each other in several instances and it was consequently difficult to determine the position of all bones. In addition, some bones appear to have been missing (rodent action?) and others may have been disturbed as the burials settled following upon the

decay of tissues. The specific burial position of each individual is described in terms of the numbered sequence assigned in the course of excavation.

Individual 1: A primary burial of an adult male, age about 30 (age and sex determinations are derived from the appendix describing the skeletal material by Mr. Aaron Elkins which follows this report). The individual was placed on the back with one arm folded across the chest and with the legs flexed to the right side. Many of the long bones were missing so that full details on burial position were not available. A small, mortar-like grinding basin was found one foot southwest of the center of the burial at the feet of both individuals 1 and 6. Underneath, in the hollow formed by the depression in the inverted grinding slab were numerous insect larvae, resembling a grub worm. Possibly these were placed in this position since they are too numerous to have accumulated here through their own activities.

Individual 2: A female, about 25 years of age, was also placed on the back with the right humerus parallel to the long axis of the body but with the right radius and ulna flexed and resting upon the pelvic area. The position of the left arm is not clear. The legs were slightly flexed at about a 30 degree angle to the left side of the body. The skull had become displaced from its normal position and rolled forward until it rested face downward. A small group of sherds was found nearly six inches below the level of the skull.

Individual 3: Also a female, about 23 years of age, this person may have been placed on the right side. As in the case of Individual 2, the skull had been displaced and rolled from its original position. Since the bones of the feet were beneath the pelvis of Individual 4, clearly this latter person had been placed on top of the group.

Individual 4: This person, a female aged about 20, rested upon the back, but since most of the long bones could not be clearly identified as

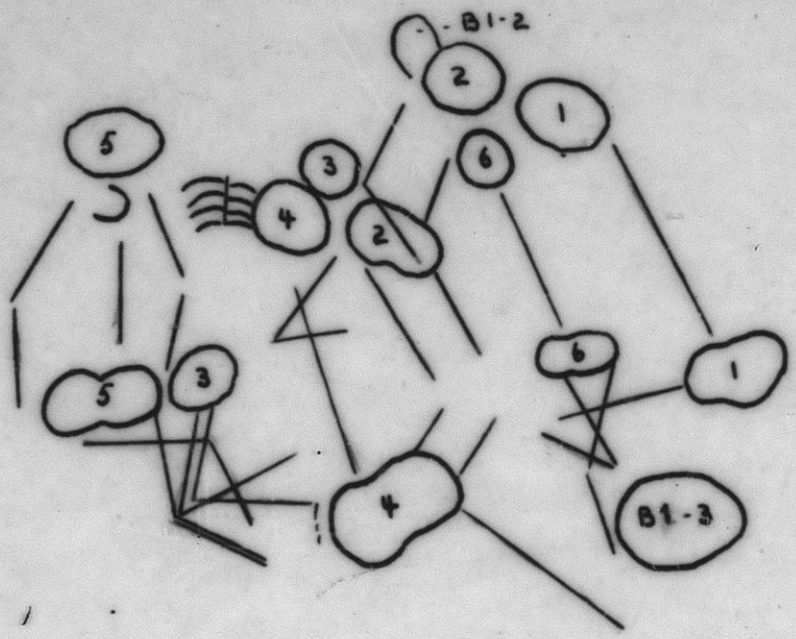


Figure 3. Sketch of burial positions in Burial 1, D1-47.

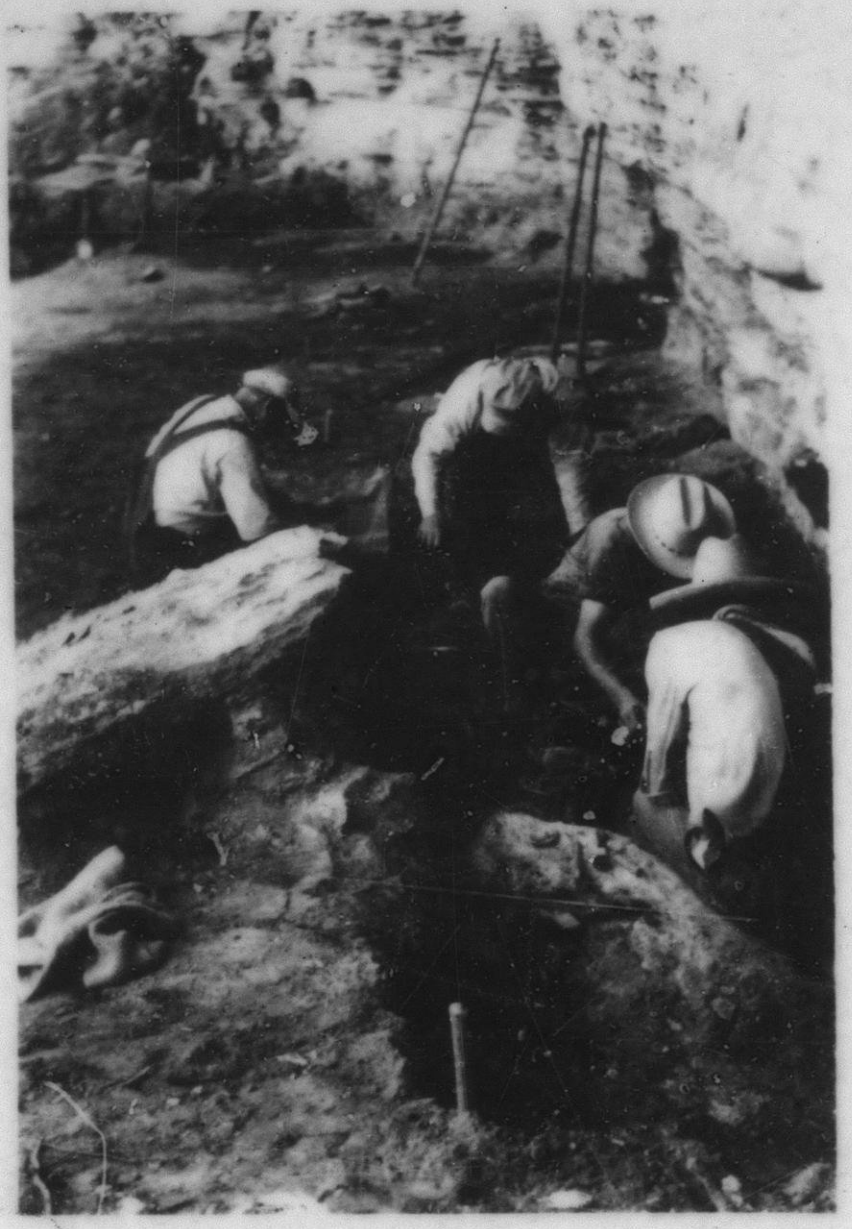


Figure 4. Initial excavations in vicinity of Burial 1. Large rock on left was subsequently removed.

Figure 4A. Burial 1 at site Di-47. Photograph is taken from North.

Figure 4B. Burial 1 at site D1-47. Close shot of burial from South.

the burial was uncovered, its position could not be recorded. The left arm appeared to be flexed across the chest. Individual 4 rested upon both individuals 2 and 3.

Individual 5: This person, a male between 21 and 30 years of age, was buried on the back with the arms extended along the side. The right leg was flexed across the left leg which was only slightly bent. The mandible had become disassociated from the skull and rested upon the right shoulder. The skull was on the left side, facing the north. A fragment of twill plaited matting rested upon the abdominal region.

Individual 6: A child, between 7 and 9 years of age, while buried on the back, had curiously contorted legs with the right leg tightly flexed and the left only slightly flexed but with both bent inward upon each other. Over the mandible of the infant, another mandible had been placed so that both were found fitting closely together.

A small triangular point was found at the right side of Individual 6 between it and the skull of Individual 3. This projectile point as well as the sherds previously mentioned in connection with Individual 2, may owe their presence to the abundance of such artifacts in the refuse deposits into which the burials were inserted rather than being an intentional grave offering.

The relative position of these individuals can perhaps be best grasped from the sketch (Figure 4). The varying positions may best be ascribed to the requirement of attempting to fit the series into a burial pit of limited size. The heads of four individuals were oriented to the west and one to the northwest.

Burial 2. This burial was also located in square 2:2, 6.66 feet North and 2.83 feet East of the 2:2 stake. It will be noted that this places it essentially in the same area as Burial 1 but it was 4.58 feet below the surface and consequently not discovered until the first burial had been removed. It

still, however, could have been a part of the same group interment. It consisted of the primary inhumation of an infant about one year in age. The child was placed on the right side with the limbs fully flexed, the head being oriented to the southwest. No grave goods were found in association with the burial.

Four ash or fire beds were also recorded in the deposit and are described below. Their presence and position are of interest in demonstrating the pattern and nature of occupation in the shelter.

Feature 1. This feature consisted of a small oval bed of charcoal and ash, primarily small and soft pieces of charcoal. The bed was 1.66 feet in maximum length (N-S direction) and 1.0 feet in maximum width (E-W direction). The vertical thickness was .41 feet and the center of the bed was 6.08 feet North and 1.16 feet West of stake 1:5. As in the case of the other fire beds, no stones or other materials outlined the bed. The top of the feature was .97 feet below the surface of the deposit.

Feature 2. The fire bed consisted of small, soft pieces of charcoal and ash with a large number of mussel shells mixed with the charcoal. The bed was roughly oval in outline and had a maximum length of 1.5 feet (E-W direction) and a maximum width of .8 feet (N-S direction). The vertical thickness was .33 feet and the center of the bed was 2.5 feet North and 1.0 feet East of stake 1:6. The top of the feature was .95 feet below the surface of the deposit.

Feature 3. The fire bed consisted again of small and soft pieces of charcoal and ash. The bed was roughly oval in outline with the maximum length 1.33 feet (E-W direction) and the maximum width 1.16 feet (N-S direction). The vertical thickness was .41 feet and the center of the bed was 6.16 feet North and 1.25 feet West of stake 1:5. The top of the feature was 1.45 feet below the surface of the deposit.

Figure 4 . Burial 2 at site D1-47.

Feature 4. The fire bed consisted of soft, fragile pieces of charcoal forming a roughly oval outline. The maximum length was 1.1 feet (N-S direction) and the maximum width .95 feet (E-W direction). The vertical thickness was .25 feet and the center of the bed was 1.66 feet North and .5 feet West of stake 1:6. The top of the feature was 1.73 feet below the surface of the deposit.

Additional concentrations of ash and charcoal, though not so clearly delimited in outlines, were noted in square 2:4, levels 9-11; 2:5, level 9; 1:2, level 14; and 1:4, level 13.

II. ARTIFACT DESCRIPTION

The artifact types described for D1-47 were initially studies as a part of a larger series from sites of varied cultural affiliation in Delaware County. It was assumed that types should be established that would be indicative of cultural change in the area and that to achieve this objective it would be necessary to test the validity of provisional sorting categories by plotting their distribution in time and space. A preliminary paper discussing the methodological approach has been published (Baerreis, Freeman and Wright, 1958).

While this was the basic operating procedure, it was also felt that the primary description of the artifacts in the site report should present the individual specimens in sufficient detail to permit a reclassification of the types should this ultimately prove necessary. Doubtless this will be the case, for even with preliminary testing of a substantial portion of our types the validity of some are still unresolved. Further, many forms appear in such a low frequency that they may well be imported specimens whose primary type description must be based upon a larger series in their parent area.

Projectile point types which are present in adequate numbers have been given names in conformity with current usage or if a projectile point type has already been named by workers in this area that name has been retained to designate the projectile points even though the actual frequency may be low. A procedural problem does arise in connection with named projectile point types from geographically distant areas where a form similar to a Delaware County specimen has been described and given a type name. Should, then, the local specimens be given the same type name? We have followed a school of thought which would maintain that the designation by a common type name implies an historical connection of some order and not simply a fortuitous resemblance in form. Ideally, it should be possible to demonstrate some sort of a connection in time or space by which the historical interrelatedness could be shown. Because of the paucity of distribution studies and the actual gaps in our knowledge this can not always be done. However, we have taken as a working assumption that projectile point types of southeastern Missouri or of eastern Texas are sufficiently close spatially that mutual influences with our area did occur. On the other hand, projectile point types have been established for Tennessee, to cite one instance, which may well be a part of the same stream of cultural influences present in eastern Oklahoma. The type, Kays Stemmed (Kneburg, 1956: 26), may be similar if not identical to a local variety designated Smith A, and Eva Basal Notched (Ibid, p. 24) may be comparable to the Marshall or Castroville points. Here, however, in view of the spatial gap between the two regions and the lack of sound demonstrations of cultural connections between the two areas, we have retained the separate names.

Projectile Points

Included in the projectile point descriptions are some large forms which may well have served as knives rather than the tips of darts or arrows. Where discontinuities in the size range are encountered that might reflect functional differences, these are indicated. It is felt, however, that a final decision in regard to a functional separation of knife and projectile point forms which differ only in size should be deferred until a larger series of measurable points is available.

All measurements were taken with sliding calipers and recorded to the nearest millimeter. Thickness and point length as recorded are maximum dimensions. Stem length was measured from the base to the junction of stem and blade. Where the shoulder is asymmetrical, the stem length recorded is the larger of the two dimensions. Blade length was taken from this last mentioned point to the tip of the blade. Blade width was measured as the maximum blade width and taken wherever it occurred on the blade. The weight of all intact projectile points was determined by the use of a beam scales and recorded to the closest tenth of a gram.

All of the projectile points were manufactured from chert. Since the chert was present in a variety of colors and to a lesser extent in slight differences in texture, it seemed obvious that if the variety of chert could be identified as to source it would provide a valuable clue as to which specimens might be imported from some distant area, rather than being a product of local manufacture. Further, a comparison of the materials from which projectile points and other varieties of chipped stone implements, such as scrapers or knives, were manufactured might reveal the operation of factors of cultural selection. The difficulty in carrying out such an analysis was primarily our lack of knowledge of the full range of variation

in local and regional chert types. We have therefore recorded only major color variants in the chert categories and hope that at some time in the future it will be possible to make a more systematic analysis of the material.

Gary Points

A proposed subdivision of the Gary Point into three lettered varieties was presented in the paper previously cited (Baerreis, Freeman and Wright: 1958) which modified the description in An Introductory Handbook of Texas Archaeology (Suhm, Krieger and Jelks, 1954: 430-1). The full range of these forms may be found there. We are here concerned only with the Gary points of site D1-47.

Gary A (Figure 5)

Only six points of this variety were recovered from site D1-47. Two of the points have only a very small portion of the tip missing. If the line of curvature of the blade were continued, an addition of 2 mm. would be sufficient to reconstruct the original length. In this, and in subsequent projectile point descriptions such additions to the length of the point have been made where needed, but in no instance has the length been reconstructed where it appears that more than a two millimeter section is broken from the point. All of the remaining points lack a larger section at the end of the blade, but classification was still possible on the basis of stem and shoulder form.

Form: The stem of these points contracts from the shoulder to a rather sharply pointed base or in one instance to a rounded base (# 301; Figure 5, e). (The number given is the catalog number of the specimen. It should be noted that other implements from the same square and level possess the same catalog number.) The contraction of the stem noted above

does not form a distinct shoulder area but rather produces a slight to pronounced concave region which merges gradually with the stem. The stem proper maintains a contraction to the base, one of the distinctive features of the Gary A variety. The blade outline varies from a markedly convex form (# 536; Figure 5, b) to slightly convex (# 626; Figure 5, c) or generally straight in the remaining specimens. Some asymmetry can be seen in the shoulder area (#301; Figure 5, e).

Technique: One point is manufactured primarily by percussion flaking (# 536; Figure 5, b) while the remainder bear pressure retouching that obscures some or all of the primary flake scars. On one specimen (# 124; Figure 5, d) the lateral edges of the stem are ground smooth. This feature is lacking on the remaining points.

Material: All of the points are made from chert, either entirely gray in color or mottled or banded with white, tan or pink.

Dimensions:

	f	Range	Mean
Maximum length . .	2	67 - 73	70.0 (mm.)
Maximum width . .	6	23 - 34	26.7 "
Thickness	6	5 - 13	8.0 "
Stem length . . .	6	15 - 21	18.3 "
Weight	2	7.7 - 23.5	15.6 (grams)

Note that the variation in frequency reflects the number of projectile points in the group from which the observation could be obtained.

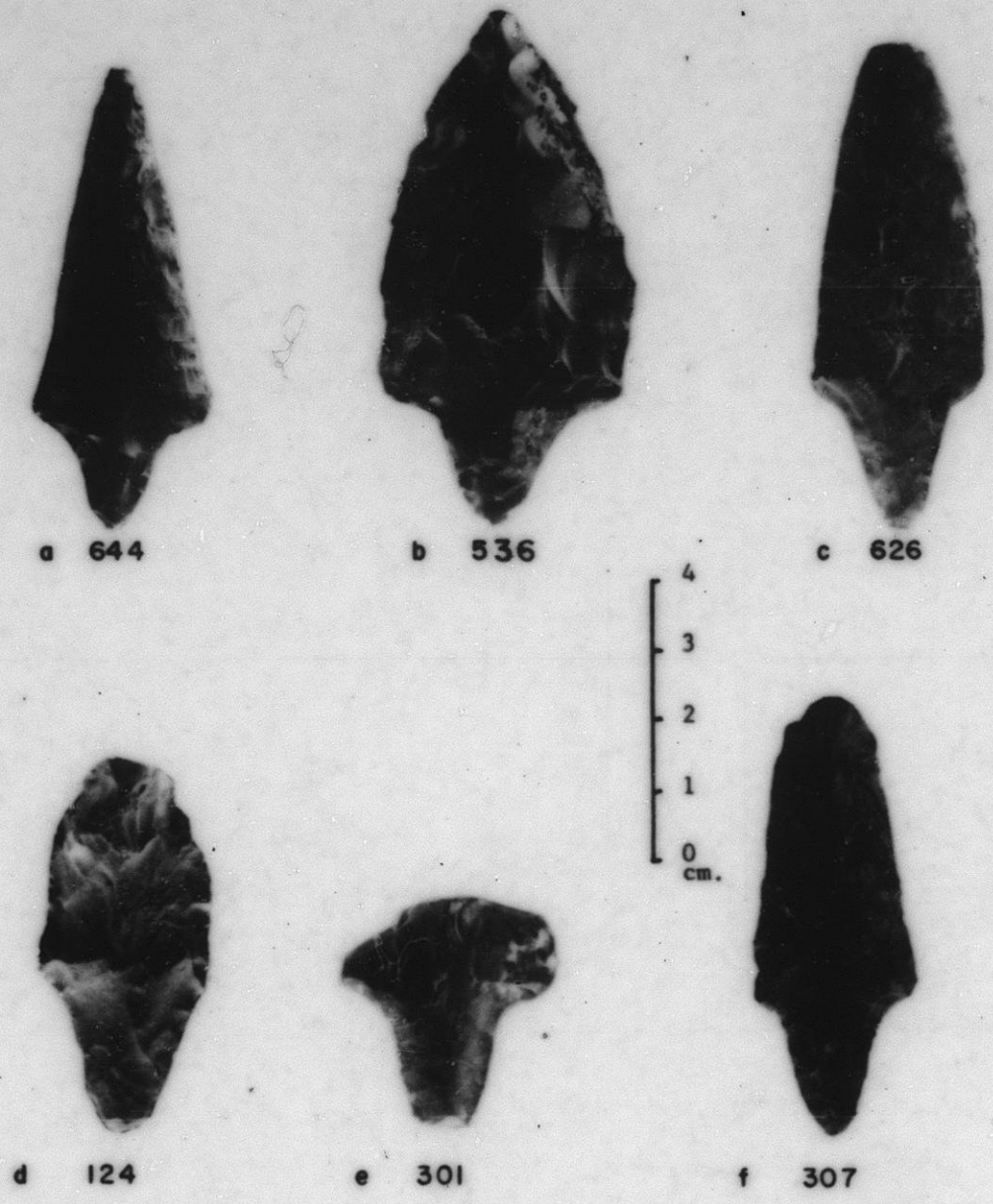


FIGURE 5. GARY A PROJECTILE POINTS.

#	Square	Level	Stem Grinding	Maximum Length	Maximum Width	Chert Color
644	2:8	2	No	67	25	Grey
124	1:3	4	Yes	--	23	Grey
301	2:5	7	No	--	30	Grey/white
307	2:2	11	No	--	23	Grey
536	1:4	13	No	73	34	Grey/brown
626	0:4	14	No	--	25	Grey/brown/red

Gary B (Figure 6, a - e)

This variety is represented by a series of five points, of which only a single point is unbroken.

Form: The stem of this variety of Gary point is broader and tapers less sharply to a rounded base. In this aspect # 530 (Figure 6, b) and # 536 (Figure 6, c) are somewhat less typical of the group. However, in addition, as we see in these same points, the shoulder area tends to be more sharply demarcated from the stem proper. This feature, while not universal, is also to be seen in # 14 (Figure 6, d) though a break at one shoulder obscures the distinctiveness of the area. A rounded base which merges imperceptibly with the stem sides is present on all points, another characteristic attribute of the variety. Blade outline is variable and includes straight forms (# 404; Figure 6, a and # 463; Figure 6, e) as well as slightly convex (# 563; Figure 6, c) to convex (# 14; Figure 6, d). In this latter point it should be noted that there is a slight increase in blade width above the shoulder area, the only point of the group possessing this feature. The asymmetrical form of the blade in # 530 (Figure 6, b) should doubtless be attributed to an attempt to resharpen the point following breakage or possibly to an attempt to produce a drill shaft. One projectile point, # 404 (Figure 6, a) has a very inconspicuous shoulder which approaches a variety designated Gary C (Baerreis,

Freeman and Wright, 1958: 69). The shoulder, however, is sufficiently developed to preclude classification in this variety although it could be seen as a transitional form.

Technique: All of the projectile points in this group show secondary pressure retouching although on some the primary flakes are still visible. No extensive lateral grinding of the stem is present although # 536 may exhibit this feature to a slight degree.

Material: Grey, banded grey or whitish chert was used in the manufacture of the points.

Dimensions:

	f	Range	Mean
Maximum Length. . .	1	82	82 (mm.)
Maximum Width . . .	5	26 - 32	30.0 "
Thickness	5	7 - 9	7.6 "
Stem Length	5	12 - 24	19.0 "
Weight.	1	14.0	14.0 (grams)

Individual Point Provenience and Associated Traits:

#	Square	Level	Maximum Length	Maximum Width	Chert Color
14	0:3	6	--	31	Grey
463	0:7	7	--	32	Grey
404	0:4	10	--	32	Mottled grey
530	1:3	12	--	29	Mottled grey
536	1:4	13	82	26	Mottled grey

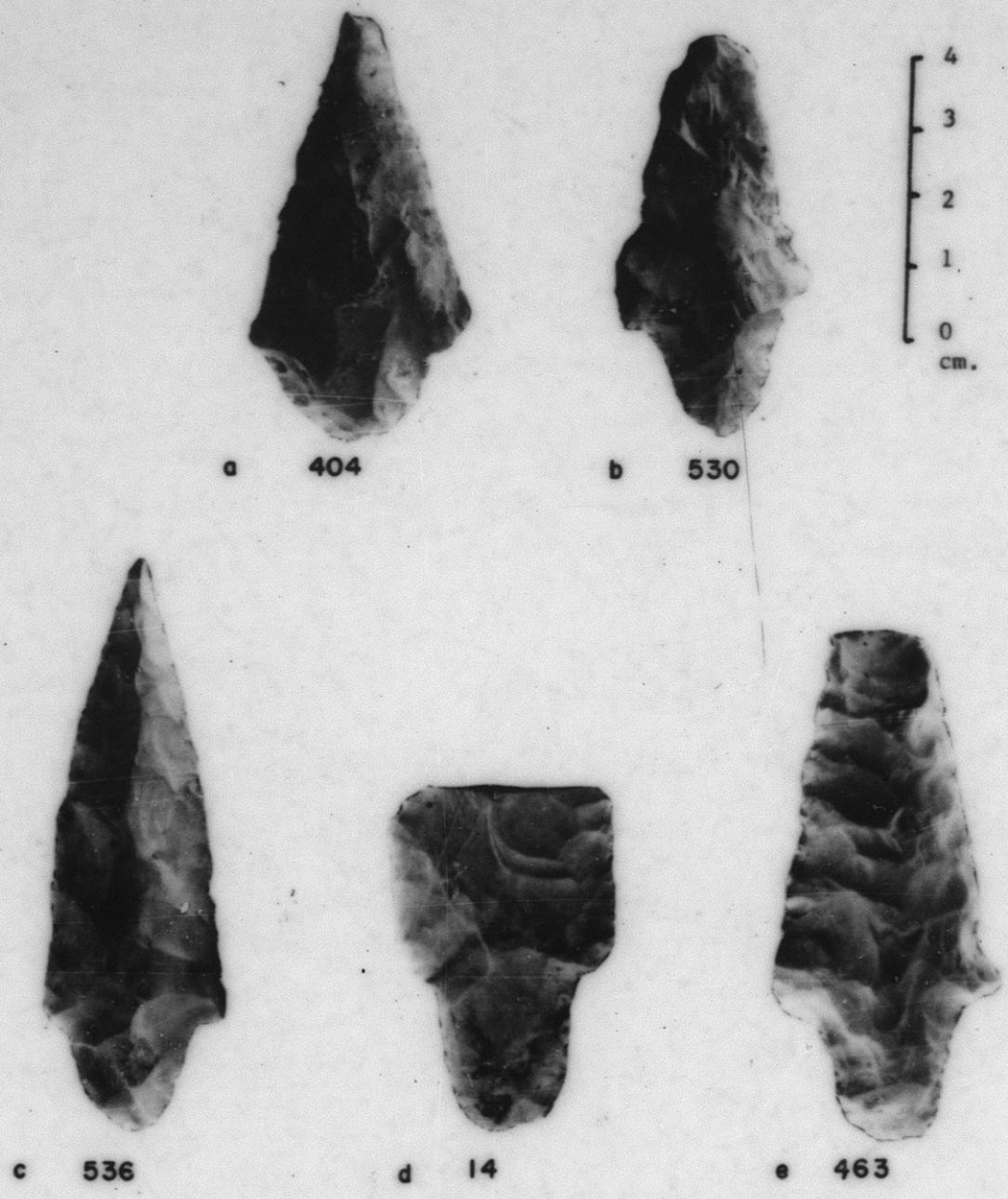


FIGURE 6. GARY B PROJECTILE POINTS.

Langtry Points

Langtry, like Gary, represents one of the established projectile point types of the general Caddoan area (Suhm, Krieger and Jelks, 1954: 438-9) for which a segregation into several varieties has been proposed (Baerreis, Freeman and Wright, 1958: 69-71). As with the Gary points, we are concerned with these varieties as they appear in this site.

Langtry A (Figure 7)

A total of seven points were placed in the Langtry A variety.

Form: Variety A of the Langtry point consists of those specimens on which there is a gradual contraction of the stem from the point of juncture of stem and blade to the base. The sweeping curve which forms the side of the stem does not permit the recognition of a distinct shoulder area which, by contrast, sets apart the Langtry B variety. The illustration of specimen # 225 (Figure 7, g) may suggest a Langtry B variety rather than the one under discussion but one shoulder is accentuated by a slight break. The Langtry points in general, as in these specific examples, are characterized by the possession of a sharply demarcated basal area. Blade form is variable and includes convex (5), recurved (1) and straight (1). The variability in shape may in part be due to a practice of resharpening a blade when the tip has been broken. Basal forms include straight (1) and slightly convex (1), but concave is by far the most popular (5).

Technique: While a secondary pressure retouch is used to shape all of the projectile points of this group, it should be noted that the blade largely retains the primary percussion flake scars. Four of the points possess lateral and basal grinding on the stem. It may be significant that this same group has a concave basal form.

Material: All of the points are made of varieties of chert, either white, grey, mottled grey or pink in color.

Dimensions:

	f	Range	Mean
Maximum Length. . .	3	56 - 73	65.0 (mm.)
Maximum Width . . .	6	24 - 33	29.7 "
Maximum Thickness .	7	6 - 8	7.4 "
Stem Length	7	15 - 22	18.1 "
Base Width.	6	11 - 18	14.2 "
Weight.	2	8.6 - 18.3	13.5 (grams)

It should be noted that while maximum width normally occurs at the shoulder area, in one point (# 242; Figure 7, a) it is located above this area. Weight was measured for only two points since one specimen for which maximum length was recorded (# 66; Figure 7, e) has a sizeable area missing from one side of the blade. The stem is from 1/3 to 1/5 of the total length, averaging about 1/4. The width is 1/2 to 1/3 of the total length, but more commonly 1/2.

Individual Point Provenience and Associated Traits:

#	Square	Level	Maximum Length	Maximum Width	Grinding	Chert Color
66	1:7	1	66	33	No	Mottled grey
242	2:2	6	73	29	Yes	Pink/grey
225	2:6	6	56	28	Yes	Mottled grey
308	2:4	9	--	24	Yes	Grey/white
521	1:5	11	--	--	No	Grey/white
537	1:2	14	--	31	Yes	Grey/white
515	1:2	18	--	33	Yes	Grey/white

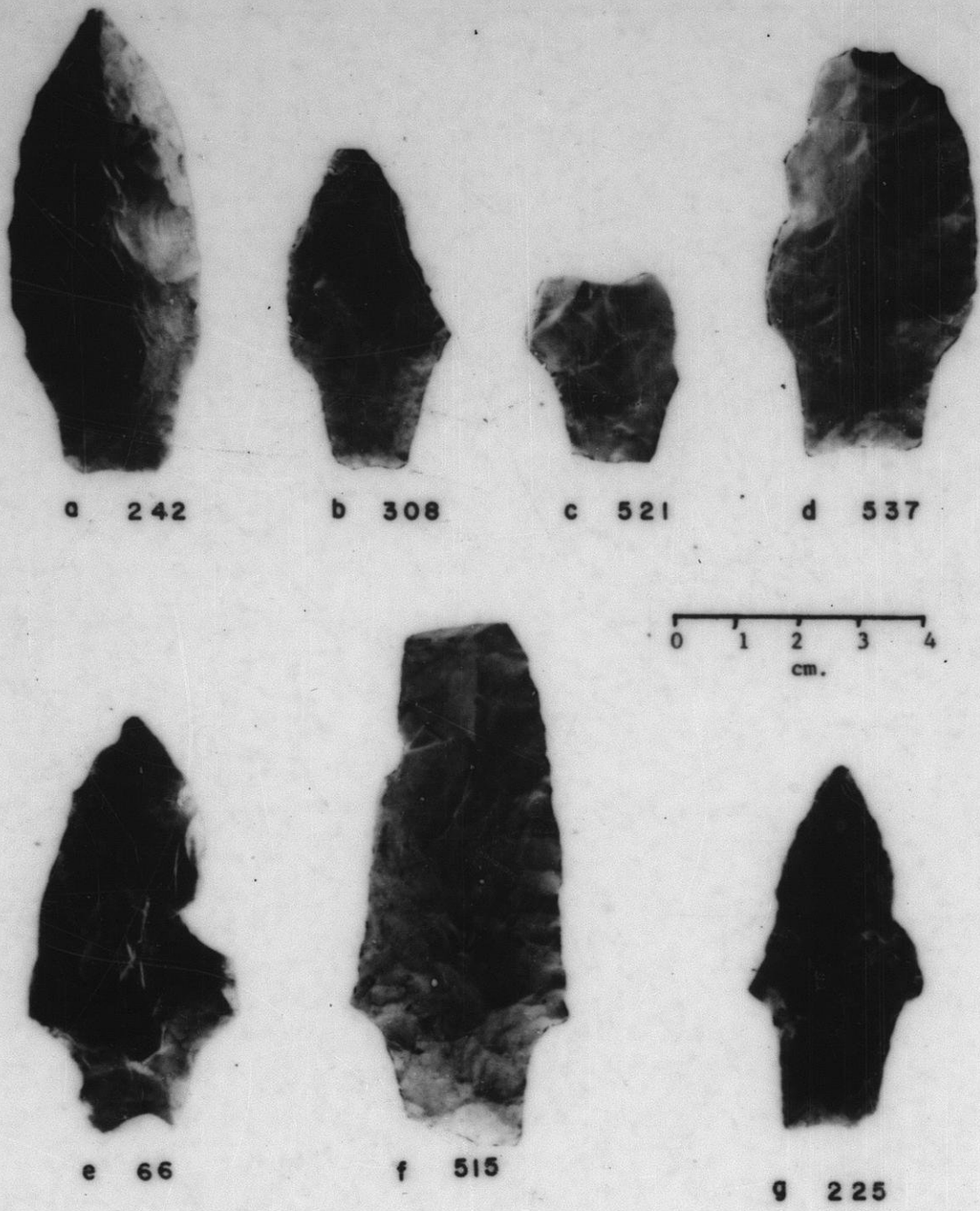


FIGURE 7. LANGTRY A PROJECTILE POINTS.

Langtry B (Figure 8)

This variety of Langtry point is characterized by the possession of a distinct shoulder area. While specimen # 592 (Figure 8, b) might appear to more closely resemble Langtry A, this is to be accounted for by recent fractures in the shoulder area. In all, three specimens of this variety were present at the site.

Form: The contracting stem on two of the Langtry B points (# 537; Figure 8, a and # 304; Figure 8, c) forms an obtuse angle with the blade while on the third point the shoulder area is short and inconspicuous. On the two nearly complete points, the sides of the blade are straight. The base may be classified as straight on one specimen (# 592) while a second (# 304) is irregularly slanted in relation to the long axis of the point. The basal form of the third point is obscure because of breakage in this area.

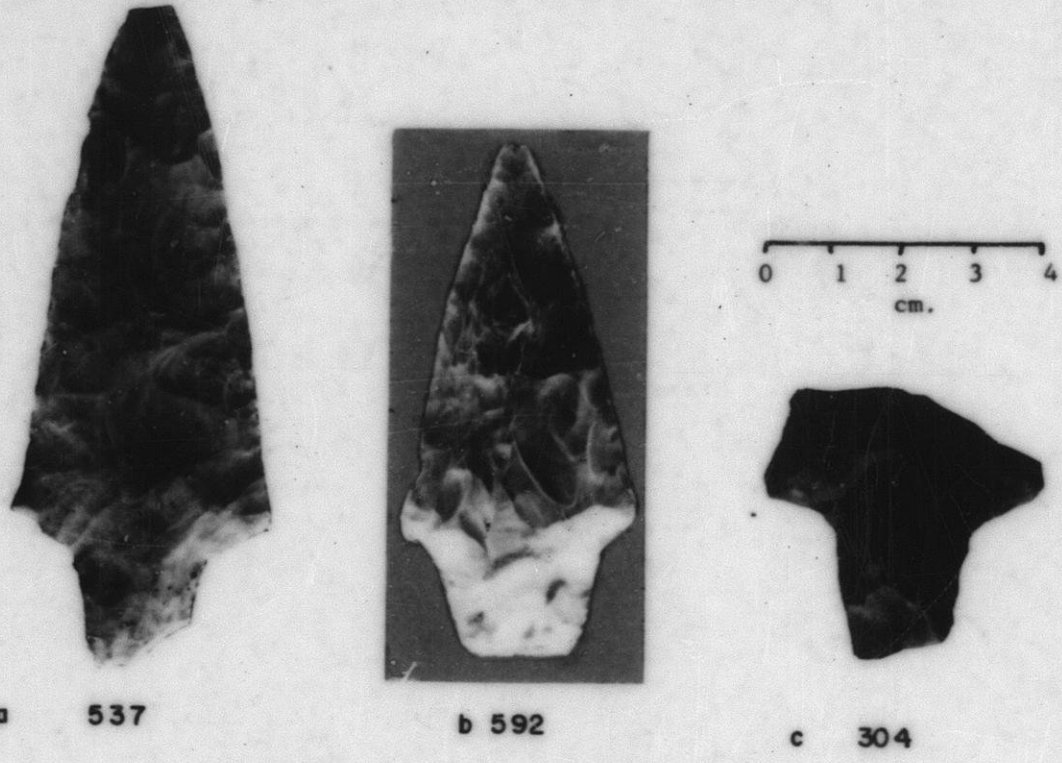


FIGURE 8. LANGTRY B PROJECTILE POINTS.

Technique: While secondary retouching appears along the edges of the blade, for the most part the points retain the bold primary flakes which were skillfully used to form a flat biconvex section. Slight traces of a median ridge are to be found on one face of specimen # 592. Traces of lateral grinding are present on the stems of the three projectile points.

Material: The varieties of chert are pink-grey, grey and tan-grey in color.

Dimensions:

	f	Range	Mean
Maximum Length. . .	1	67	67 (mm.)
Maximum Width . . .	3	31 - 39	35.0 "
Maximum Thickness .	3	7	7.0 "
Stem Length	2	15 - 26	20.5 "
Base Width.	2	14 - 15	14.5 "
Weight.	1	13.7	13.7 (grams)

On the single complete specimen the stem approaches 1/4 of the total length while the width is approximately 1/2 of the length.

Individual Point Provenience and Associated Traits:

#	Square	Level	Maximum Length	Maximum Width	Grinding	Chert Color
304	2:3	11	--	39	Slight	Mottled grey
537	1:2	14	--	37	Slight	White/grey
592	1:5	18	67	31	Slight	Grey

Cooper Points

The term, Cooper point, has been given to a series of dart points which have not previously been formally described as a type. The name is derived from the Cooper Site (D1-33 and D1-49), a large Hopewellian village site located on Grand River at the mouth of Honey Creek (Bell and Baerreis, 1951: 27-33) where these points were found in substantial numbers. To clarify the description of the general type, particularly in relation to the characteristic dimensions, information pertaining to the Cooper Site and its points is drawn upon in the introductory statements.

The Cooper point is divided into three varieties which are thought to be part of a continuum within a single point complex. All three varieties are characterized by an expanding or flaring stem which is produced by a notch inserted diagonally in the corner of the blade. However, unlike point types such as Snyders, Marcos, or Marshall to name but a few, where the notch is formed in such a manner that both sides of the notch are of equal length, the notch in the Cooper point is not symmetrical. In the Cooper point one side of the notch forms the flaring stem. The top of the notch forms the shoulder area which varies in degree of development in the Cooper A and B varieties. Cooper A comprises those points in which the shoulder is either straight (horisontal) or overhanging (slightly barbed). The barb, however, is never as pronounced as it would be in those types which have a diagonal notch with symmetrical sides. The Cooper B variety has a notch which does not penetrate as deeply into the blade of the point as in Cooper A, thus forming a shoulder area which is obtuse. Actually in all varieties the shoulder is formed as a smooth, continuous curve which merges with the stem but in Cooper B the shoulder does not attain a horizontal or overhanging form. Cooper C is a provisional variety which has a more nearly horizontal

placement of the notch but since it is not represented at D1-47 it is not discussed further at this time. There are, of course, additional attributes associated with this form which serve to define the point type.

In Cooper A the blade is most commonly convex and in some instances this convexity is sufficiently extreme to place the maximum width of the blade above the shoulder. The blade edge is also to be found in straight, and more rarely, recurved categories. The base of the point is characteristically convex, either slight or pronounced in degree, but occasionally straight and rarely concave. The width of the base is always less than the width of the blade at the shoulder.

In Cooper B the blade is convex but may also be straight. The base form varies between convex and straight, but is most often convex to markedly convex, though a few concave bases have been noted. While the width of the blade at the shoulder tends to be greater than the width at the base, there may often be a difference of only one to two millimeters between these two measurements, and in some instances the measurements are equal or the width of the base exceeds the width at the shoulder.

In an earlier classification of the projectile points from the Delaware County area in Oklahoma, these projectile points had been designated B1 (Baerreis, 1951: 16) and their distribution in a series of Archaic sites described. This classification did not segregate the Cooper A and B varieties and may also have included some projectile points which would not now be placed in the type. The shape is also comparable to that of Ellis points (Suhm, Krieger and Jelks, 1954: 420-1) but this type has a pronounced difference in size range. Ensor points (Ibid, 422-3) also share many characteristics but would appear to be largely restricted to a variety with a shorter stem and broader base and thus more nearly resemble Cooper B and C varieties. The description of Lange points (Ibid, 436-7) would also seem to include

common features and some points which are illustrated in the Texas report (Plate 97, k and p) would in our series be classed as Cooper A. We would, however, visualize the Lange point as having the stem formed by removing a large triangular area from the corner rather than a notch, with a consequent tendency toward straight or even convex sides to the stem. The characteristic dimensions of these points may be compared with the Cooper points from the two major units of the Cooper site although the generalized statements on size derived from the Texas handbook are not adequate for this purpose. The Motley point, defined on the basis of its occurrence at the Jaketown site in Louisiana (Ford, Phillips, and Haag, 1955: 129-31) would appear to be quite similar to Cooper A but in their description a resemblance to the Delaware County archaic points is denied (Ibid, 131). The average length of the Motley point is stated as being 73mm. which is substantially larger than the Cooper points though if this size is derived solely from the sample of seven projectile points at the Jaketown site, the sample is doubtless inadequate for a generalization. Further comparison of these two types (Motley and Cooper) seems desirable.

A comparison of Size Range of Cooper A and Related Types

	Cooper A D1-33 (CoI)	Cooper A D1-49 (CoV)	Ellis	Ensor	Lange	Motley
Length						
f	65	22				
range	39-75	41-70	30-50	30-70	50-85	55-98
mean	54.7	55.0				73
Width						
f	82	86				
range	23-38	26-42	20-30	20-30	27-40	28-35
mean	29.9	32.6				30
Minimum Stem Width						
f	83	103				
range	15-24	14-26				
mean	19.8	20.5				
Base Width						
f	76	94				
range	17-32	19-32	15-20	10-	17-25	
mean	25.1	26.6				
Thickness						
f	66	106				
range	5-11	6-12				6-12
mean	7.9	7.9				8
Stem Length						
f	82	107				
range	7-18	8-18				
mean	11.5	12.8				
Weight						
f	58	16				
range	7.1-27.8	11.1-20.7	(grams)			
mean	12.8	14.2	"			

Additional measurements beyond those which would serve to compare the Cooper point with the Texas and Louisiana points have been presented so that the large series from D1-33 and D1-49 might be compared with the smaller series of points from the site (D1-47) currently under study. The comparative measurements are from Suhm, Krieger and Jelks, 1954 and Ford, Phillips, and Haag, 1955.

To further facilitate the comparison of the D1-47 Cooper points with the larger series upon which the type standards were based, the dimensions of Cooper B points from D1-33 and D1-49, the major units of the Cooper site, are presented below. It may be noted that in gross dimensions, such as length, these mean sizes accentuate the difference between the Cooper point and the Motley point.

Size Range of Cooper B Points from the Type Site

	D1-33 (CoI)	D1-49 (CoV)
Length		
f	28	15
range	40-72	39-65
mean	50.5	53.7
Width		
f	31	27
range	22-31	26-36
mean	27.6	30.1
Stem Length		
f	31	27
range	7-16	8-17
mean	11.3	12.9
Minimum Stem Length		
f	28	26
range	16-24	18-26
mean	20.6	21.7
Base Width		
f	28	25
range	21-31	23-32
mean	26.4	27.1
Thickness		
f	31	27
range	6-10	7-11
mean	7.7	8.3
Weight		
f	26	14
range	6.7-16.8	8.8-20.9
mean	11.0	13.8

Cooper A, D1-47 (Figures 9-10)

It will be recalled that Cooper A comprises the variety which is characterized by the possession of a notch which produces a horizontal or slightly overhanging shoulder. Thirteen points fell in this variety in D1-47.

Form: Five of the Cooper A points from D1-47 have the notch placed in such a fashion as to produce a definite overhang or slight barb at the shoulder. On the remainder the notch curves outward to meet the blade in a generally horizontal position. All but one of the points have convex sided blades. This single point, the blade of which is doubtless reworked and shows considerable asymmetry, has a recurved blade (# 432; Figure 9, f). Except for a single specimen where but a small portion of the point is present (# 294; Figure 9, j), the convexity of the blade is not sufficient to place the maximum width of the blade above the shoulder.

The stem is flaring on all points, which is one of the constant features of the type, although a partial exception may be noted in one example (# 305; Figure 9, h). On this specimen, where there is only a one millimeter expansion to the base, breakage and secondary reworking appears to be responsible for its present form. The base is convex on eight specimens, concave on three, and straight on two.

Technique: The points appear to have been initially shaped by percussion techniques and bold primary flakes are preserved on all points. Traces of primary flakes at the notches suggest that these were originally inserted by a percussion blow. Subsequent pressure retouch at the edges produced the more symmetrical forms of the points. One specimen (# 535; Figure 9, e) is exceptional in having delicate pressure retouching along the edge of the blade. This may be due to late resharpening as the asymmetry of the blade would suggest. This suggestion is further confirmed by a marked plano-convex cross section

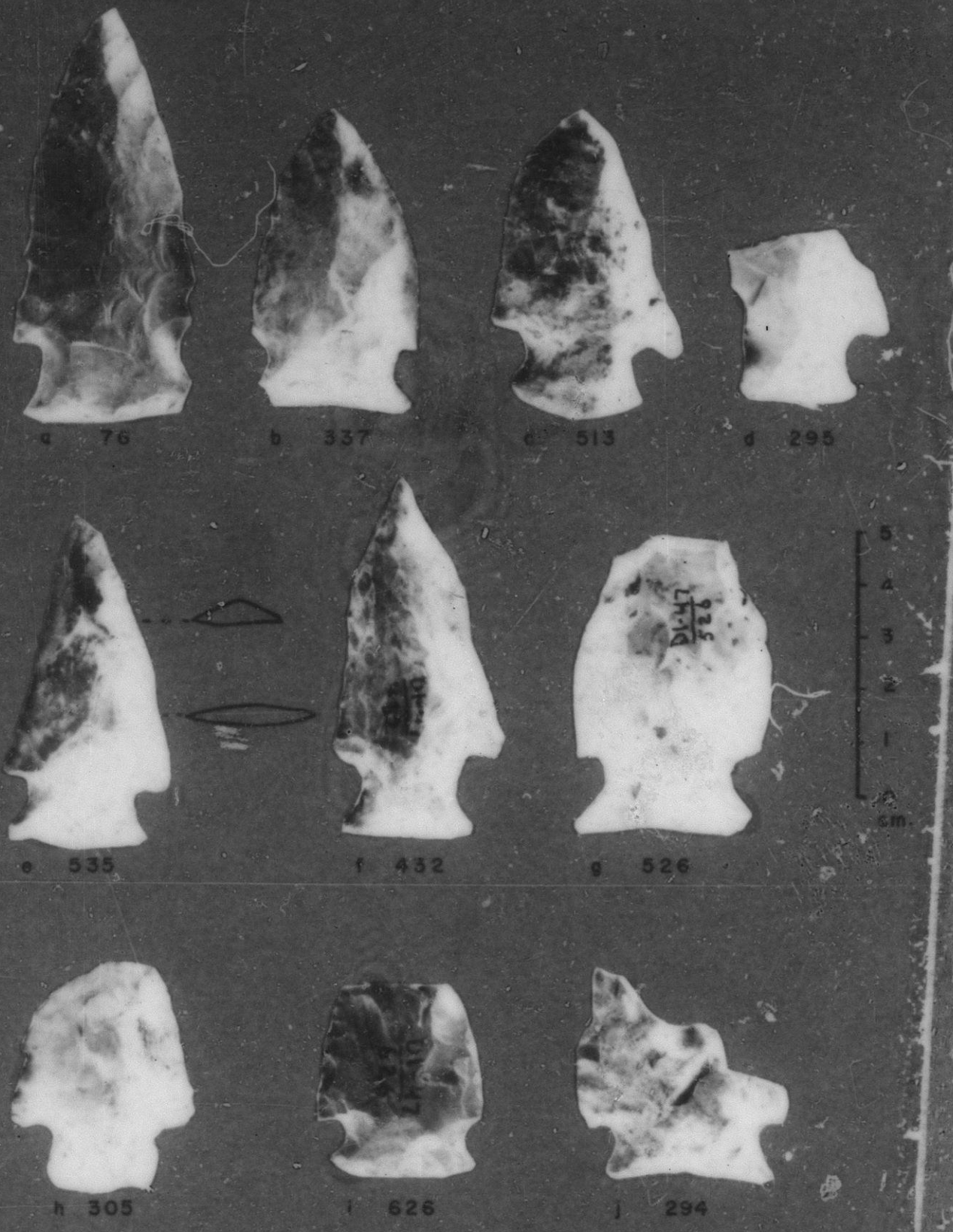


Figure 3. Coopers A Projectile Points

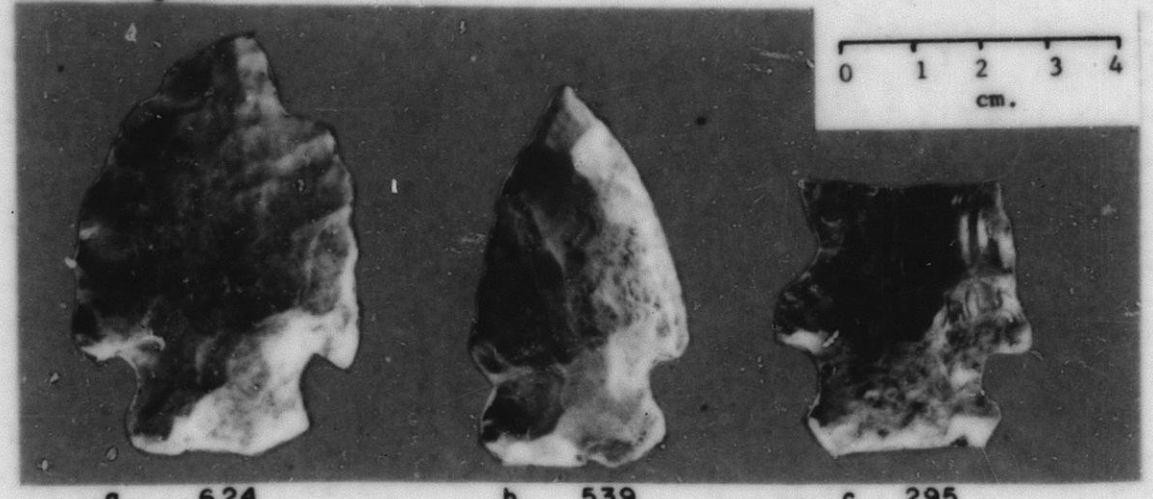
near the tip of the blade. On the other points a biconvex cross section prevails. Slight basal grinding is found on only two of the points (# 626; Figure 9, i and # 294, j) but there are also suggestions that some notches may have been smoothed by grinding.

Material: All of the points are made from chert which ranges in color through white, pink and grey and is frequently mottled.

Dimensions:

	f	Range	Mean
Maximum Length. . .	7	52 - 75	59.4 (mm.)
Maximum Width . . .	11	29 - 38	33.1 "
Maximum Thickness .	13	6 - 10	8.0 "
Stem Length	13	9 - 17	12.9 "
Minimum Stem Width.	12	18 - 26	21.1 "
Base Width.	10	19 - 31	24.7 "
Weight.	6	10.4 - 16.6	13.8 (grams)

The stem ranges between 1/3 and 1/6 of the total length of the point, the average being 1/4. The maximum width of the point is close to 1/2 of the total length.



a 624 b 539 c 295

FIGURE 10. COOPER A PROJECTILE POINTS.

Individual Point Provenience and Associated Traits:

#	Square	Level	Maximum Length	Maximum Width	Chert Color
76	0:6	Top 2 1/2'	75	33	Grey/pink
294	1:6	7	--	--	Grey/white
624	2:8	8	56	38	Pink/white
337	1:6	8	53	30	Grey/white
305	1:3	9	--	34	White
295	2:2	10	--	36	Pink
526	1:5	10	--	34	White
295	2:2	10	--	--	White
513	2:2	14	57	35	Grey/white
626	0:4	14	--	30	Grey
535	1:5	14	58	29	White
432	2:1	15	66	31	Grey/white
539	1:2	17	52	30	Grey/white

Cooper B (Figure 11)

It will be recalled that the Cooper B variety has, in effect, a shallower notch, the upper segment merging from an obtuse shoulder with the flaring stem.

Form: The characteristic blade shape is one with convex sides. While several of the points from D1-47 show marked asymmetry or approach a short blade with straight sides (Figure 11, i-1), these clearly comprise points in which the blade has been reworked subsequent to breakage. The widest portion of the blade on all specimens is at the shoulder. The base is convex except in one specimen (Figure 11, h) whose irregular form is difficult to classify but might be designated recurved.

Technique: As in the Cooper A variety, the points were originally shaped by percussion techniques and large primary flakes are preserved on all points. Pressure retouch has subsequently modified the margins of the points. Very slight basal grinding is found on a few points and is most pronounced on three (Figure 11, a--# 531, b--# 520 and d--# 539).

Material: All of the points are made from chert which ranges in color from white through dark grey and a mottled pink-grey.

Dimensions:

	f	Range	Mean
Maximum Length. . .	8	39 - 67	54.7 (mm.)
Maximum Width . . .	10	24 - 38	29.2 "
Maximum Thickness .	12	6 - 9	7.8 "
Stem Length	12	8 - 16	13.1 "
Minimum Stem Width.	12	16 - 24	20.7 "
Base Width.	11	19 - 32	26.8 "
Weight.	7	8.1 - 17.8	11.7 (grams)

The stem ranges between 1/3 to 1/6 of the total length of the point, the average being 1/4. The maximum width of the point is about 1/2 of the total length.

Individual Point Provenience and Associated Traits:

#	Square	Level	Maximum Length	Maximum Width	Chert Color
588	1:8	1	54	24	Grey/pink
67	1:7	4	--	26	Dark grey
289	1:3	7	56	25	White
523	2:3	12	--	--	White
380	1:2	12	52	28	Grey
531	1:6	13	67	38	White
520	1:2	13	60	--	White
528	1:3	13	39	35	White
525	1:2	14	--	32	Mottled grey
538	1:4	15	57	26	White
512	1:3	15	53	29	Dark grey
539	1:2	17	--	29	White

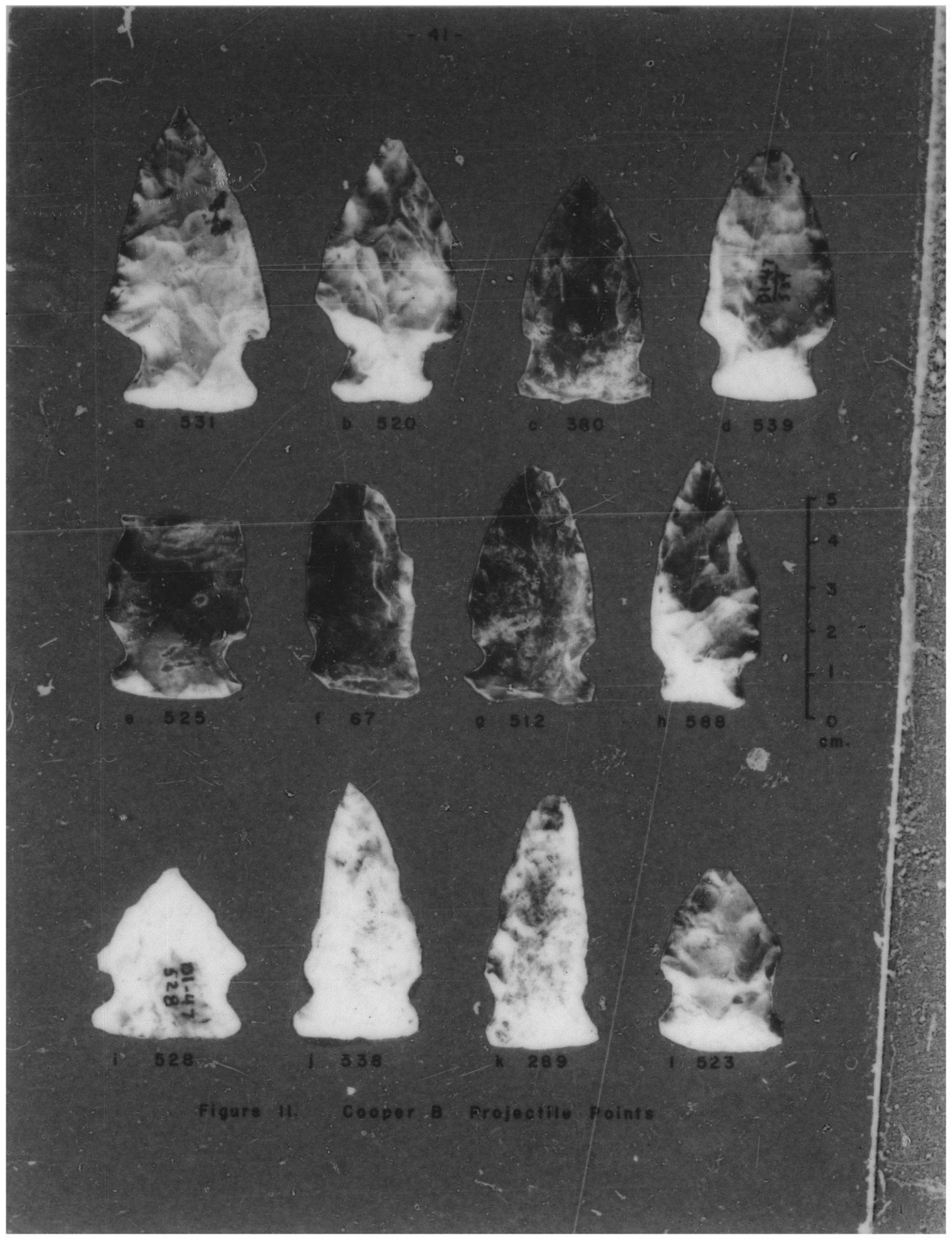


Figure 11. Cooper B Projectile Points

Barbed Points (Figure 12)

The group of "barbed points" represents a provisional sorting category for which we have not been able to resolve the question of type assignment. The points share many features with the Williams Point previously defined in Texas (Krieger, Suhm and Jelks, 1954: 490-1) but the larger series from Delaware County currently being studied indicates a somewhat deviant range of attributes from those illustrated in the report cited. Possibly two or more types are represented or a single Oklahoma type parallel to the Williams Point.

The two specimens illustrate the broad range of variation within the group. It is possible that the smaller specimen could represent a reworked larger form but it exhibits none of the thickness, steep flaking and asymmetry which usually accompanies such an operation. Both specimens were initially shaped by percussion flaking and traces of the primary flakes remain, particularly on the larger specimen (Figure 12, a). This same specimen has a convex blade and base with the base being slightly ground. It will be noted that the smaller specimen tends to have a blade with straight sides. Both specimens are manufactured from a grey chert.

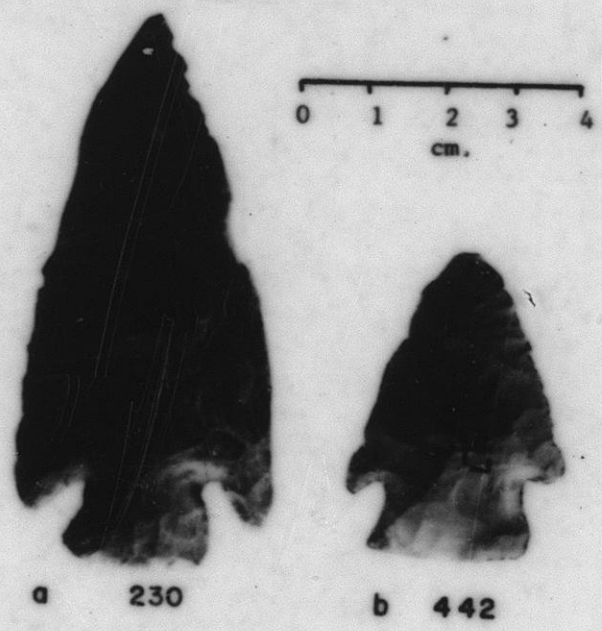


Figure 12. Barbed Points.

Dimensions:

	# 230	# 442
Maximum Length.	77	41 (mm.)
Maximum Width	37	28 "
Maximum Thickness	7	6 "
Stem Length	13	11 "
Minimum Stem Width. . . .	16	18 "
Base Width.	21	22 "
Weight.	15.6	6.0 (grams)

The proportion of stem length to total length is 1/6 and 1/4 while the proportion of width to length is 1/2 in both instances. Specimen # 230 was found in Square 1:5, Level 5 and specimen # 442 in Square 0:5, Level 10.

Snyders Points

A number of points from sites in Delaware County have been classified as the type named Snyders in a preliminary mimeographed description prepared by Edward G. Scully (1951: 12). We have attempted to restrict this point to the broad-bladed form intended in this description and illustrated in other reports (e.g., McGregor, 1952: Plate XIX, A). In the Oklahoma points so classified the outline of the point is ovate acuminate, the blade having strongly convex sides. The notch was inserted from the corner of the base and is wide and deep. Usually the width of the notch exceeds its depth although it may be equal or nearly equal to it. The stem expands to a convex or occasionally straight base with a sharp angle of juncture of base and stem. The stem is consistently short in relation to the total length of the point and due to the broadness of the blade, the maximum width approaches a one to one ratio with the total length of the point.

A problem in classification arose in that some of the points from the Delaware County sites are similar to the Snyders points in the form and position of the notch but deviant in blade outline and general proportions. These points have provisionally been classified as Snyders-like. Their outline approaches an elongated triangle or elongated oval. The sides of the blade are usually convex but sometimes straight. The deviation in form results in a higher ratio of maximum width to total length. While the notch is inserted in the corner of the point it tends to be narrower and not as deep as in Snyders. Snyders points in general show more careful and precise flaking than the relatively cruder flaking of the Snyders-like variety.

It may be of some assistance in clarifying the characteristics of the Snyders and Snyders-like variants to contrast these points with Marcos points (Krieger, Suhm and Jelks, 1954: 442-3) which is the most similar large, corner-notched dart point defined in the Handbook of Texas Archaeology. Marcos points, aside from having a smaller average length (5-6 cm.) also have a notch which is proportionately narrower and which produces a narrow neck. The blade shape also seems more commonly to be straight-sided. The stems, in combination with a straight base not commonly found on the Snyders variants, are proportionately shorter and have sharper corners.

Both the Snyders and Snyders-like varieties may have functioned as a knife rather than as a dart point in view of the deviation in size from the normal proportions of the projectile points.

Snyders Points, D1-47 (Figure 13)

Only two Snyders points were present, both having the tip of the blade missing. In one of these specimens (Figure 13, a) the point may have been in process of being sharpened or worked to a shorter form when it was discarded in view of the irregular curvature near the break.

Form: Blades have convex sides with the degree of curvature sufficient to place the maximum width of the blade above the shoulder of the point. The stem expands to a convex base. The notches, made from the corner of the blank outline, are deeper than they are wide.

Technique: While the basic shaping of the point was achieved by percussion flaking, secondary retouch has been used to produce a symmetrical outline. One specimen (Figure 13, b) has extensive basal grinding.

Material: Both points are manufactured from a white chert, mottled with grey or tan respectively.

Dimensions:

	# 533 (a)	# 533 (b)
Width (blade).	51	50 (mm.)
Width (base)	31	30 "
Width (minimum, stem). .	24	25 "
Stem Length.	16	18 "
Maximum Thickness. . . .	10	10 "

Both specimens are from Stratum 17 of Square 1:1.

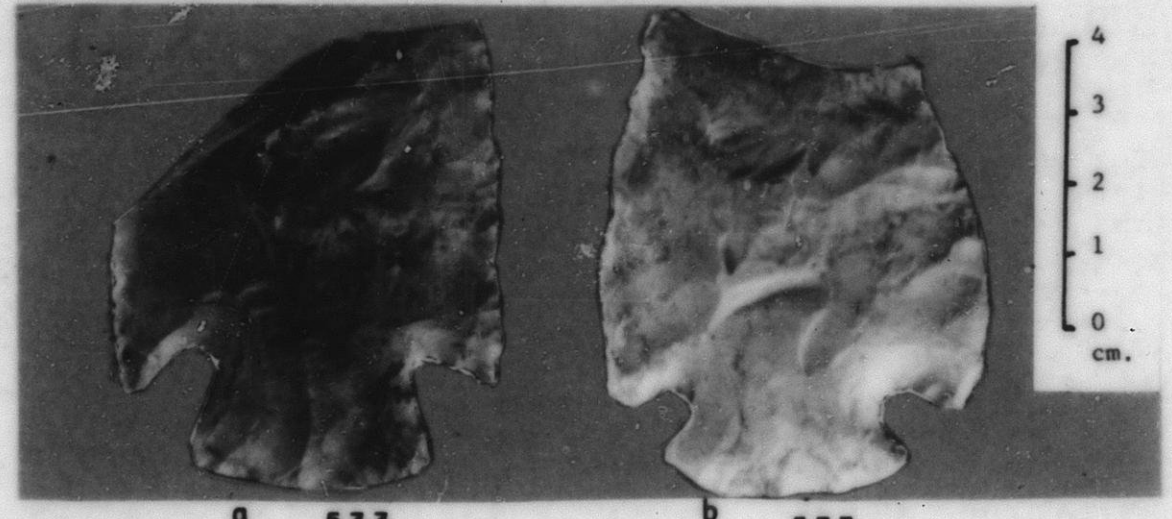


FIGURE 13. SNYDERS POINTS.

Snyders-like Points (Figure 14)

Four of the D1-47 projectile points are placed in this category. It may be noted that as a group they do not attain the extreme breadth of the Snyders point. The "Snyders-like" group should be regarded as a provisional sorting category until more is known of this form.

Form: Blades have either a convex side or approach a straight-sided form. The maximum width of the point is found at the shoulder area. The stem uniformly expands to a convex base. The notches, made from the corner of the point, are of a depth equal to or slightly less than their width. The stem is short in relation to the total length of the point.

Technique: Considerable skill is exhibited in flaking technique and surfaces tend to bear primarily the scars of secondary retouching. Slight basal grinding is found on two of the projectile points (# 440 and # 521).

Material: Gray and mottled white chert.

Dimensions:

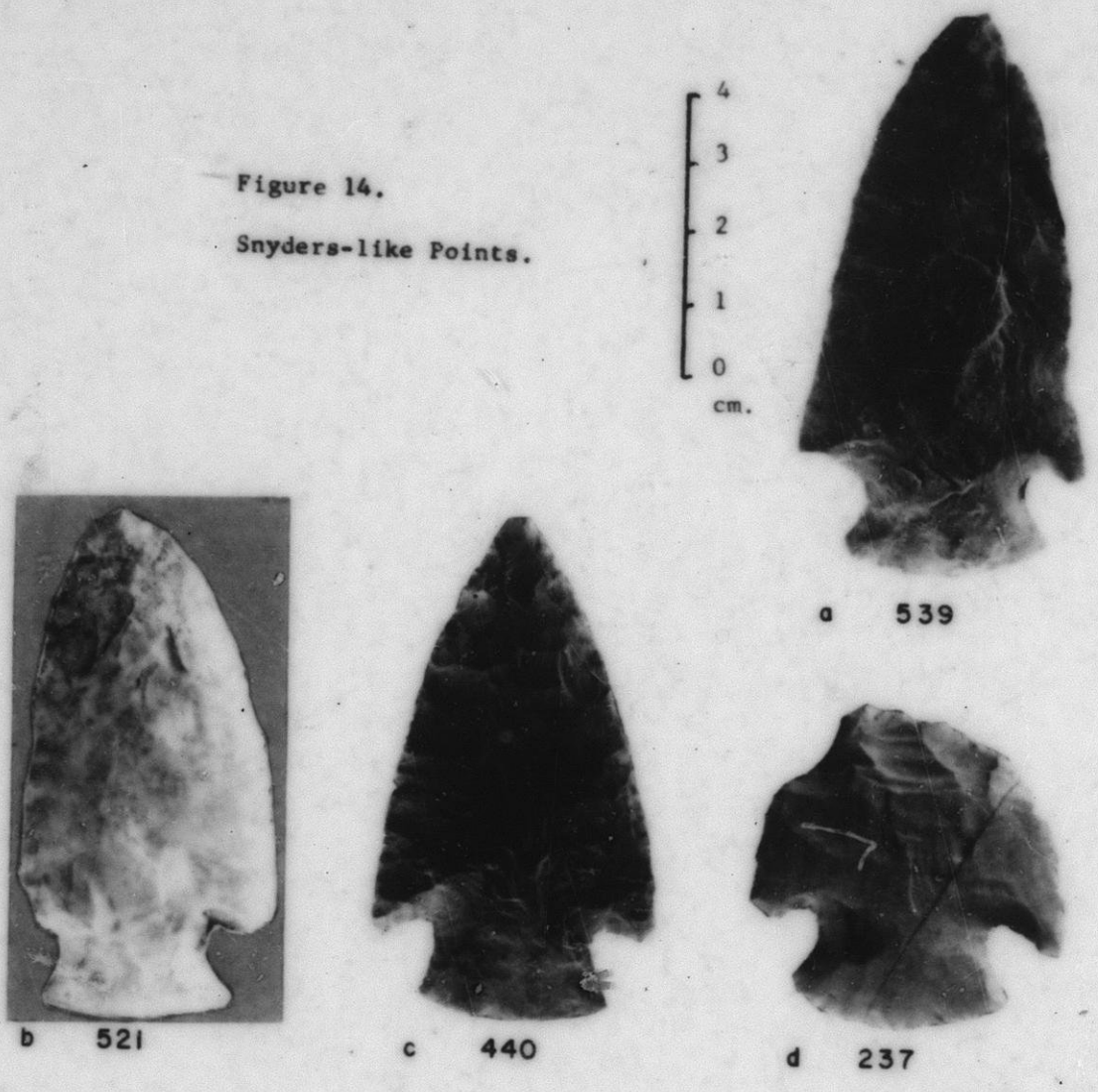
	f	Range	Mean
Maximum length. . . .	3	71 - 82	75.3 (mm.)
Width (blade)	3	40 - 42	41.0 "
Width (base).	4	26 - 29	27.5 "
Width (minimum, stem)	4	20 - 22	21.5 "
Stem length	4	11 - 16	14.2 "
Max. thickness. . . .	4	7 - 9	8.0 "
Weight.	3	18.7 - 22.7	21.1 (grams)

Individual Point Provenience and Associated Traits:

#	Square	Level	Maximum Length	Maximum Width
237	1:3	5	--	42
440	0:7	11	73	41
521	1:5	11	71	--
539	1:2	17	82	40

Figure 14.

Snyders-like Points.



Fairland Points

The Fairland point as defined by Krieger, Suhm and Jelks in the Handbook of Texas Archaeology (1954: 424-5) is restricted to a form which has a "base characterized by wide, deep concavity which produced very sharp corners." While points conforming to this description, as well as to the other features which characterize the Fairland point, are present in the series of points from Delaware County, the majority of the points tend to have straight or slightly concave bases. Consequently we have tentatively established two varieties of the Fairland point, Fairland A and Fairland B. In the Fairland A variety we have placed those points which correspond to the Fairland type as described in the Texas Handbook. Points which are like Fairland A except that they have a straight base have been placed in the Fairland B variety.

Fairland A - D1-47 (Figure 15)

Only two specimens from D1-47 fall in this variety. The tip is missing on one specimen (# 526; Figure 15, b) and while the other specimen (# 618; Figure 15, a) was similarly broken, the tip has been resharpened. Many of the specimens illustrated in the Texas Handbook with a proportionately short, straight-sided body doubtless represent a similar reusing of broken points.

Form: The blade outline has slightly convex sides on one specimen, with the other, the reworked specimen, being nearly straight. The stem is formed by a shallow notch and flares gently to a broad, concave base.

Technique: Blade surface show a combination of flat, primary flakes and secondary retouch. Blade edges are carefully finished and symmetrical in outline. Specimen # 526 (Figure 15, b) appears to have been broken and retouched at the base so that the basal thinning is not as pronounced as

on the other specimen.

Material: Both specimens are manufactured from a white chert.

Dimensions:

	# 526	# 618
Maximum length.	-	56 (mm.)
Maximum width	32	30 "
Maximum thickness	8	6 "
Stem length	17	10 "
Minimum stem width.	26	26 "
Base width.	32	32 "
Weight.	-	12.0 (grams)
Chert color	white	white

Specimen # 526 was found in square 1:5, stratum 10 while specimen # 618 was found in square 0:8, stratum 4.

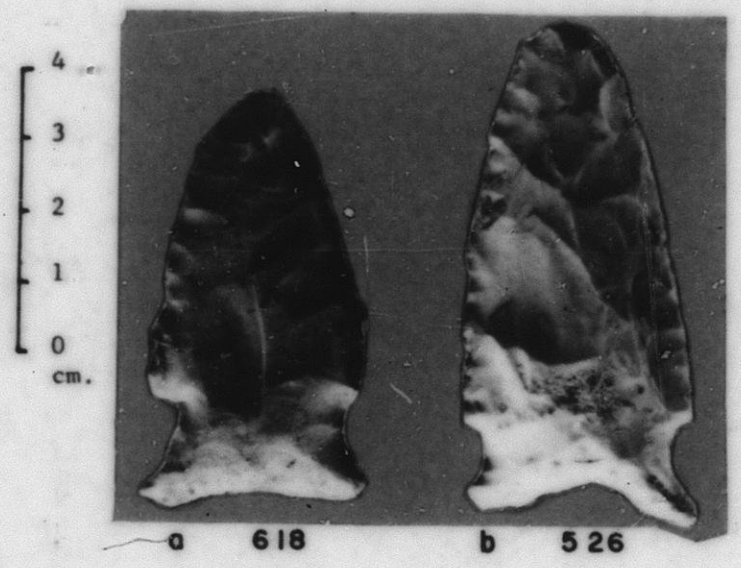


Figure 15.

Fairland A Points.

Fairland B (Figure 16)

Six projectile points comprise the sample of this type, three of which are unbroken.

Form: The blade outline tends more closely to approximate a straight-sided form than in Fairland A. Another distinctive feature is the presence of a short, slender tip to the blade (Figure 16, a-b, d) which has been noted in Texas projectile points in connection with the Williams points (Krieger, Suhm and Jelks, 1954: 490-1). The base tends to be thin and sharp.

Technique: Careful workmanship is characteristic of the group. Slight grinding of the stem, but not the base, is present on a few points. Short, stubby points (such as

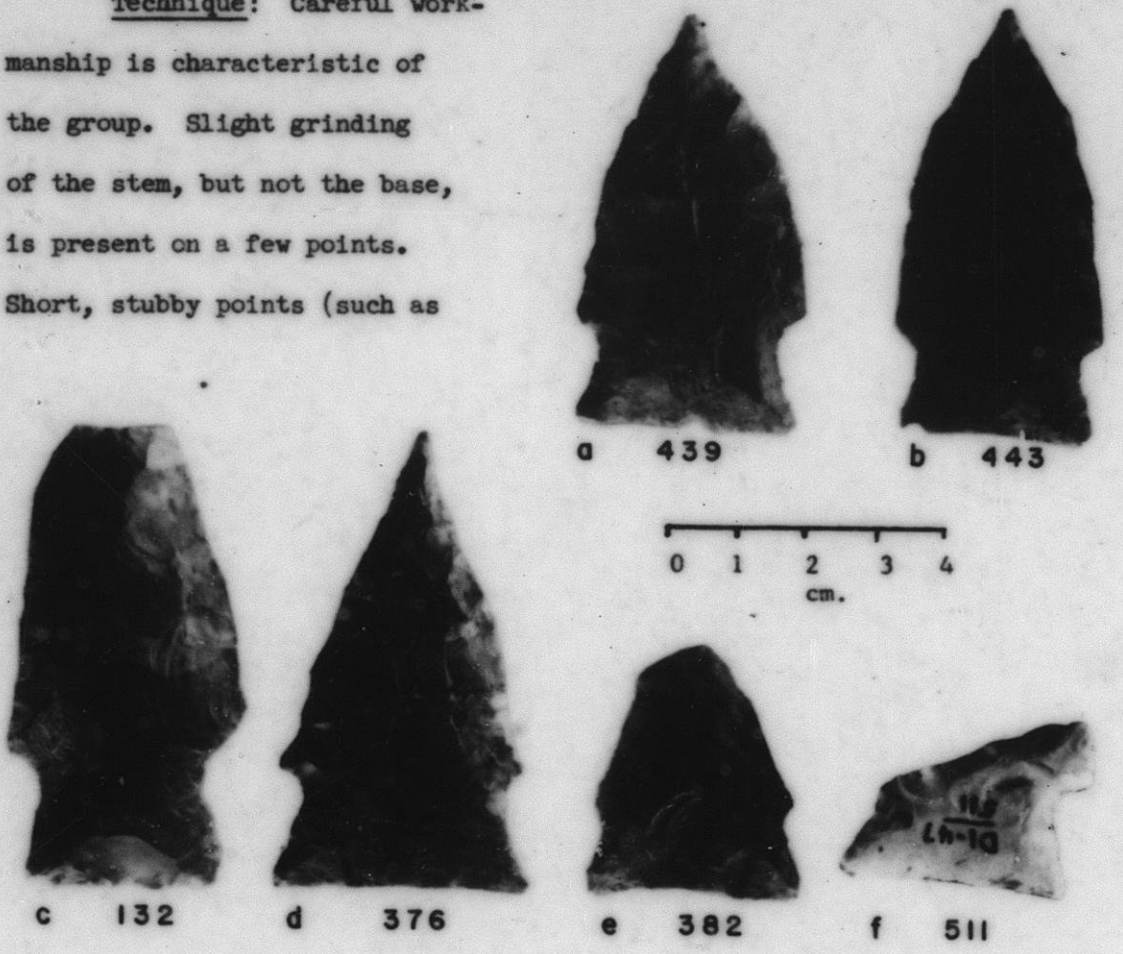


Figure 16. Fairland B Points.

Figure 16, e) may be reworked from larger specimens.

Material: All are manufactured from chert, either grey, mottled grey, tan or white in color.

Dimensions:

	f	Range	Mean
Maximum length	3	57 - 64	60.3 (mm.)
Width (blade).	5	27 - 34	30.8 "
Width (base)	6	27 - 36	30.5 "
Width (minimum, stem). . .	6	22 - 28	24.8 "
Stem length.	6	13 - 21	15.6 "
Maximum thickness.	5	7 - 11	7.8 "
Weight	3	12.7 - 14.5	13.7 (grams)

Individual Point Provenience and Associated Traits:

#	Square	Level	Maximum Length	Maximum Width
376	1:1	9	64	34
382	1:5	9	--	27
132	0:5	Top 2 1/2'	--	33
511	1:5	12	--	--
439	2:1	13	57	32
443	2:1	14	60	28

Cupp Points (Figures 17 and 18)

A new projectile point type has been provisionally established and designated the Cupp point. Its distinguishing characteristics include a rather bulbous stem which is combined with a slender, elongated blade. The blade has either straight or slightly convex sides and is occasionally serrated. The points are long, ranging from 64 to 96 mm. (mean - 82 mm.), and narrow, the width ranging between 17 and 30 mm. (mean - 23 mm.). Thus the total length is three to four times the width of the blade. The shoulder is usually distinct and may be slightly barbed. The stem is proportionately short, averaging one-sixth of the total length. All of the projectile points are manufactured from chert with the surfaces finished by skillful secondary flaking. To better illustrate the type, a series of points from various sites in Delaware County is illustrated in Figure 18.

In many of the characteristics this point is not unlike the Palmillas points defined by Krieger, Suhm and Jelks (1954: 462-63). A range in length for these points of 30-60 mm., however, falls below that of the Cupp points. In the series of Palmillas points described by Ford and Webb (1956: 63) the range in length is increased (42 - 70 mm.) and their illustrations enhance the resemblance to the Cupp elongated form but the range is still inadequate for the Delaware County series.

Cupp Points - D1-47 (Figure 17)

Only two fragmentary points of the Cupp type were found at D1-47.

Form: While a portion of the blade is missing from both points, the remaining section indicates that the original form was triangular with straight sides. The stem of # 304 (Figure 17, b) is a true bulb with a rounded base while the other point has a convex base clearly demarcated from

the flaring stem. Both points have distinct shoulder areas.

Technique: Skillful pressure retouching modifies the surface of both points.

Material: The points are made of a banded grey and tan and a mottled grey chert.

Dimensions and Provenience:

	# 242	# 304
Maximum width.	20	22
Maximum thickness.	8	7
Stem length.	14	11
Minimum stem width	11	14
Base width	16	--

Specimen # 242 was found in square 2:2, at level 6 and specimen # 304 in square 2:3 at level 11.

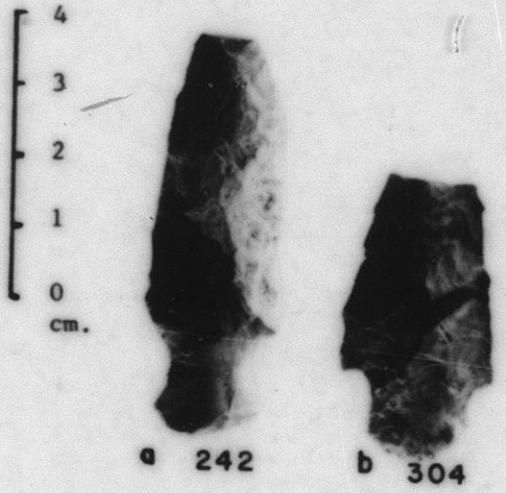


Figure 17.

Cupp Points.

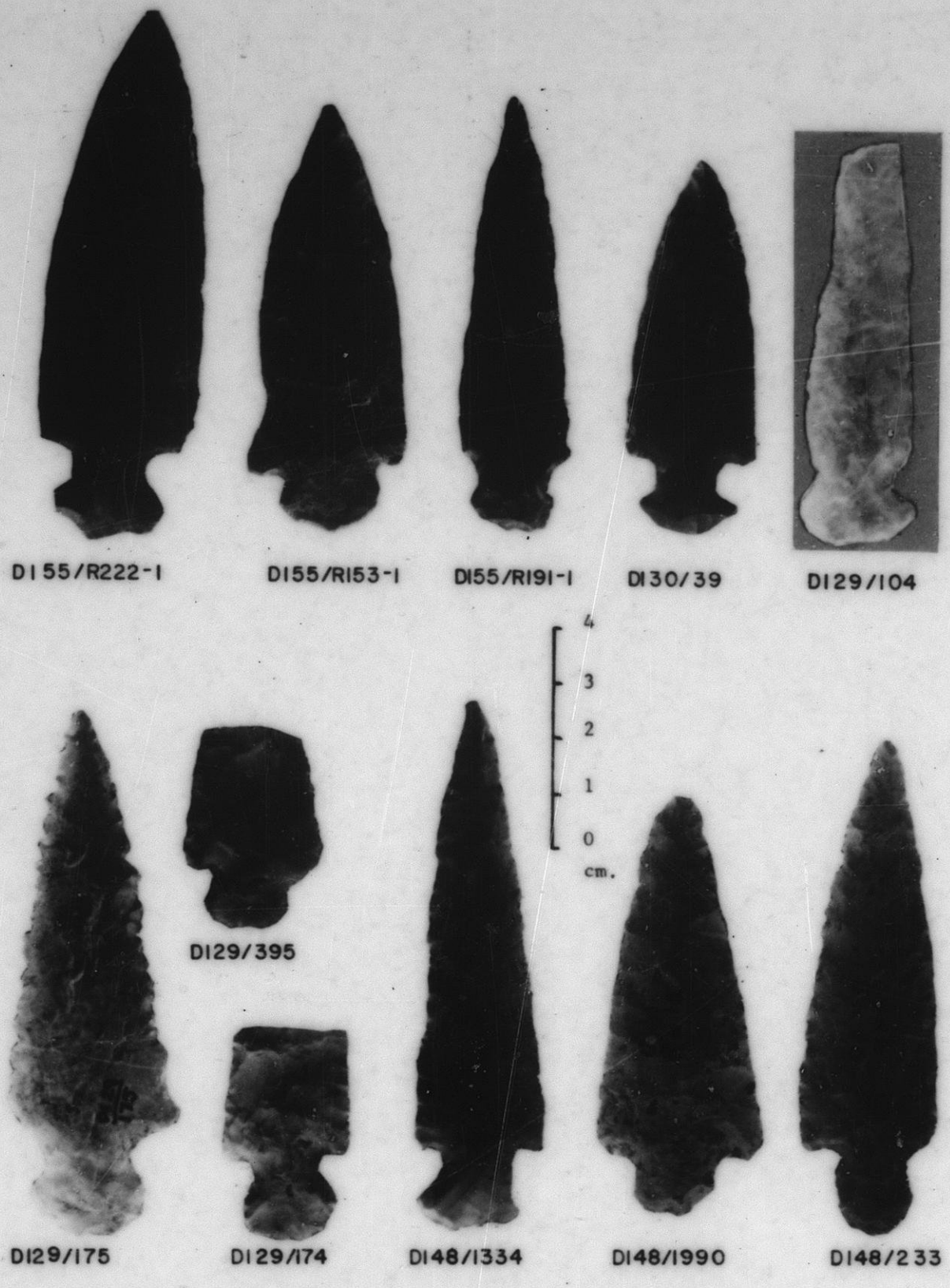


Figure 18. Cupp Points from other Delaware County sites.

Smith Points (Figure 19)

In our current analysis of Delaware County specimens, we have redefined a variety previously designated E1 and E2 (Baerreis, 1951: 18-19, 106, 107), as the Smith point. Since no chronological implications can as yet be ascribed to the variation in stem form recognized by the subdivisions E1 and E2, these have been dropped. It would be equally plausible to search for significance in the distinction between a simple shoulder and a markedly barbed shoulder found in some varieties but again, chronological implications of this attribute remain to be demonstrated.

Only a single Smith point (Figure 19) was found at D1-47 (specimen # 238) in square 2:2 at level 5. One of the barbs of this point is missing but the specimen was originally provided with prominent ones as can be seen in the complete side. The sides of the stem are parallel and the base is straight and bears slight basal grinding. While largely shaped by percussion flaking, a secondary retouch modifies the form of the point. The material is a mottled grey chert. The point is 78 mm. in maximum length but its maximum width can not be determined due to breakage. The stem is 19 mm. long and 20 mm. wide. The thickness is 9 mm.

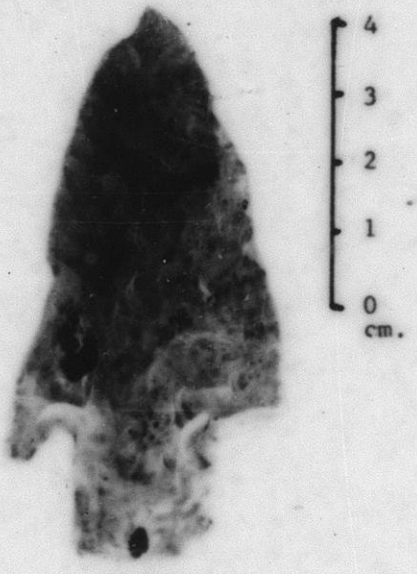


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Figure 19.

Smith Points.

Unclassified Large Projectile Points

Also present at the site were a series of large projectile points that could not be classified as to type. Inability to classify arose through two factors. In part, it was due to the fragmentary condition of the points, crucial portions of the stem, shoulder or base being missing. The points of this group are tabulated according to general characteristics and individually listed so their site location can be presented. While the group cannot be treated with precision typologically, it has been deemed essential to enumerate them since their presence is of utility in a tabulation of the frequency of projectile points and in an analysis of the proportion of large to small projectile points. Because of their fragmentary condition, measurements and illustrations for this group are omitted. A second category, however, consisted of those projectile points sufficiently deviant from established type categories so that inclusion in the group was questioned. In these examples, the form was not present in sufficient numbers (in this site or in others currently being studied) to warrant a type or provisional type designation. These points are illustrated and measurements are given in the hope that they might some time in the future be identified.

Contracting Stem Points. All eight projectile points in this group with contracting stems had been broken at the base, thus removing the feature which would permit them to be classified as either Gary or Langtry points. In view of their fragmentary condition, they are not illustrated but the locations are presented below.

(Contracting stem points):

#	Square	Level	#	Square	Level
243	0:5	7	404	0:4	10
289	1:3	10	440	0:7	11
375	2:1	11	526	1:5	10
404	0:4	10	B1-6	2:2	10

Notched Points: A group of nine points having a stem formed by a deep or shallow notch are similarly in too fragmentary a condition to require measurements or illustration. All, however, are large dart points. Their locations are listed below.

#	Square	Level	#	Square	Level
29	1:5	2	294	1:6	7
88	2:4	6	307	2:2	11
288	2:6	5	443	2:1	14
287	1:7	7	592	1:5	18
518	2:6	9	629	0:6	18

The remaining points to be considered in the unclassified category, would appear to be potentially capable of being placed in a type though not in our present state of knowledge. We have therefore prepared an illustration and a brief description of each of them in the hope, as previously mentioned, that they might at some time in the future be identified. Many of these, of course, could be derived from distant areas which would account for the low frequency of the form in Delaware County. If this is indeed the case, the description of these forms assumes equal or even greater importance than the more numerous types. For convenience in reference, each of the points is numbered, the same numbers appearing on the accompanying figures.

(1). Specimen # 225 found in square 2:2, level 6 (Figure 20, 1). The fragment consists of the basal section of a point which at first glance resembles a broad, lanceolate form. It is manufactured of a mottled grey and white chert and skillfully flaked by a precise pressure retouch. Slight grinding is present on the sides and perhaps also on the basal area though breakage at this latter point obscures what was probably a concave base. It is possible, however, that this point is an extreme form of a Langtry A point with a straight-sided stem rather than the common form which is slightly concave. Traces of a change in curvature, suggesting the beginning of the blade, appear immediately at the broken section of the point. The width at the shoulder area is 32 mm. and the maximum thickness 6 mm.

(2). Specimen # 528 found in square 1:3, level 13 (Figure 20, 2). This basal section of a point is manufactured from a white chert, primarily by percussion technique. The flaring sweep of the stem and the sharp corner produced by the slightly concave base resembles the Fairland point previously described. It is, however, a much narrower stem than that commonly found on the type though slight grinding on the stem is also present. The point is 29 mm. wide at the shoulder and the stem length is 17 mm. The minimum stem width is 19 mm. and the maximum thickness 9 mm.

(3). Specimen # 337 found in square 1:6, level 8 (Figure 20, 3). This point, manufactured from a pinkish white chert, also bears a general resemblance to the Fairland point. The irregularity of the blade area suggests that some reworking has taken place and a break at the base makes it impossible to determine whether the form originally had a straight or slightly concave base. Slight grinding is present on the sides of the stem. The point is now 25 mm. in width at the shoulder and the stem is 8 mm. in length. The maximum thickness is 7 mm.

(4). Specimen # 590 found in square 2:1, level 7 (Figure 20, 4) and # 127 (Figure 20, 5) appear to represent the same form category. The stem is formed by a very broad, shallow notch which produces an inconspicuous shoulder area and a base about equal in width to the shoulder. The point is relatively thin and sharp at the edges, no traces of grinding being present. While the form is sufficiently rare in Delaware County to prevent the presentation of a formal type description, it would appear to represent a variety that is common in the state of Missouri. Chapman (1948: 117) in presenting the traits of the Boone Focus, a Woodland complex, illustrates points of this form (Figure 28, especially 10 and 11). Similar points recovered in the survey of the Table Rock Reservoir Area of Stone County, Missouri (Chapman, Maxwell and Kozlovich, 1951: Figure 3) are designated Type Y. They are also reported for the Pomme de Terre reservoir area in Missouri where they were provisionally designated Y1, Y2, and Y5 but it was concluded that these variants were related and could be combined into one type (Chapman, 1954: Figure 22 and pp. 98-99). Although the Type Y projectile points are not specifically attributed to this complex, it would appear from the excavations at the Raymond Site in the Pomme de Terre reservoir that the points are associated with a Late Woodland complex (ibid., p. 85). The form also appears to be present in Greene County, Missouri (Marshall, 1955: Figure 3). In excavations conducted in the Table Rock Reservoir at the Rice Site, Bray (1956: Figure 23 and p. 127) places generally similar points in a provisional type designated Rice Side-notched. The point type would appear to be associated with both the middle and late complexes at the Rice site, the latter being cited as similar to the Neosho Focus of northeastern Oklahoma (ibid., p. 71).

If the provisional type, Rice Side-notched is sustained, it is

probable the two Oklahoma points should be placed in this category.

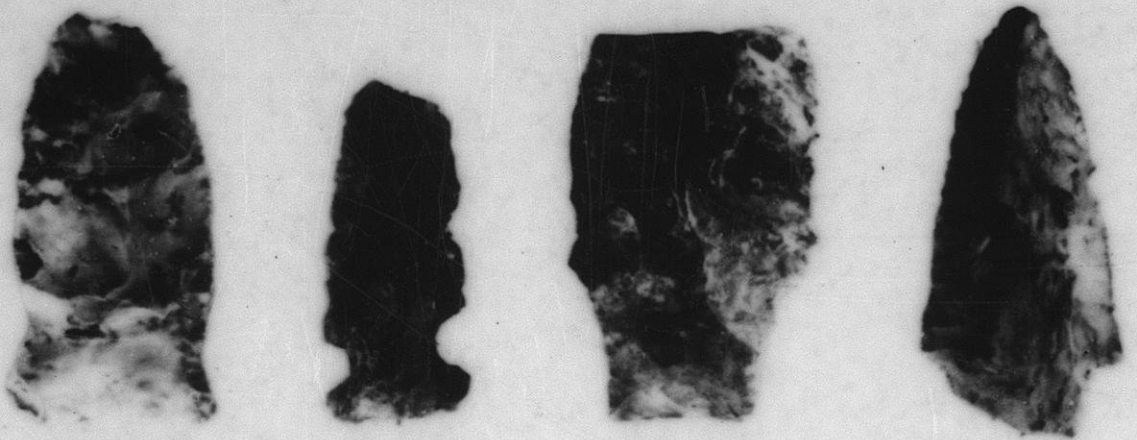
Specimen # 590 is manufactured from a pink and grey chert by precise pressure retouch. The point is 28 mm. in width at the shoulder area and 29 mm. in width at the base. The minimum constriction of the stem gives a width of 25 mm. and the stem is 15 mm. in length. The maximum thickness of the point is 6 mm.

(5). Specimen # 127 found in square 1:4, level 4 (Figure 20, 5) is the second point suggested as possibly falling in the Rice Side-notched category. It is manufactured from a mottled light and dark grey chert (Boone chert ?) and has been largely shaped by bold percussion flaking. The stem merges so imperceptibly with the blade that it is difficult to determine the precise point of juncture. The maximum width of the blade is 29 mm. and the width at the base 30 mm. The stem is 24 mm. in width at its point of minimum constriction. The maximum thickness is 8 mm.

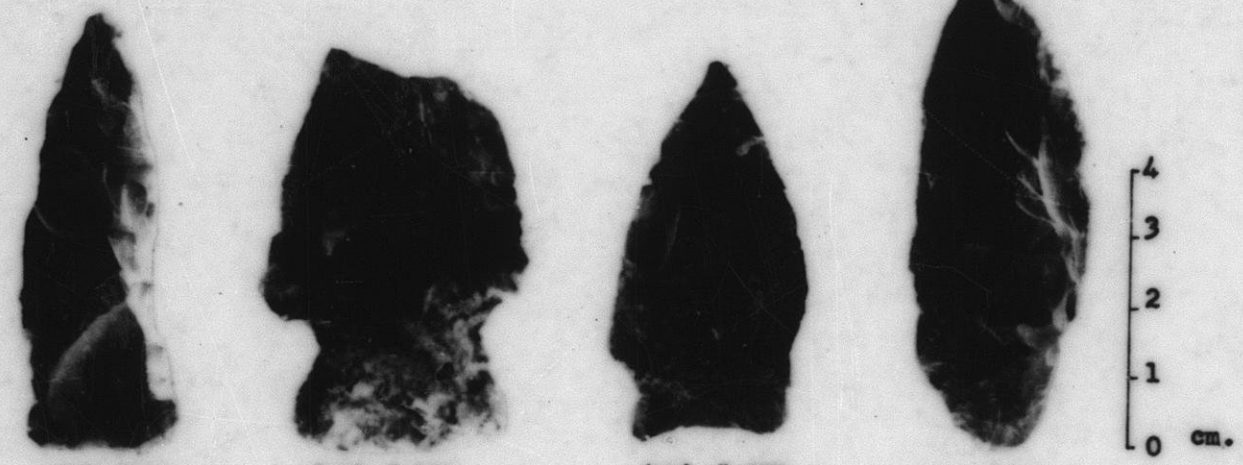
(6). Specimen # 378 was found in square 1:4, level 10 (Figure 20, 6). It was manufactured by a combination of pressure and percussion techniques from a grey-brown chert. The blade is long and narrow and the stem formed by side notches. The base is markedly convex and the edge of the stem rounded. The point might be regarded as a deviant Cupp point but the marked breadth of the stem coupled with an appearance of shortness seems to place it out of the range of the normal form. The maximum width of the blade is 20 mm. and the width of the base is similarly 20 mm. The stem is 14 mm. in length and the maximum thickness is 6 mm.

(7). Specimen # 591 was found in square 2:1, level 9 (Figure 20, 7). While the point gives the appearance of being a contracting stem form, this impression is created by the concave shoulder area. The basal section of the stem is clearly squared and extensive grinding is found on the sides and to

(1) # 225 (2) # 528 (3) # 337 (4) # 590



(5) # 127 (6) # 378 (7) # 591 (8) # 70



(9) #308 (10) # 590 (11) # 590 (12) #529

Figure 20. Unclassified points.

a lesser extent on the nearly straight base. The general form of the stem is closer to the Smith point than it is to Langtry but it is of a somewhat intermediate category that makes classification difficult. The manufacturing technique is largely of the percussion variety though the form is modified by an edge retouch. The blade is slightly recurved. In dimensions, the point is 35 mm. wide at the shoulder and 21 mm. wide at the base. The stem length is 22 mm. and the maximum thickness 10 mm.

(8). Specimen # 70, found in square 1:5, level 4 (Figure 20, 8), has a fragmentary stem which makes it difficult to determine whether it has a straight-sided stem like the Smith point or a contracting stem. The point is manufactured from a white chert and bears a precise pressure retouch. The point is 29 mm. in width at the shoulder and has a maximum thickness of 9 mm.

(9). Specimen # 308, found in square 2:4, level 9 (Figure 20, 9), has a shape which has been extensively modified by several large thermal spalls. Its appearance suggests both the shallow notches of the Rice Side-notched and the straighter stem of the Smith point. In its overall dimensions, however, the point is smaller and narrower than both varieties. It was manufactured from a banded brown and grey chert by pressure retouching. The maximum length of the point is 61 mm.

(10). Specimen # 590 was found in square 2:1, level 7 (Figure 20, 10). It was manufactured by percussion and pressure techniques from a mottled grey chert. The prominent, sharply-flaring stem does not fit readily in the point categories that have been established. The generally obtuse shoulder areas and the stem which shifts from straight to slightly convex sides where it merges with the convex base remove it from such a category as the Cooper points. The point has a maximum blade width of 37 mm. and a

width at the base of 29 mm. The stem is 20 mm. in length and the maximum thickness is 8 mm.

(11). A second point from the same location (Figure 20, 11) is also manufactured from a mottled grey chert by pressure and percussion techniques. The convex blade tapers to a somewhat needle-like tip. The stem is produced by a technique that suggests a strong relationship with the Fairland B points and, like them, the sides of the stem are ground. The stem, however, appears to be proportionately narrower and the flare is less accentuated. Since the base of the point is broken, information is lacking on this area. The blade has a maximum width of 28 mm. and the maximum thickness is 7 mm.

(12). Specimen # 529 was found in square 1:4, level 12 (Figure 20, 12). Crudely manufactured, primarily by percussion technique, from a dark grey chert, the implement could readily be either a knife or point. It is assumed, however, that the rounded end consists of a contracting stem of generally Gary characteristics. The specimen is 67 mm. in maximum length and 25 mm. in maximum width. The stem is 17 mm. in length and the maximum thickness is 10 mm.

(13-16). Four projectile points which may comprise a group of inter-related forms are illustrated in Figure 21, 13-16. The task of their description is complicated by the fact that the generally similar projectile points found in the Delaware County area are not present at site D1-47. This latter group consists of the points which, in an earlier analysis of the Archaic complexes of Delaware County (Baerreis, 1951) had been given the provisional designation of Type C (ibid., pp. 17-18; Fig. 6, a-f; Fig. 11, a-c). In his analysis of the Rice Site in Stone County, Missouri, Robert T. Bray (1956: 127-8) has designated a similar form Table Rock Stemmed. Although the illustrated Missouri series is small, there would appear to be some

slight differences between what are regarded as the modal characteristics in the two areas. In the Oklahoma points the base is commonly convex and occasionally straight in contrast to the Missouri base described as straight or slightly concave. The stem of the Missouri points is described as square to slightly expanding toward the base while the Oklahoma points would characteristically have a slight flare to the base though stems with a straight-sided expansion to the base are also present. Finally, the Missouri points are described as having a blade with edges straight to slightly convex while in the Oklahoma points the convex blade is a characteristic feature. A more systematic comparison of measurements may also reveal some size differences. Those available suggest the Oklahoma points tend to be somewhat narrower but larger samples from both areas may erase these differences. Despite the stress upon the differences, there would appear to be little doubt that we are dealing with related forms--the similarity in workmanship, extensive grinding on the stem and base and general characteristics of form and size are striking. The differences which have been cited may well be due to the small sample available for analysis at the Rice Site. Consultation with Mr. Bray and examination of the collections at the University of Missouri indicates the same range in features in the points of the two areas. It is possible, however, that the modal form of the two regions may vary. To further facilitate comparison, a series of Table Rock Stemmed points from Delaware County are illustrated in Figure 21, 17-26. With this as background information, we may return to the problem of the description of the specific points from D1-47 for which broad (or remote) relationships with the Table Rock Stemmed points were suggested.

(13). Specimen # 532 was found in square 2:2 at level 15 (Figure 21, 13). It is manufactured from a white chert by percussion technique with

extensive reshaping by pressure flaking. The convex blade combined with a flaring stem and a markedly convex base fit the general form characteristics of Table Rock Stemmed. However, the extent of lateral grinding on the stem is slight and the base appears not to be ground. The stem is slightly broader in its proportions than is common and the shoulder is somewhat more strongly developed than in the model Table Rock Stemmed form. The specimen is 55 mm. in length, 32 mm. wide at the shoulder and the stem is 15 mm. in length. The base is 20 mm. in width and the stem is 16 mm. wide at its narrowest point. The thickness of the point is 8 mm.

(14). Specimen # 536 was found in square 1:4 at level 13 (Figure 21, 14). It is manufactured from a light gray chert by similar techniques to the preceding specimen but is not quite so skillfully finished. The edges of the blade tend to be somewhat more straight-sided and the juncture of the flaring stem with a straight base produces sharp corners to the stem. No grinding is present on the stem or base. Since a small portion of the tip is missing the maximum length of the point cannot be obtained. The maximum width is 27 mm. at the shoulder and the base is 18 mm. wide. The stem is 15 mm. wide at its point of minimal constriction and has a maximum length of 12 mm. The maximum thickness is 9 mm.

(15). Specimen # 530 was found in square 1:3 at level 12 (Figure 21, 530). While similar in general size characteristics to the previously discussed specimens, the pronounced barbs give the specimen a distinctive appearance as does the straight sides of the blade. The projectile point is largely formed by percussion flaking and is manufactured from a dark grey chert. No grinding appears on the side of the stem and the basal form cannot be determined due to breakage in this area. The point has a maximum width of approximately 31 mm. and the maximum thickness is 7 mm. Due to breakage on

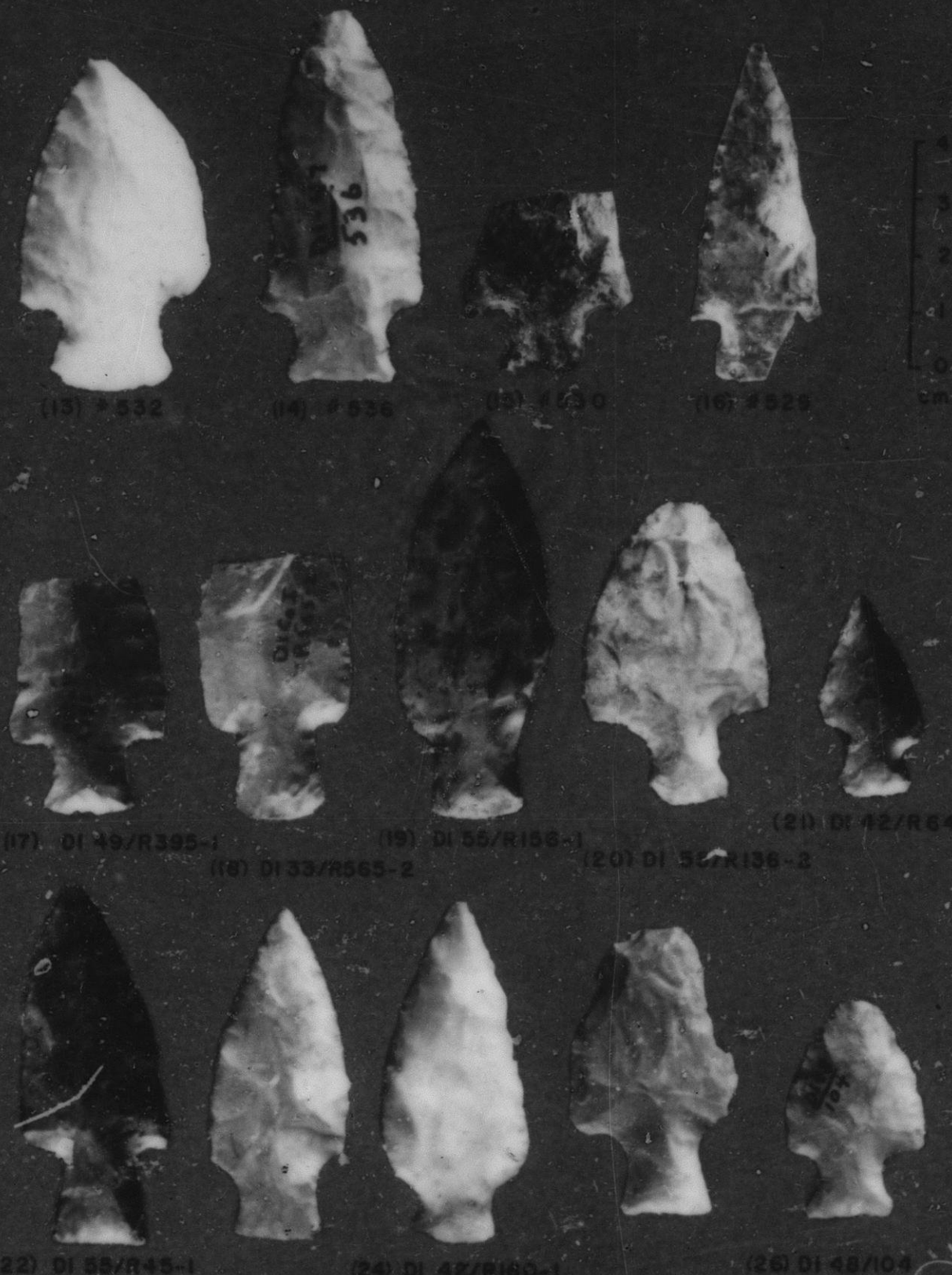


FIGURE 21 UNCLASSIFIED PROJECTILE POINTS (13)-(16)
TABLE ROCK STEMMED (17)-(26)

the stem, the only measurement which can be determined is the minimum stem width of 13 mm.

(16). Specimen # 529 was found in square 1:4, level 12 (Figure 21, 26). The point is precisely manufactured from a white chert by a combination of percussion and pressure techniques. It deviates from the Table Rock Stemmed point in the straightness of the blade outline, in the possession of a straight base and in the absence of grinding on the stem and base. The point is 60 mm. in maximum length and 23 mm. wide at the shoulder. The stem is 10 mm. long and 12 mm. at the point of minimum stem width. The maximum thickness of the point is 7 mm.

In the preceding group (points 13-16) the relationships to projectile points in Missouri, particularly Table Rock Stemmed have been stressed. Aside from these particular points, it should also be noted that other projectile points in the Missouri area (e.g., Bray, 1956: Figure 23 and 26) show a similar range in form although these have not been given formal type names.

Two additional projectile points should be considered in the broad unclassified category. These specimens (Figure 22) deviate in general size characteristics from the large projectile point group and comprise an intermediary category between the large and small projectile points. In view of the smaller end of the range of Table Rock Stemmed points (e.g., Figure 21: 21 and 26), however, it is perhaps not inappropriate to consider them as the smallest expression of points which still belong in the dart point category.

(17). Specimen # 29 was recovered from square 1:5, level 2 (Figure 22, 17). Both faces of the blade bear large primary flakes while rather steep retouching appears on the margins of the blade. The steepness of the retouch in this area as well as the asymmetry of the blade suggests the possibility that the projectile point has been reworked from a larger form.

The specimen may have originally had slender, pointed barbs that are now broken. If this is the case, it would appear that the form was essentially one of diagonal notches produced from the corner of the point. The form of the base is obscure. The point has a maximum width of 22 mm. and a maximum thickness of 5 mm. It is manufactured from a mottled dark grey and white chert.

(18). Specimen # 243 was found in square 0:5 at level 7 (Figure 22, 18). It is manufactured, with a delicate pressure retouch covering both faces, from a mottled brown, grey and white chert. Breakage at the corners again obscures the form which appears to have also been one making use of diagonal corner notches. There is perhaps much less justification for the inclusion of this form with the large projectile points since no reworking of a larger sized point is indicated. The specimen originally had a length of approximately 35 mm. and a maximum thickness of 5 mm.

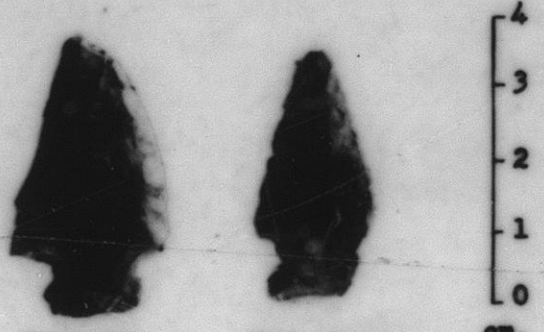


Figure 22. Unclassified points.

Blade Fragments of Large Projectile Points

Listed below are a series of blade fragments from large projectile points or possibly, in some instances, finely manufactured knives. Since only the tip of the blade or a section from the central portion of the blade is present, no further information can be provided concerning the nature of the original projectile point. While this material is obviously of no value for a typological analysis, it is possible that changing percentages of the fragments in different zones might permit functional inferences as to the character of the occupation.

#	Square	Level
70	1:5	4
71	1:5	6
79	0:5	top 2.5'
127	1:4	4
130	0:2	top 2.5'
224	1:4	5
233	1:5	6
234	2:3	6
235	1:2	5
241	1:5	7
243 (2)	0:5	7
293	2:3	8
300	1:2	11
302 (2)	1:4	9
375 (2)	2:1	11
379	2:2	12
381	2:3	11
382	1:5	9
384 (3)	1:3	10
402	0:6	10
404	0:4	10
405	2:1	12
433	0:5	8
435	1:1	12
444	2:5	7
514	2:1	17
516	1:7	9
517	1:4	14
521 (2)	1:5	11
522	2:4	12
524	0:3	11
526 (2)	1:5	10
528	1:3	13
529	1:4	12
530	1:3	12
620	2:8	6

Projectile Point With Graver-like Tip

This specimen (# 541, Figure 23) consists of a large projectile point whose tip has obviously been reworked in order to produce a small graver-like spur, 2 mm. in length. It was found in square 2:1 at level 18. In view of the asymmetry of the blade shape, this is clearly a case of reworking rather than a blade form intentionally produced with a needle-like spur. It is possible, of course, that in reshaping a projectile point with a broken blade that this form was utilized to produce a sharp point. However, it seems more likely that the point may have a more specialized function as a result of the reworking. Resemblance of the form to a graver is accentuated by the fact that the spur tends to be somewhat planoconvex in section. The original form of the projectile point is obscured by breakage in the shoulder area. It is manufactured from a white chert. The specimen has a maximum length of 64 mm., a width of 43 mm. and a thickness of 12 mm.

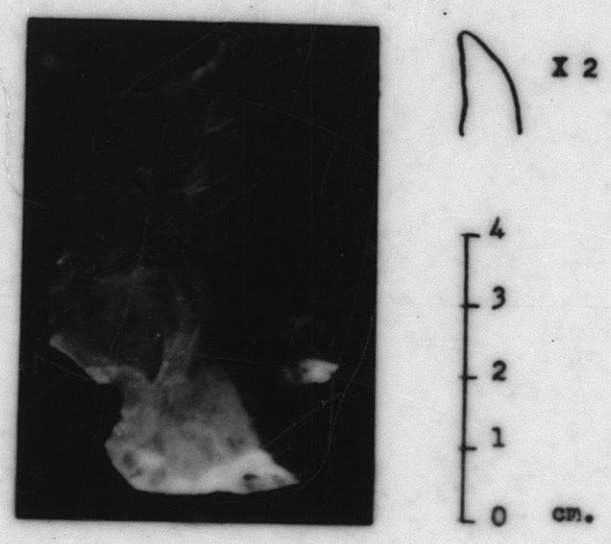


Figure 23. Projectile point with graver-like tip.

Bunt

In the analysis of the Archaic material from sites in Delaware County (Baerreis, 1951), two projectile point forms were classified as bunts. These differed from the normal projectile point in that the end or tip of the blade was intentionally rounded rather than pointed and further could be separated from stemmed scrapers possessing steep retouching from one face which produced the characteristic scraper edge. The two varieties of bunts were thought to be possibly a result of usage rather than a primary difference in function. One form had a rounded and sharp edge, produced by careful pressure flaking from both faces, while the other had a similar edge that was blunted and battered, appearing to have been struck against a hard surface. At the same time the possibility was recognized that the sharp-edged form could have served as a knife, rather than a blunt tip for stunning game (ibid., pp. 20-21). This latter possibility still exists, the primary function of the tool not being resolved.

A single example of the sharp-edged bunt (specimen # 541, Figure 24) was found at D1-47 in square 2:1 at level 18. The specimen, manufactured from a grey chert, is carefully shaped by pressure and percussion flaking. The point form appears to be of the Snyders-like variety and the dimensions of the specimen are: length - 46 mm.; maximum width - 41 mm.; and, maximum thickness - 8 mm.

Figure 24.
Bunt.

Unfinished Projectile Points

Two projectile points which are unfinished provide us with some insight into manufacturing processes used by the occupants of D1-47. One specimen (# 374; Figure 25, a) appears to have been broken when about one half of the point was completed. It is possible that this specimen involves the reworking of a larger blade or point since large primary flakes are to be found on both faces of the specimen. The curvature on one side of the blade has been nearly completed. A diagonal notch also appears on this side of the point. The other edge of the blade has not been similarly retouched and the implement is broken at the point where the other notch would be inserted. It is possible that this break occurred at the time the manufacture of the notch was attempted. If this is the proper interpretation, it would appear that the work habits involved the preparation of one side of the point to nearly its final stage before work was attempted on the opposite side. Of interest also is the fact that on the unfinished side retouching has produced a steeply beveled edge like that of a scraper. Such a bevel could represent the striking platform on which the final retouch to produce the bifacially beveled blade was executed. The suggested working procedure differs from that previously suggested for the Archaic horizon where it seemed that the notches might have been the last element produced on the implement (Baerreis, 1951: 33-4). The specimen was found in square 2:7, level 8.

A second specimen (# 77; Figure 25, b) is a clear example of the reworking of a broken form. In this instance the broken specimen bears a dark grey patination while one edge which is retouched on both faces is of a light white color. The working procedure appears to have been the same in both specimens. In this second example one edge has been reshaped to

the desired form while the other bears no evidence of such reworking. The specimen was found in square 0:3, in the top 2.5'.

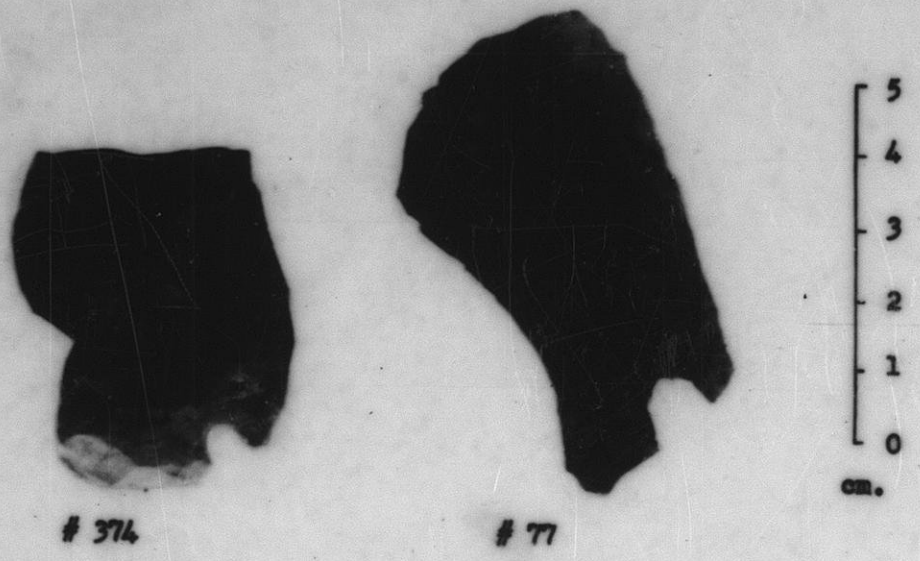


Figure 25. Unfinished projectile points.

SMALL PROJECTILE POINTS

An objection has been previously raised to the practice of designating small projectile points of simple geometric forms by type names which might result in their being given an erroneous or misleading cultural, time and space connotation (Baerreis, 1954: 43). The varied distribution of such forms in Oklahoma sites is briefly discussed in the paper cited. The same form categories are followed in this report, three divisions being required for the points of D1-47.

Simple Triangular Points (Figure 26)

The simple triangular points have straight to slightly convex sides, but even in the case of the latter the point of maximum width is at the base. In form, the base is either concave, slightly convex or straight. In manufacturing technique these points exhibit the most delicate pressure retouch found at the site. One specimen (# 290, Figure 26, b) bears a large flake

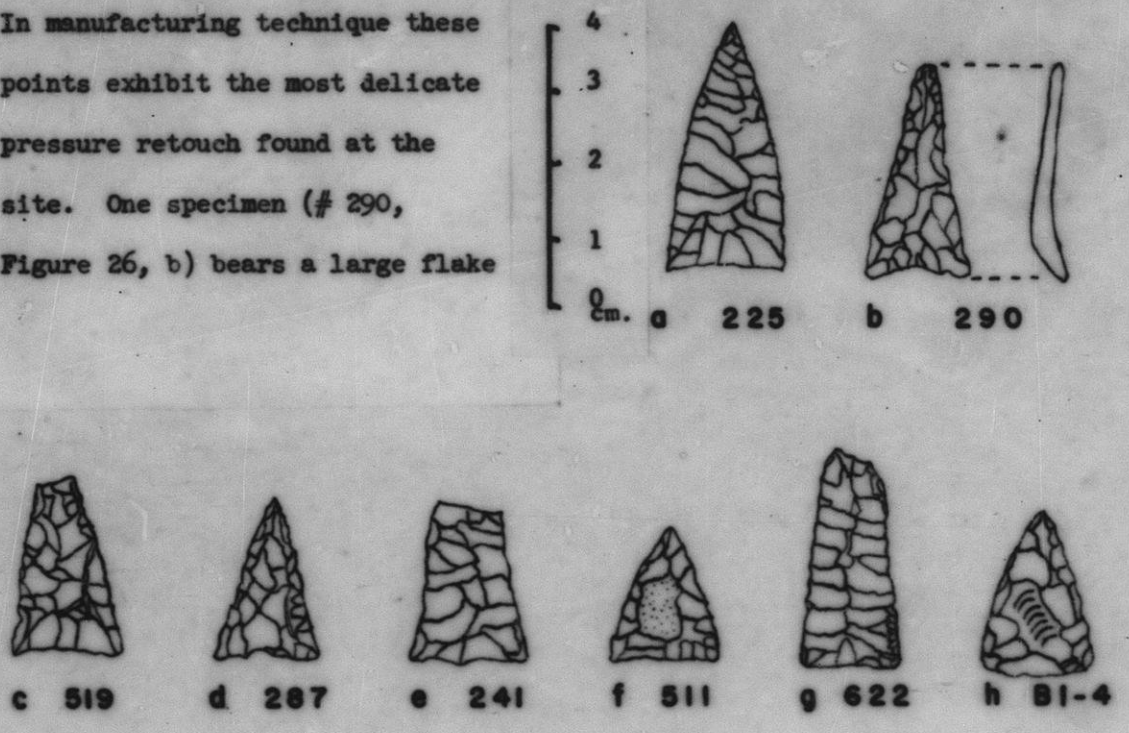


Figure 26. Simple Triangular Points.

scar in the center of one face but is retouched along the edges and over the entire opposite face.

Dimensions:

	f	Range	Mean
Maximum length	5	18 - 34	25.4 (mm.)
Maximum width.	8	13 - 18	15.0 "
Maximum thickness. . . .	8	2 - 4	3.0 "
Weight	5	.5 - 1.7	.95 (grams)

Individual Point Provenience and Associated Traits:

#	Square	Level	Length	Width	Chert Color
225	2:6	6	34	16	White/grey
290	2:4	7	30	14	White
241	1:5	7	--	16	Grey
287	1:7	7	22	14	White
622	2:8	7	--	13	Dark grey
519	1:6	10	--	14	Grey
511	1:5	12	18	18	Grey
B1-4	(with Burial 1)		23	15	Brown/white

Lanceolate Triangular Points (Figure 27)

The lanceolate triangular point is to be differentiated from the simple triangular point in having the point of maximum width located above the base. Obviously then, all points of this form have convex sides. Base forms are straight or concave. The points fall into two groups in terms of degree of finish and thinness of the point. Figure 27, a-e, comprise the thin points that bear delicate pressure retouch on both faces. Figure 27, g-i, consist of thicker points but with a similar pressure retouch over both faces except in one example. Plate 27, f, consists of a point which is

longitudinally curved, keeping the curvature of the original flake. Traces of this primary flake scar remain on both faces with only the edges being retouched. All of the points are manufactured from chert, either white, grey or of a pink tinge.

Dimensions:

	f	Range	Mean
Length.	7	25 - 36	32.0 (mm.)
Maximum width	9	8 - 18	12.1 "
Base width.	8	7 - 16	10.1 "
Thickness	7	3 - 7	4.7 "
Weight.	6	1.0 - 4.3	2.2 (grams)

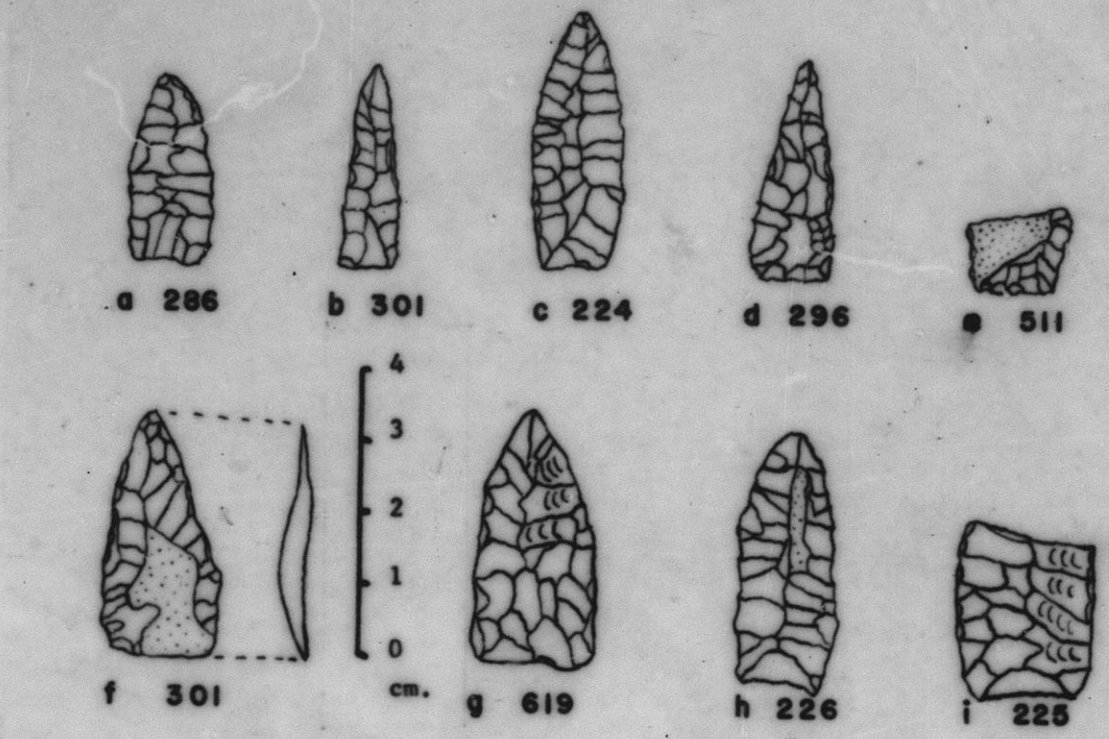


Figure 27. Lanceolate Triangular Points.

Individual Point Provenience and Associated Traits:

#	Square	Level	Length	Width	Chert Color
224	1:4	5	35	12	Grey/brown
619	1:8	5	36	17	Grey/pink
226	1:6	6	36	14	Brown
225	2:6	6	--	18	White
301	2:5	7	34	17	Grey/pink
286	2:7	7	25	11	Dark grey
301	2:5	7	28	8	White
296	1:4	8	30	11	Grey/brown
511	1:5	12	--	12	White

Small Lanceolate Points (Figure 28)

The small Lanceolate point consists of those forms in which there is a continuous curvature from the sides of the blade through the base. Thus the base cannot be clearly differentiated from the remainder of the point form. As a group these points are cruder in workmanship than the other small projectile points and it is possible that in part they represent unfinished specimens. Traces of percussion flakes remain on both faces though all have bifacial pressure retouching. Grey and pinkish-white chert were used as materials.

Individual Point Provenience and Associated Traits:

#	Square	Level	Length	Width	Thickness	Chert Color
14	0:3	6	42	21	5	White/pink
198	2:4	8	50	22	5	Grey/brown
404	0:4	10	--	17	4	Grey
530	1:3	12	29	15	5	Dark grey

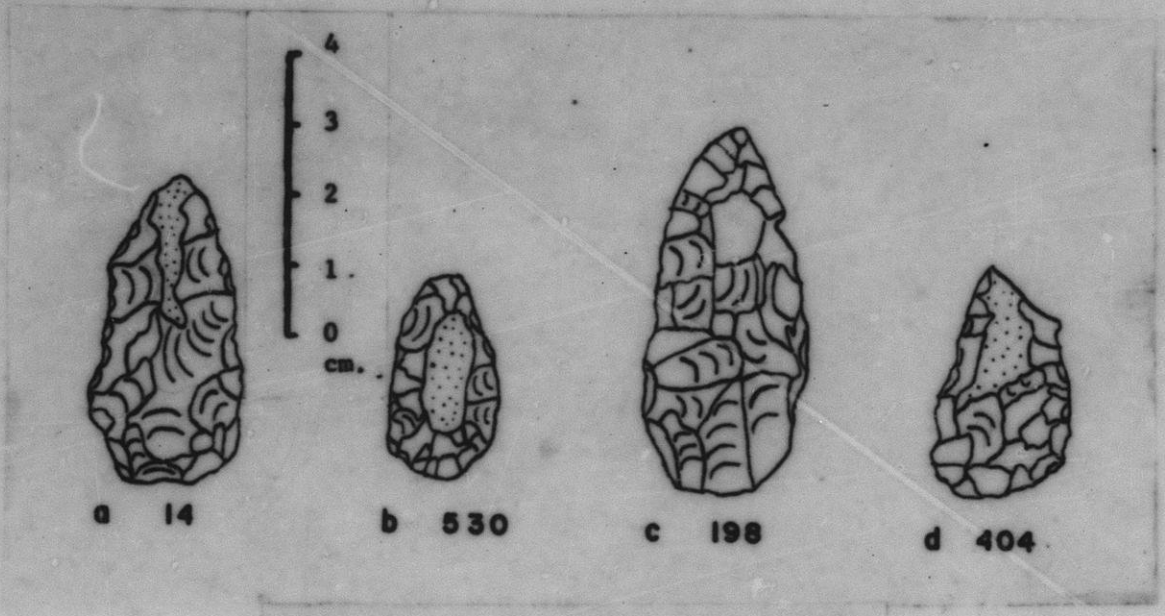


Figure 28. Small Lanceolate Points.

Unclassified Small Projectile Points (Figure 29)

The group consists of a series of small points which are either broken or unfinished. They are segregated as a group because of their utility in plotting the total distribution of a small point complex within the shelter. Figure 29, b-d, consist of the tips of points while a and e are segments of blades of finished points. The remainder are unfinished or extensively reworked points. # 236, Figure 29, i, has been retouched upon one face while the opposite face consists of a single spall suggestive of a heat fracture. Specimens 392 and 618, Figure 29, k-l, were retouched at the base and along the side of one face, but evidently never completed. The tip of # 294, Figure 29, j, appears not to have been completed and # 244, Figure 29, n, is retouched only on one face. Specimen # 76, which is not illustrated, has a simple triangular form and is also retouched on only one face.

Individual Point Provenience

#	Square	Level	Chert Color	#	Square	Level	Chert Color
76	0:6	top 2.5'	Red				
618	0:8	4	Grey	294	1:6	7	Grey
72	1:6	4	Grey	291	1:3	7	Pink
225	2:6	6	Pink	244	0:6	7	White
236	1:2	6	Black	293	2:3	8	Grey
294	1:6	7	White	79	0:1	top 2.5'	Grey
286	2:7	7	Grey	519	1:6	10	White/pink
241	1:5	7	Pink	521	1:5	11	Grey

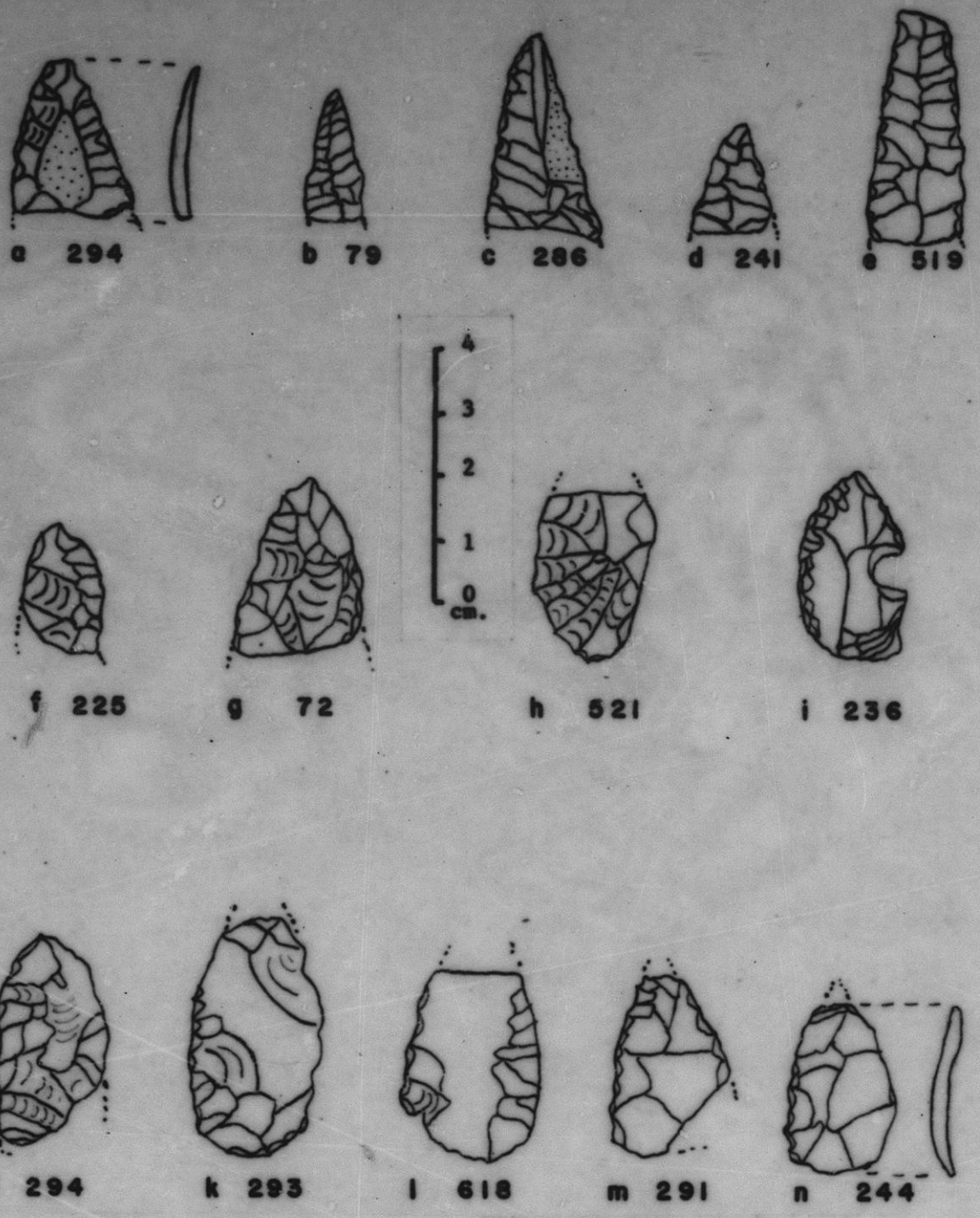


Figure 29. Unclassified small projectile points.

Small Serrated Point (Figure 30)

One small serrated pointed manufactured from a grey chert was found in square 0:4 at level 14. Small points having the same general characteristics appear to be associated with the Gibson Aspect but the types presently defined (Alba, Scallorn, etc.) would seem to be primarily those made with relatively great precision and having rather distinctive shape attributes. However, associated with these in some Oklahoma sites are points somewhat more crudely made that do not conform in specific detail to the named types. The point under consideration, for example, could perhaps be a cruder variant of the Scallorn type (Suhm, Krieger and Jelks, 1954:506-7) but in its more bulbous base tends toward the concept of the Alba type (Bell, 1958:8-9). It is likely that it represents a distinct type and perhaps should be grouped with Types 6 and 7 identified at the Brackett site in Cherokee County, Oklahoma (Bareis , 1955:14).

The D1-47 specimen is manufactured by pressure flaking techniques. The blade seems to have originally been recurved and the edges are serrated. The stem (8 mm. in length) flares to a rounded base (9 mm. in width). The maximum width of the point at the shoulder is 10 mm. and the maximum thickness is 5 mm.

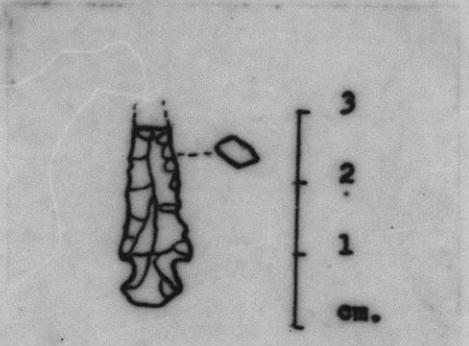


Figure 30. Small serrated point.

KNIVES

Specimens placed in the knife category include those implements which appear to have primarily a cutting function, as in the modern knife. They are classified in large part on the basis of shape and size. While some possess a sharp, pointed end suggesting a penetrating function like a dagger (or a projectile point), these implements do not conform in size and proportions to the normal range of dart points. It is possible that such pointed specimens could have been attached to the end of a spear or dart, but there is no way in which they can be distinguished from a knife that might similarly be attached to a handle. It should also be mentioned that in conformity with an earlier analysis of materials from this area (Baerreis, 1951:21-22), a distinction is made between "knives" and "core knives". The latter group consists of a series of implements of generally the same size and shape as the knives but represent cruder specimens having a more irregular outline, generally a greater thickness and are shaped largely by a percussion flaking technique. They may represent unfinished knife forms or blanks from which other implements were to be manufactured. Such implements are discussed following the description of the knives. As in the report previously cited, the knife forms have been grouped in size ranges including large knives 80 mm. in length and above and knives of medium size ranging between 50 and 80 mm.

Large Ovate-Acuminate Knives (Figure 31, a-c)

Three knives have a general willow leaf shape, a rounded base and sides, and taper to a sharp point. The dimensions of the knives are given in the accompanying table as well as a description of the chert color. One specimen was found in two pieces, the base in square 2:1, level 16 and the tip in square 2:1 South, level 7. As explained under excavation procedure, these are adjacent squares, not the same square. Since large rock masses in the floor of the

shelter were struck at the beginning of level 8 in square 2:1 South, the knife may have been dropped and broken at or near the original surface of the shelter in this square. Half of the knife then perhaps remained at this level while the remainder fell to level 16 in the adjacent square (2:1). Obviously when level 7 of square 2:1 South was occupied, square 2:1 was open to the depth of level 16.

The specimens in this group have been shaped primarily by a percussion technique with a secondary retouch used to sharpen the edges and produce symmetrical forms. Specimen # 540 (Figure 31, b) is the most carefully finished in the group and is also characterized by rather extensive grinding of the

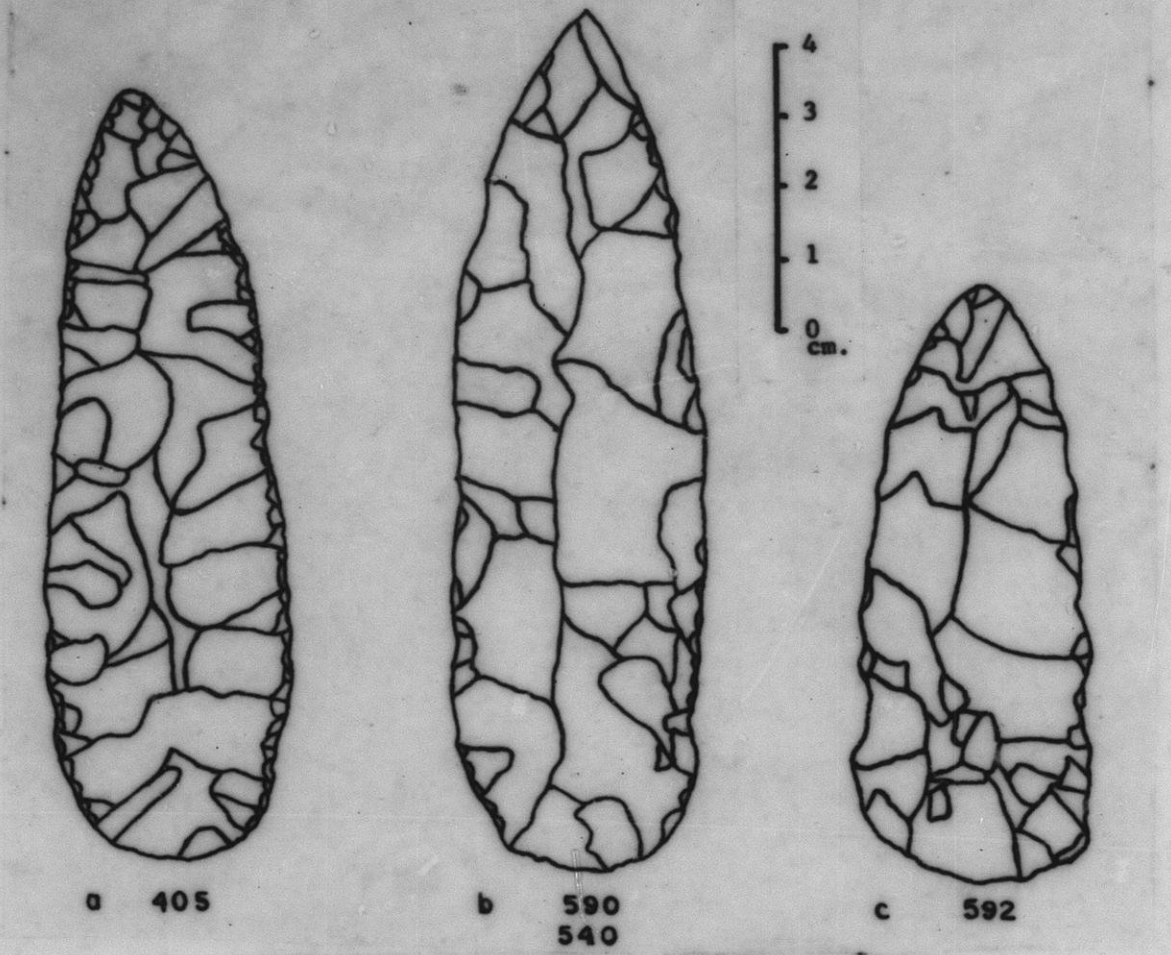


Figure 31. Large ovate acuminate knives.

basal area to smooth the sharp edge. This grinding extends to a maximum of 15 mm. above the extreme extension of the base proper. A biconvex cross section is found on all specimens.

Specimen Provenience and Associated Traits:

			(Measurements in mm.)			
#	Square	Level	Length	Width	Thickness	Chert Color
405	2:1	12	108	32	10	Dark grey
540/ 590	2:1	16 South 7	118	34	12	Mottled grey
592	1:5	18	82	31	16	White

Large Ovate to Elliptical Knives (Figure 32, a-e)

Unlike the ovate-acuminate category, both ends of these knife forms are rounded. Use as a piercing implement is therefore precluded. Considerable variation in shape is to be seen, however, ranging from the proportionate short and broad specimen # 514 (Figure 32, a), to a nearly elliptical specimen (# 405, Figure 32, b), and to those with a more pronounced taper (Figure 32, c-d).

It will be noticed that four of these specimens bear the same number (405), indicating that they were found in the same square and level. Another specimen from this same location has been previously described in the ovate-acuminate class (Figure 31, a). The daily field notes report that a group of six knives were found within a 26" area in this square. It is of interest to note that a similar cache was found in the Neosho Focus horizon of another bluff shelter, D1-55 (D1SmI) in this region (Hall, 1951:38).

While the faces of the specimens as a group are shaped by percussion techniques, the flake scars though large are shallow and show an excellent control of technique. A pressure retouch was utilized to produce a sharp and symmetrical edge on the biconvex blades. One knife (# 405, Figure 32, d)

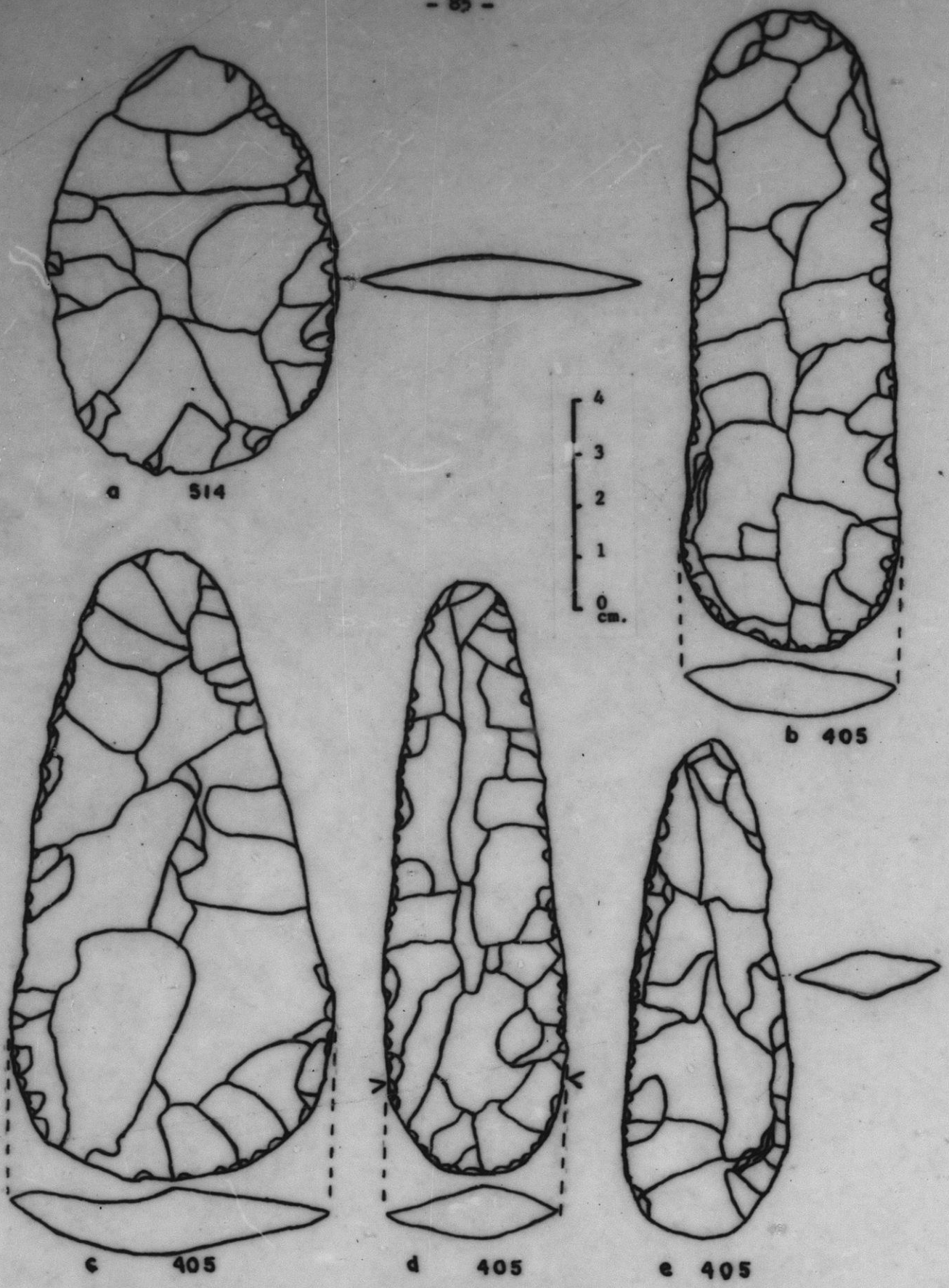


Figure 32. Large ovate knives.

bears very extensive grinding on the larger, rounded end comparable to that previously noted in the ovate-acuminate knife illustrated in Figure 31, b. The grinding is even more extensive on the specimen which is ovate in outline and would clearly appear to have been designed to dull the end rather than being derived from usage. The grinding extends to a maximum of 16 mm. above the lowest portion of the base. None of the remaining specimens bear a comparable smoothing.

Specimen Provenience and Associated Traits:

			(Measurements in mm.)			
#	Square	Level	Length	Width	Thickness	Chert Color
405	2:1	12	95	32	12	Mottled grey
405	2:1	12	114	34	11	Dark grey
405	2:1	12	124	41	12	White
405	2:1	12	122	61	15	Grey/pink
514	2:1	17	82	56	10	Light grey

Ovate-Acuminate Knives of Medium Size (Figure 33, a-f)

The ovate-acuminate knives of medium size, like their larger counterparts, comprise a group which is pointed at one end and rounded at the opposite end. They are separated, on the basis of form, from those knives which possess a distinct base. These two groups, however, clearly merge with each other by imperceptible degrees.

The variability in proportions is great (Figure 33). Individual measurements are given in the following table. A biconvex cross section is characteristic of the group. The specimens appear to be primarily manufactured by percussion flaking with secondary flaking used to sharpen the edges and create more symmetrical outlines. One specimen (Figure 33, e) diverges from the remainder of the group in being finished on both faces with relatively precise pressure flaking.

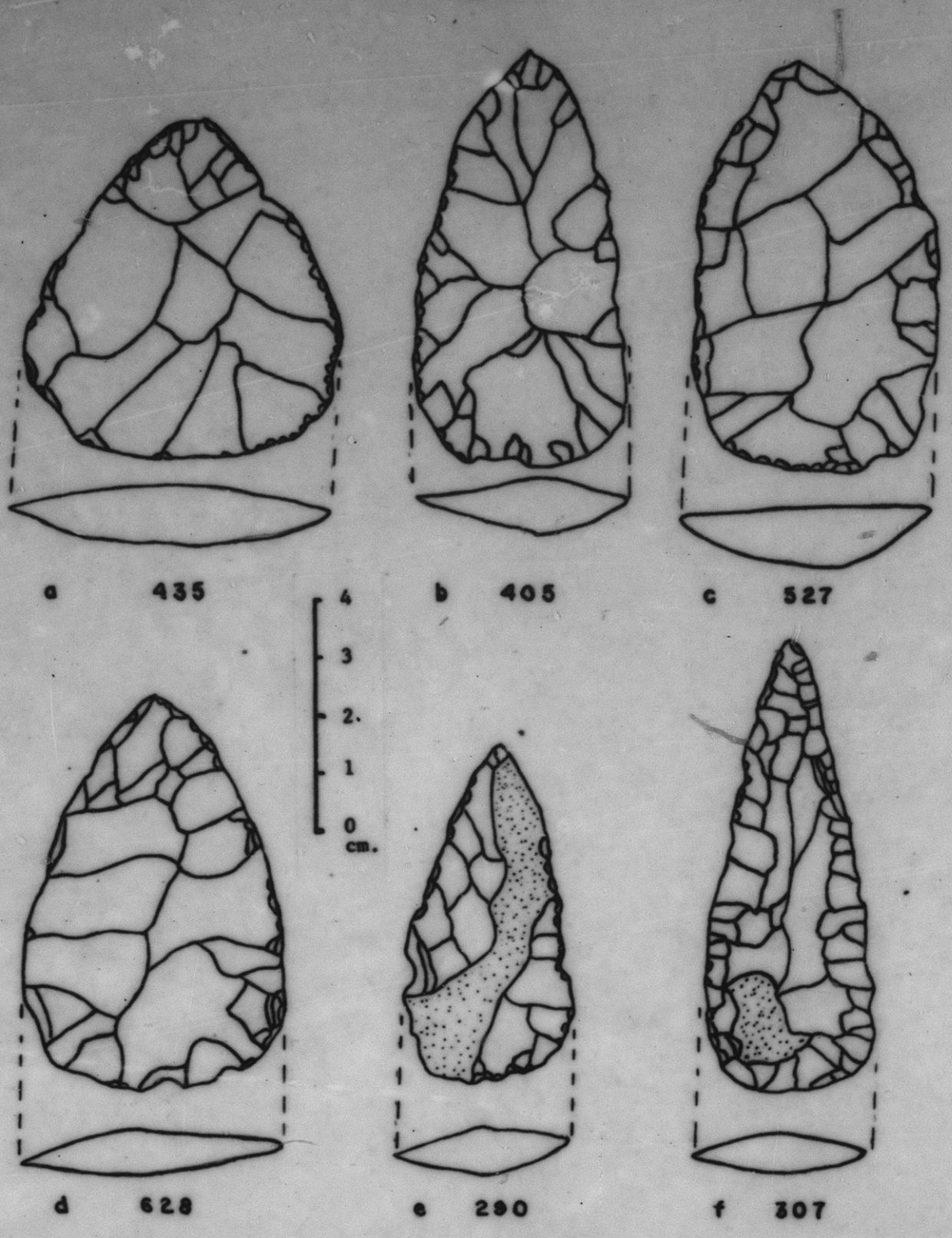


Figure 33. Medium ovate acuminate knives.

Specimen Provenience and Associated Traits:

#	Square	Level	Length (Measurements in mm.)	Width	Thickness	Chert Color
290	2:4	7	59	29	8	Pink
628	0:8	6	67	46	9	Mottled grey
307	2:2	11	78	29	8	Dark grey
435	1:1	12	59	55	12	White
405	2:1	12	72	37	10	Light grey
527	2:2	13	71	45	9	Light grey

Knives With Distinct Base (Figure 34, a-g)

A separate form category has been established for those knives possessing a distinct base. While the knives with a convex base approach, for example, the ovate-acuminate knives they may be recognized by a distinct point of juncture between base and sides of the blade. The group varies considerably in degree of finish of workmanship. # 592, Figure 34, a, is thin with a neat symmetrical outline produced by a careful pressure retouch along the edges of both faces. The remaining specimens exhibit a much greater irregularity of outline. Two types of bases are present: convex (Figure 34, a-e), and straight (Figure 34, f-g). The latter specimen now appears to have a slightly concave base as a result of what is perhaps a recent break. Since all of the specimens are fragmentary, the complete outline of the form could not be determined and only a limited series of measurements could be taken.

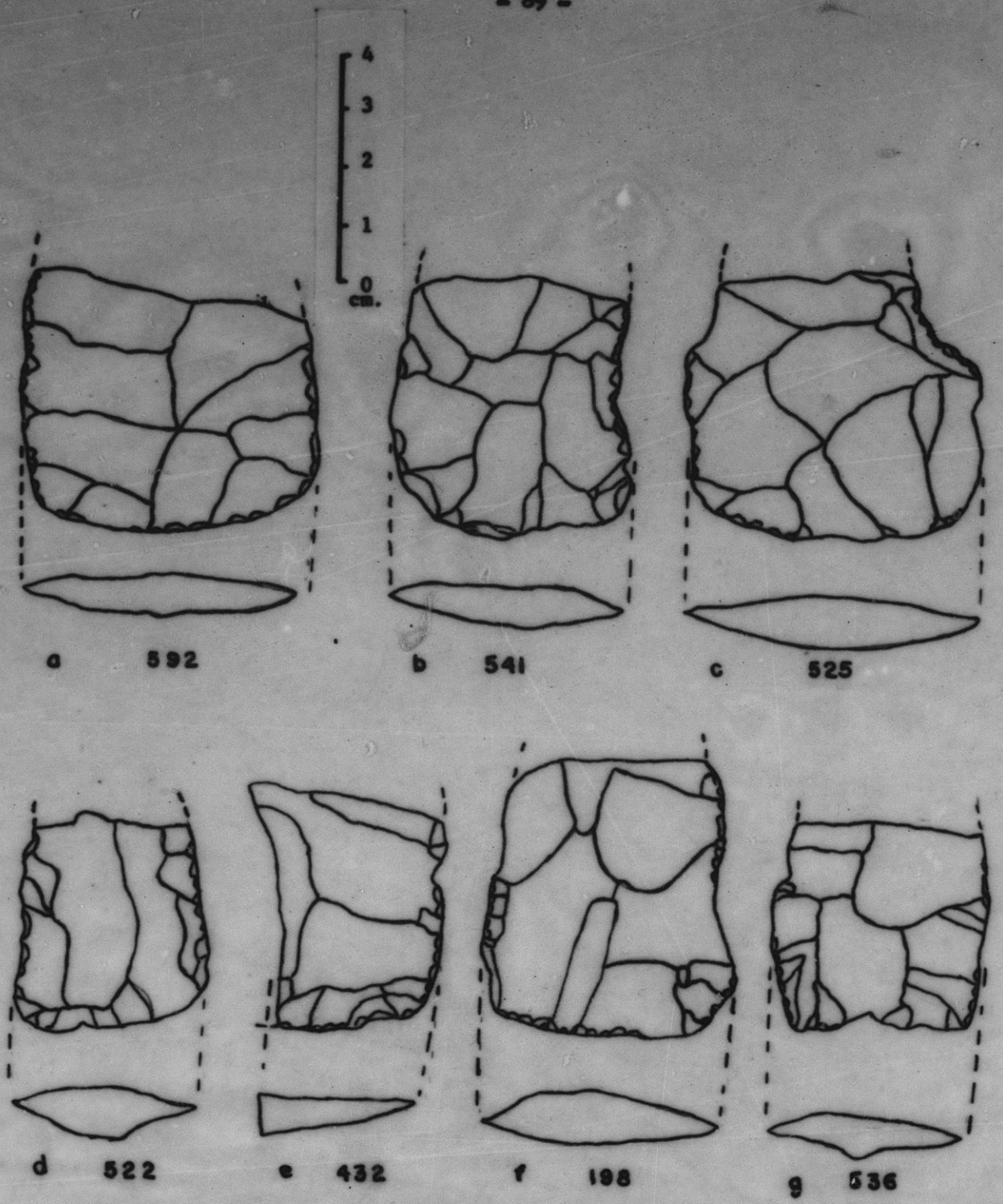


Figure 34. Knives with distinct base.

Individual Knife Provenience and Associated Traits:

#	Square	Level	Width	Thickness	Chert Color
198	1:2	7	43	13	Mottled grey
522	2:4	12	33	10	Dark grey
536	1:4	13	37	7	White
525	1:2	14	50	13	Mottled grey
432	2:1	15	--	10	Light grey
592	1:5	18	50	7	Mottled grey
541	2:1	18	41	9	White

Unclassified Knife Fragments (Figure 35, a-g)

The knife fragments placed in this category consist of fragments of the tip or mid-section of blades or, in a few instances, the tapering, bluntly rounded end may represent a basal sector but this cannot be determined with certainty. Because of their fragmentary condition, the specimens are not classified in either size or shape categories.

Individual Knife Provenience and Associated Traits:

#	Square	Level	Width	Thickness	Chert Color
80	0:1	top 2.5'	--	9	White
69	1:4	4	--	8	Banded grey
302	1:4	9	39	8	Light brown
403	0:3	9	36	9	Mottled grey
383	2:1	9	--	11	White
530	1:3	12	51	12	Mottled grey
530	1:3	12	32	7	Mottled grey
528	1:3	13	41	9	Pink
528	1:3	13	30	6	Light grey
244	0:6	7	--	9	Light grey
378	1:4	10	--	9	Mottled grey
539	1:2	17	--	9	" "

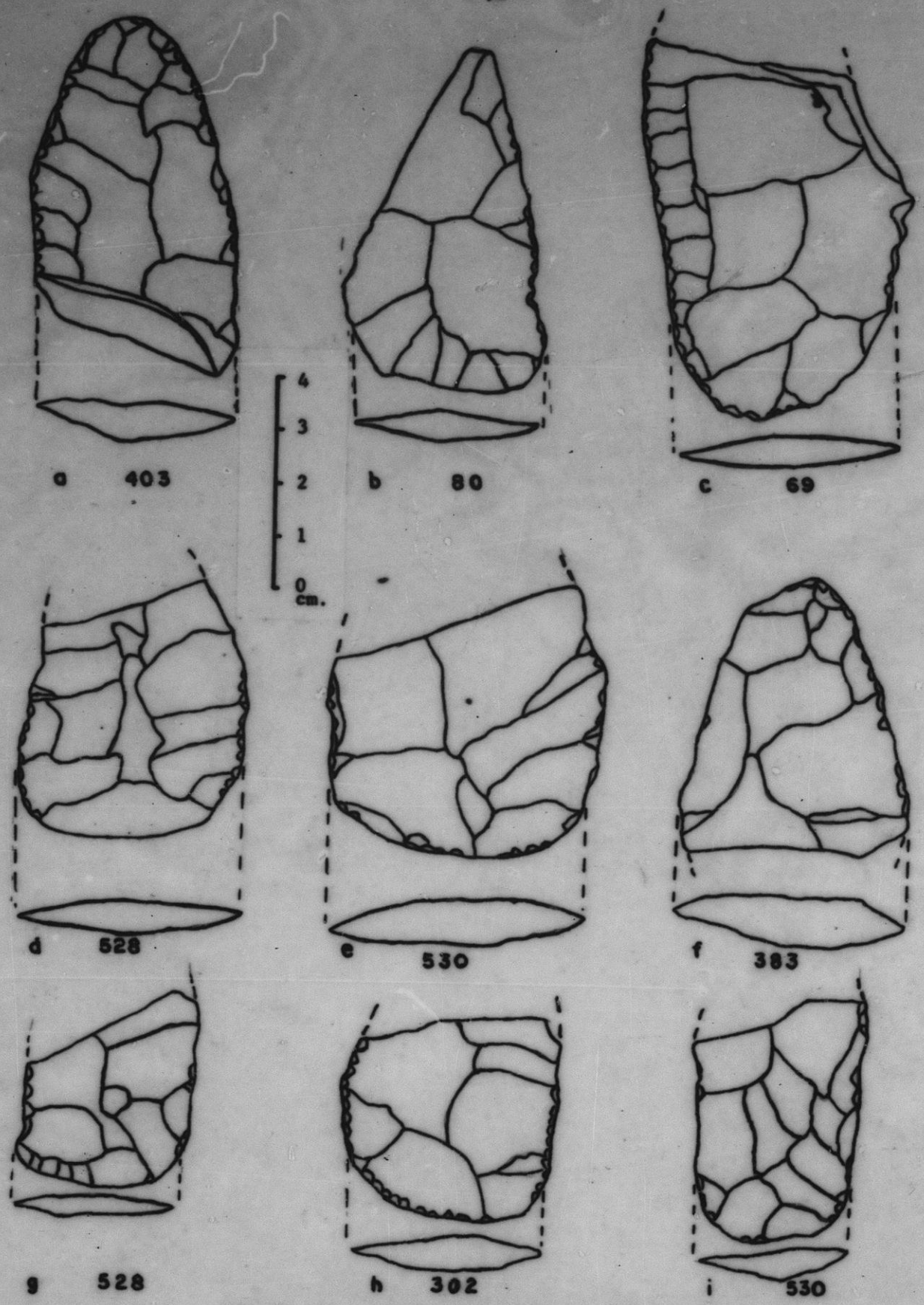


Figure 35. Unclassified knives (fragmentary).

Unclassified Knives (Figure 36)

One knife (# 287) is placed in an unclassified category since it essentially does not fit in the group of bifacially flaked knives, though bifacial flaking is present on a limited portion of the blade. The basal portion of the knife appears to represent an unmodified striking platform and traces of the primary flake scars produced in the shaping of the original core are present on one face. The other face preserves the remnant of the single flake scar produced when the flake was struck from the core. The section toward the pointed end has been modified by pressure flaking on both faces. The specimen is 65 mm. in length, 22 mm. in width and 6 mm. in thickness. The knife is manufactured from a grey chert and was found in square 1:7 at level 7.

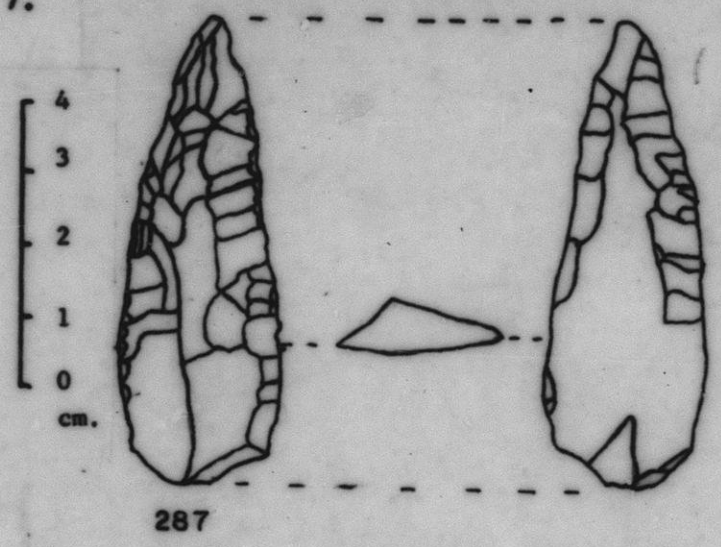


Figure 36.
Unclassified knife.

Core Knives (Figures 37-40)

Core knives comprise those implement forms which generally resemble the knife category but are shaped primarily by bold percussion flaking with only occasional pressure retouch along the edges. Such a description does not serve to differentiate this category from knives proper, but in general it is a category of crudely manufactured implements with more irregular outlines and heavier and thicker than the knives. Although it is a subjective appraisal of the quality of manufacture, an earlier analysis of specimens from northeastern Oklahoma (Baerreis, 1951:63-64) served to demonstrate that core knives occurred with a higher frequency in early archaic levels than in later ones.

The core knives are present in several shape categories. Six (Figure 37, a-f) represent an ovate-acuminate form. These are tabulated below, together with an indication as to whether pressure flaking is present to modify the edges of the form.

Ovate-Acuminate Core Knives

#	Square	Level	Length	Width	Thickness	Pressure Flaking	Chert Color
436	1:1	11	65	43	12	Yes	Mottled grey
384	1:3	10	57	34	12	No	Light grey
537	1:2	14	85	61	16	No	Mottled grey
436	1:1	11	79	51	13	No	Light grey
435	1:1	12	73	40	16	No	Dark grey
436	1:1	11	79	47	18	Yes	Dark grey

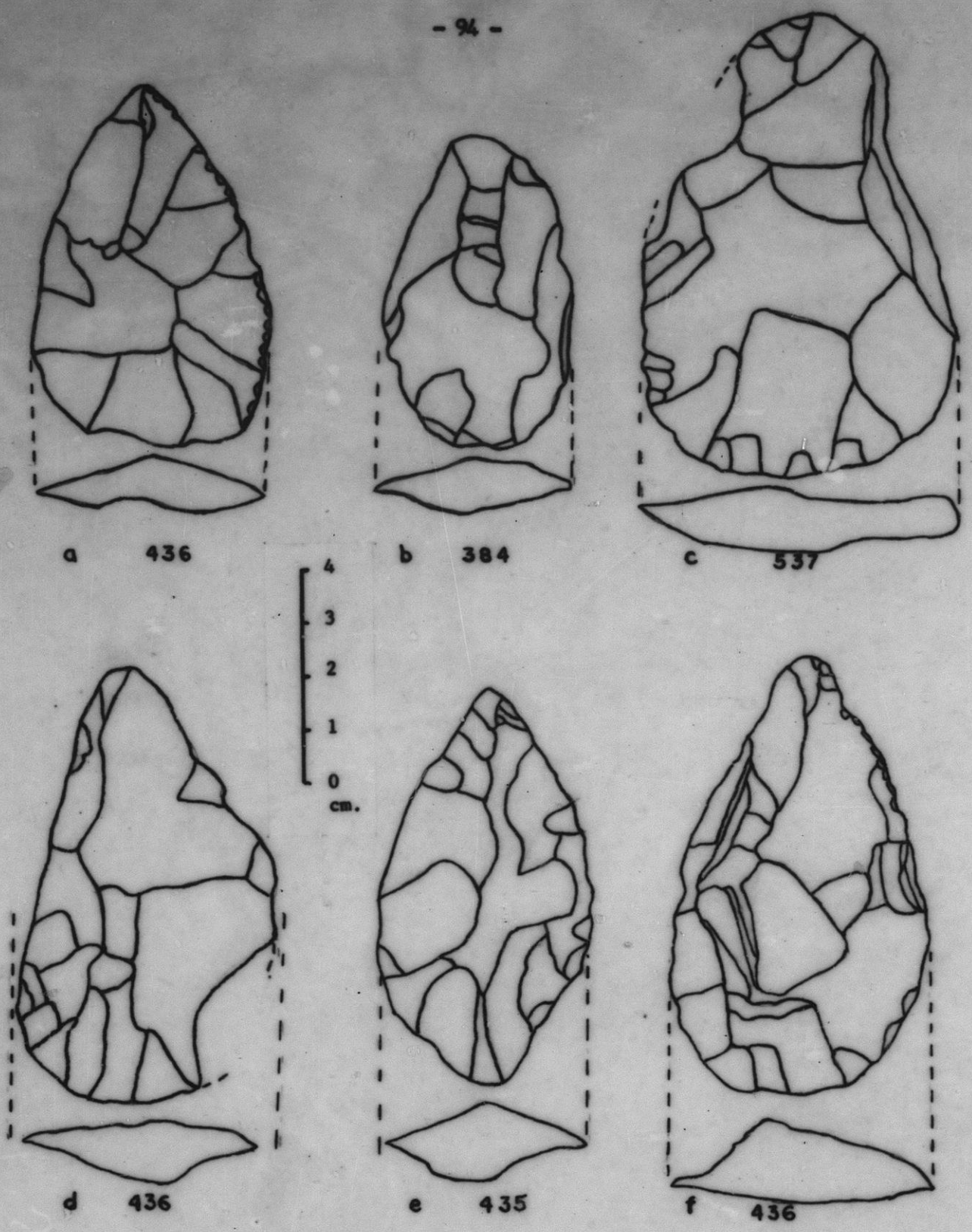


Figure 37. Ovate acuminate core knives.

A second category in the core knife class consists of those specimens possessing a distinct basal form (Figure 38, a-e). These include implements having a straight base (a-c) as well as those with a rounded base (d-e), the latter resembling a form with a distinct contracting tang.

Core Knives With Distinct Base

#	Square	Level	Length	Width	Thickness	Pressure Flaking	Chert Color
435	1:1	12	79	49	12	Yes	Mottled grey
435	1:1	12	98	39	15	No	Red/white
528	1:3	13	73	42	12	Yes	Mottled grey
124	1:3	4	78	39	12	No	Mottled grey
627	0:5	14	--	42	13	No	Mottled grey

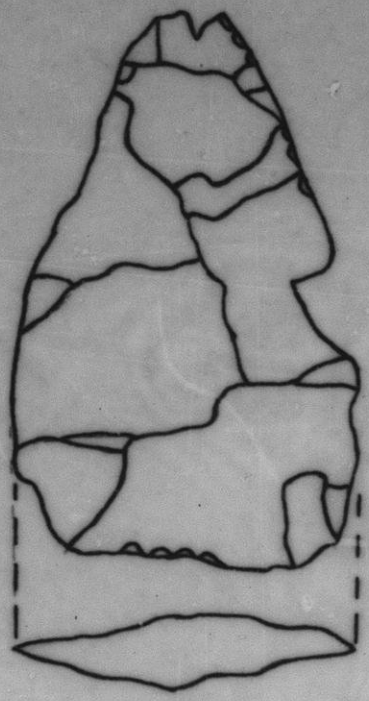
The remaining core knives consist of a series of fragments from which only limited data can be secured. The fragments are tabulated below and illustrated on Figures 39-40.

Core Knife Fragments

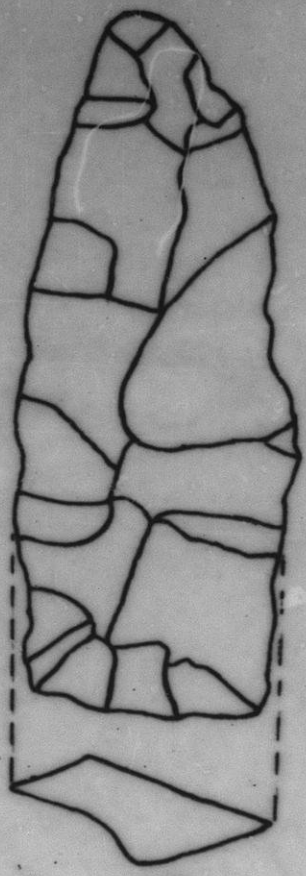
#	Square	Level	Width	Thickness	Pressure Flaking	Chert Color
530	1:3	12	(40)	11	Yes	Dark grey
530	1:3	12	50	11	No	Mottled grey
436	1:1	11	(45)	14	Yes	Mottled grey
436	1:1	11	(59)	14	No	Pink/white
541	2:1	18	(51)	12	Yes	Light grey
198	1:2	7	34	9	Yes	Light grey
287	1:7	7	40	14	Yes	Mottled grey
288	1:4	7	(50)	11	No	Mottled grey
591	2:1	19	(53)	12	No	Light grey

Core Knife Fragments (Continued)

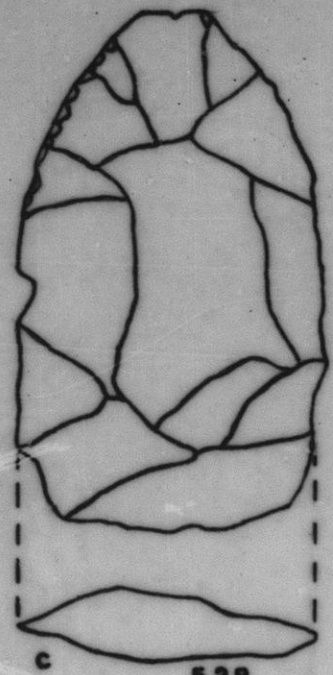
#	Square	Level	Width	Thickness	Pressure Flaking	Chert Color
307	2:2	11	(45)	16	No	White
307	2:2	11	--	12	No	White
307	2:2	11	49	15	No	White
528	1:3	13	60	17	No	White
528	1:3	13	50	12	Yes	Mottled grey
88	2:4	6	30	11	Yes	Mottled grey
442	0:5	10	37	11	No	Mottled grey
590	2:1-S	7	42	17	Yes	Mottled grey
13	1:4	1	41	14	Yes	Mottled grey



a 436



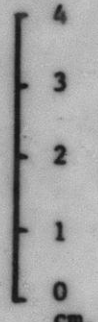
b 435

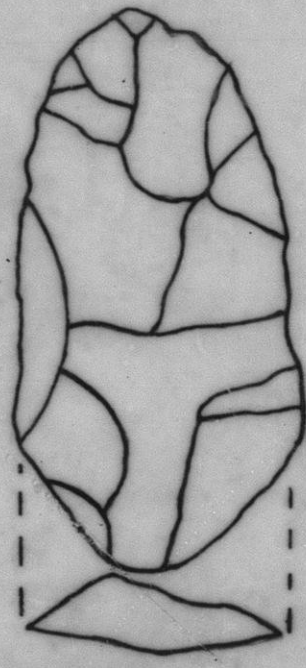


c 528

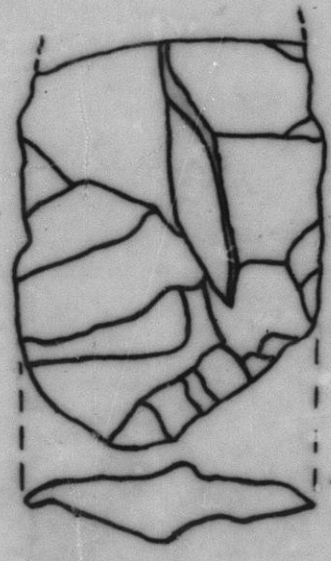
Figure 38.

Core knives with distinct base.





d 124



e 627

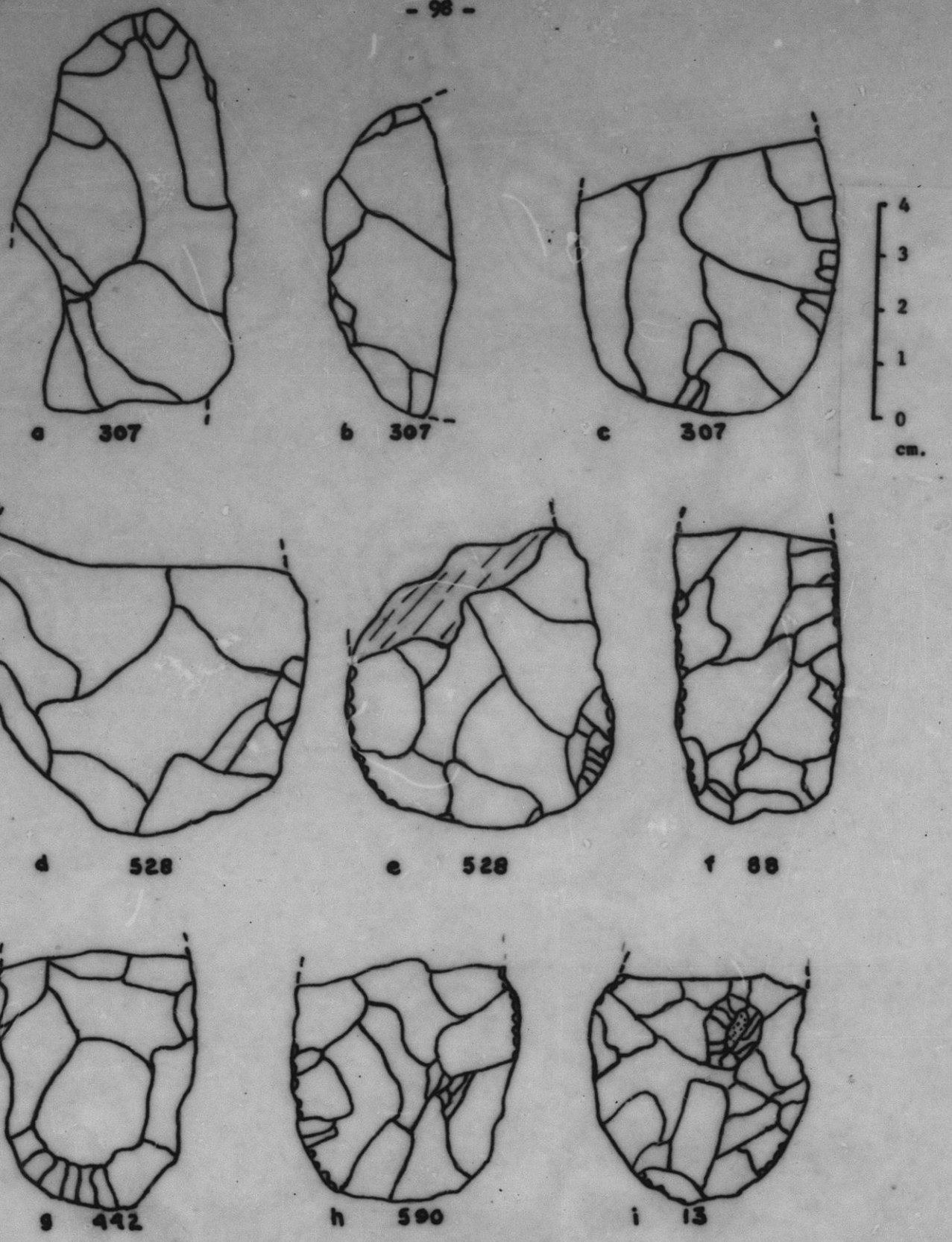


Figure 39. Core knife fragments.

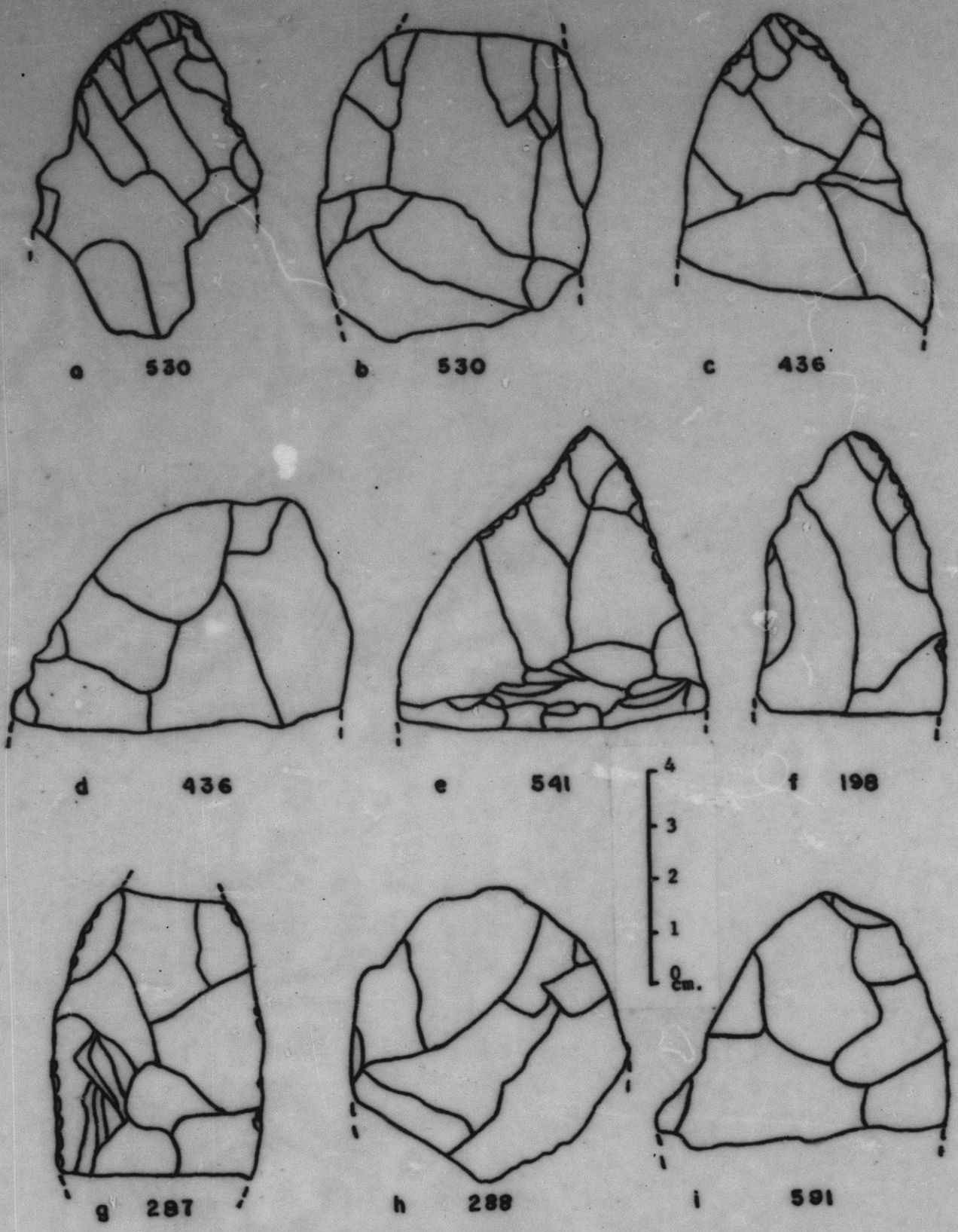


Figure 40. Core knife fragments.

Eccentric Flint (Figure 42)

An unusual specimen found in square 2:1 at level 10 is illustrated in Figure 42. It is manufactured from a rather sandy-textured grey-brown chert, primarily by percussion techniques but with a pressure retouch along the sides of the blade. In form, the specimen resembles a large contracting stem point of Gary B type to which has been added a series of three broad and deep notches on each side of the blade as well as a sharper notch on each side of the stem. The latter notch appears to have been cut by a knife--the material in this section of the specimen being softer and sandier than at the tip. The specimen has the following dimensions: length - 113 mm.; maximum width - 39 mm.; maximum thickness - 9 mm.

The specimen is reminiscent, though simpler in form, of the large group of eccentric flints purportedly found in Delaware County (Clements and Reed, 1939). Considerable doubt was cast on the authenticity of these specimens by the analysis of H. Holmes Ellis (1940). It should be noted that the D1-47 specimen bears a dark stain near the tip which is one of the features which led Ellis to discredit the eccentrics (ibid:6). It is not known at present whether the stain on the two specimens is identical.

Figure 42. Eccentric flint.

Harahey Knife

One of the distinctive artifact forms of the Plains area is generally designated by a variety of descriptive terms: "four-edged knives" (Kidder, 1932:31); "diamond-shaped knives" (Krieger, 1946:102); or, "diamond-beveled knives" (Lehmer, 1954:153), to cite but a few instances. The implement has a generally rhomboidal form and is further characterized by having the two opposite (parallel) edges beveled in the same direction as opposed to the two adjacent edges which are beveled on the opposite face of the tool. The earliest archaeological investigator we have found who described this implement as a distinctive and specific form was J. V. Brower (1899: Plate VII and p. 109). Brower used the term "Harahey knife" to designate this particular implement type, although unfortunately also to designate other knife forms characteristic of the area he identified as the province of Harahey. We suggest that the term Harahey Knife be restricted to the rhomboidal form with alternate edge bevel.

The analysis by A. V. Kidder of the Pecos specimens draws attention to another aspect of the specimens which should be described. He notes in describing this form as well as a "two-edged" which has a basically triangular form and the beveling only on the two long edges, that "when one of these knives is held point outward, the bevel lies on the left edge; this makes the tool a very handy one for use in the right hand, the cutting or whittling motion being toward the body. Such tools are reversible, for if turned over, the bevel on the other side will occupy the same relative position as before" (Kidder, 1932:30). Thus the knives will be described as having a left bevel if the bevel lies on the left edge when held point outward, or right bevel if it is found on the right edge when

held in the same position. So far as the Pecos specimens are concerned, Kidder noted that in a sample of 50 specimens only four percent had a right bevel.

Only a single complete specimen of the Harahey knife was found at D1-47. This implement (# 121) was found in square 0:4 in the top 2.5' of the deposit. The faces of the blade are relatively flat and shaped by large percussion flakes. Each bevel is formed at about a 45 degree angle, much like a scraping edge, by pressure retouching. The edges are worn and bear numerous flake scars formed in the course of use. It is clear that the implement was used extensively in whatever specialized operation it performed. The bevel is a left bevel and the implement is manufactured from a mottled grey and white chert. The dimensions of the specimen are: maximum length - 106 mm.; maximum width - 34 mm.; and, maximum thickness - 8 mm.

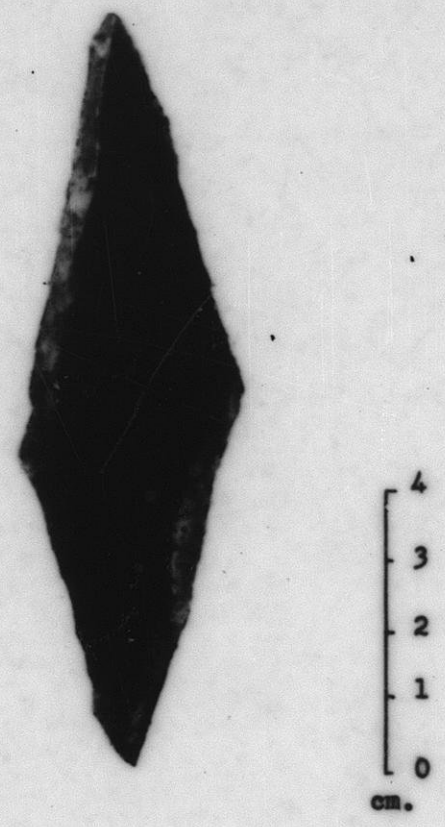


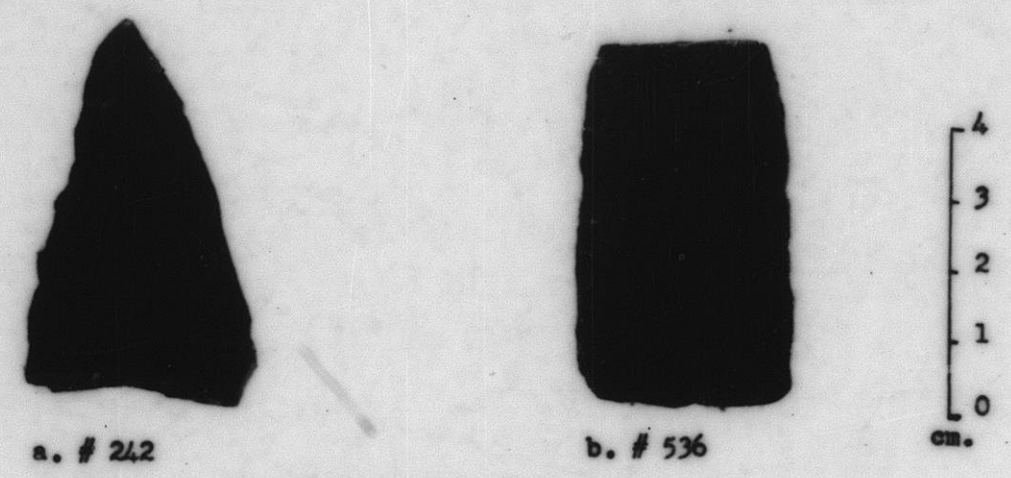
Figure 43. Harahey knife.

Beveled Knife Fragments

Two fragments of blades with alternate bevels were also present. In both instances they are broken at such a point that it is impossible to demonstrate whether or not the original form had four beveled edges or only the two now present. Both specimens have a left bevel.

One example, specimen # 242 (found in square 2:2, level 6) is manufactured from a grey chert bearing occasional white flecks and streaks. The straight sides of this specimen conform to the shape characteristics of the Harahey knife. The fragment (Figure 43, a) has a maximum width of 32 mm. and a thickness of 7 mm.

The second specimen (# 536) which was found in square 1:4 at level 13 is manufactured from a speckled grey and black chert of exotic appearance. The sides of the blade are slightly convex, thus deviating from the standard Harahey knife form, and the degree of workmanship exhibited seems finer. The fragment (Figure 43, b) has a maximum width of 33 mm. and a thickness of 6 mm.



a. # 242 b. # 536

Figure 44. Beveled knife fragments.

SCRAPERS

Implements classified as scrapers are divided into end or side scrapers depending on whether the steeply retouched scraping edge is located at the end or side of the tool. End scraper varieties are grouped by means of the technique of manufacture and extent of modification into a series of provisional types. In nomenclature, these follow a system previously used for scrapers in this area (Baerreis, 1951) although additional subdivisions have been added as a refinement of the original types. While the subdivisions of Type A, for example, are not present at this site (Dl-47) it is thought that on the basis of the larger regional sample now under analysis that this might represent culturally significant variants.

Type A-1 (Specimen # 381, from square 2:3, level 11)

This scraper, formed from a large flake, has a ventral surface consisting of a single flake scar. A large bulb of percussion is adjacent to the butt end which consists of an unmodified striking platform. The dorsal surface is retouched at the scraping edge and along one side, the remainder of the surface being unmodified. It is manufactured from a white chert.

Dimensions:

Maximum Length - 47 mm.

Maximum Width - 41 mm.

Thickness - 13 mm.

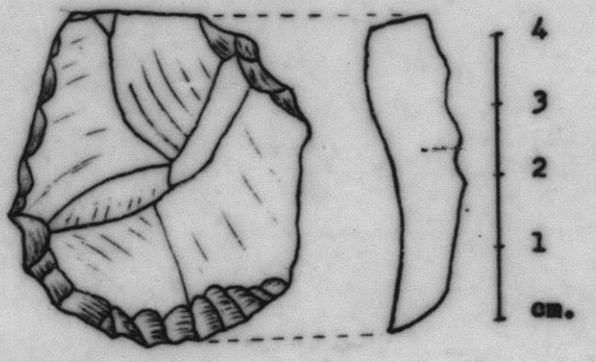


Figure 45.

Specimen # 381.

Type B-2 (specimen # 289, from square 1:3, level 7)

The ventral surface of the scraper is formed by a single flake scar, but unlike scrapers of Type A, there is no indication of the presence of a bulb of percussion. The butt end consists of a straight fracture. The dorsal surface is unmodified except where there has been retouching on the scraping end and a portion of the sides. The material is a white chert.

Dimensions:

Maximum Length - 51 mm.

Maximum Width - 58 mm.

Thickness - 11 mm.

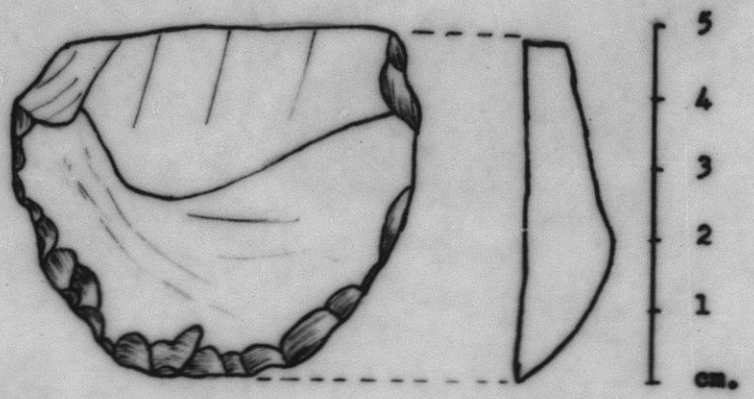


Figure 46. Scraper, Type B-2. Specimen # 289.

Type C-3 (Specimen # 307, from square 2:2, level 11)

The ventral surface of this scraper was formed by a series of primary flake scars. Despite some irregularity, the ventral surface is essentially flat in contrast to the convexity of the dorsal surface which is shaped by a combination of primary and secondary flaking. The edge is turned to produce a steep scraping edge at one end while the opposite end is formed by a straight fracture. The material is a chert of light grey color.

Dimensions: Maximum length - 47 mm.; maximum width - 39 mm.; maximum thickness - 12 mm.

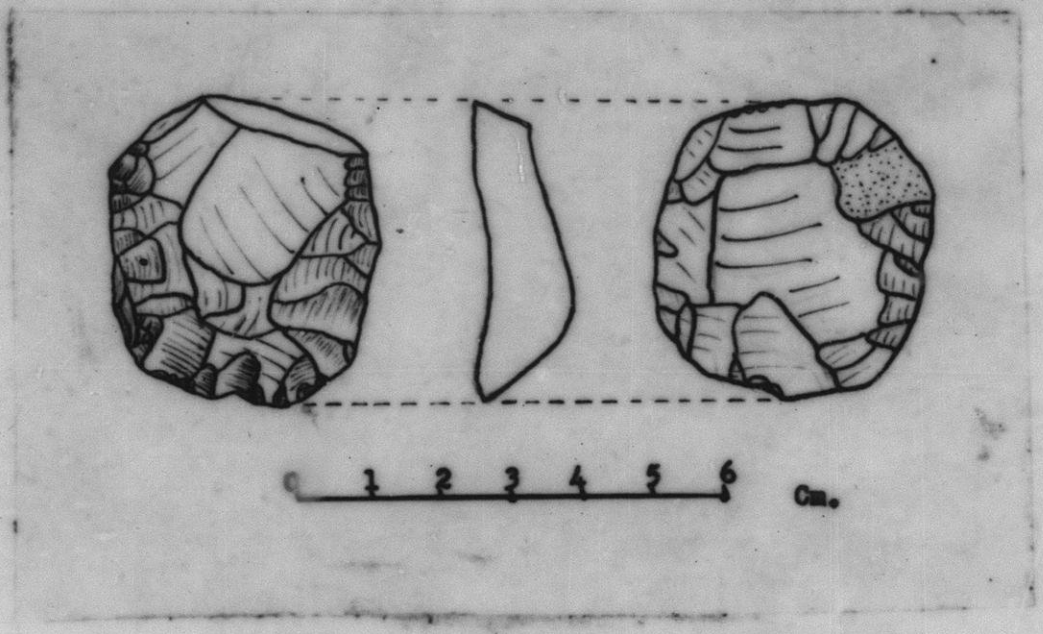


Figure 47. Scraper, Type C-3. Specimen # 307.

Type B-4. Four scrapers from D1-47, together with a larger series from Delaware County, have been grouped under this type designation. As a group they have two features which make them stand out from

others in the area. They tend first of all to have a marked taper to the butt end, the latter in its extreme form being rather pointed. This shape modification results in a rather triangular outline. The second characteristic is that as a group they tend to be rather small implements. In other attributes the group is variable. Retouching may be confined to the edges, or the entire dorsal surface may be modified. Traces of a bulb of percussion may remain adjacent to the butt end or no indications of this may be present. The butt end may be pointed or it could comprise a small facet, perhaps the remains of a striking platform that has been nearly trimmed away.

Two of the specimens from D1-47 (# 516 and # 622, Figure 47) are good examples of the type. # 516, manufactured from a pink and grey chert, is modified by retouching only along the edges, the remainder of the dorsal surface bearing large primary flake scars. The sides of the scraper taper to the butt end which comprises a small area having a straight fracture. # 622, manufactured from a light grey chert, is thinner and bears more extensive modifications on the dorsal surface but also has extensive retouching along the edges. The sides taper to a point at the butt end.

Two additional specimens (# 288 and # 434, Figure 47) are tentatively classified as variants of Type B-4 though it will be noted that the extent of the taper of the sides is not as pronounced with the result that they do not have the markedly triangular outline. Both specimens are manufactured from a white chert and having retouching at the scraping end and at the sides but retain primary flakes in the central portion of the dorsal face. # 288 appears to have a small portion of the striking platform at the butt end

although its small size does not permit positive identification on this point. The butt end of # 434 consists simply of a straight fracture and the absence of a bulb of percussion precludes its identification as a striking platform.

Individual Scraper Provenience and Measurements

#	Square	Level	Maximum Length	Maximum Width	Maximum Thickness
516	1:7	9	34	19	5
622	2:8	7	34	21	4
288	1:4	7	40	22	6
434	0:4	9	40	24	7

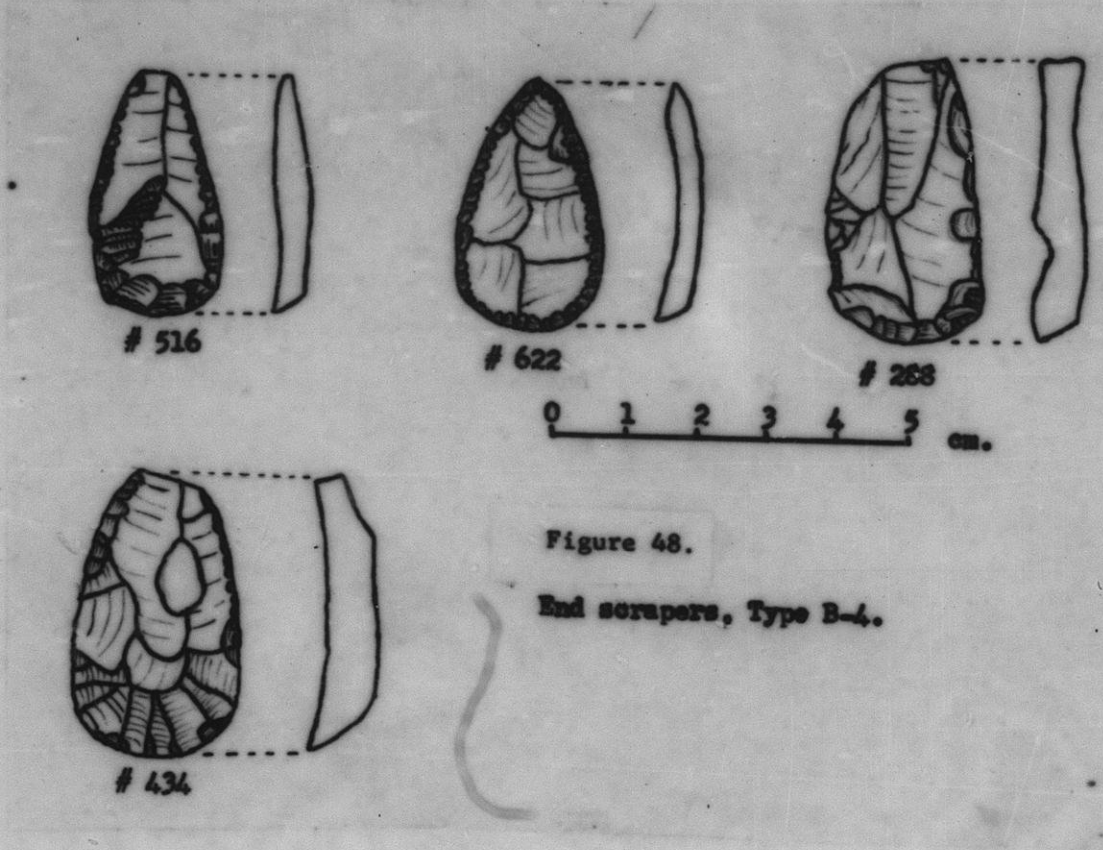


Figure 48.

End scrapers, Type B-4.

End Scraper Fragments

The four end scraper fragments placed in this category cannot be classified because of their fragmentary condition. Three (specimens 228, 536 and 619) are clearly of Type A or Type B but are broken transversely at nearly their mid-point so that the butt end which would allow more precise classification is lacking. All, however, have a ventral surface formed by a single flake scar. Specimen # 289 also has a ventral surface formed by a single flake scar but if it is appropriately classified as an end scraper, the scraping end is missing. The butt end would appear to consist of a small portion of a faceted striking platform. The specimens are illustrated in Figure 49.

Scraper Provenience and Chert Color

#	Square	Level	Chert Color
228	2:6	5	White
536	1:4	13	White/grey
619	1:8	5	White/grey
289	1:3	7	Banded grey

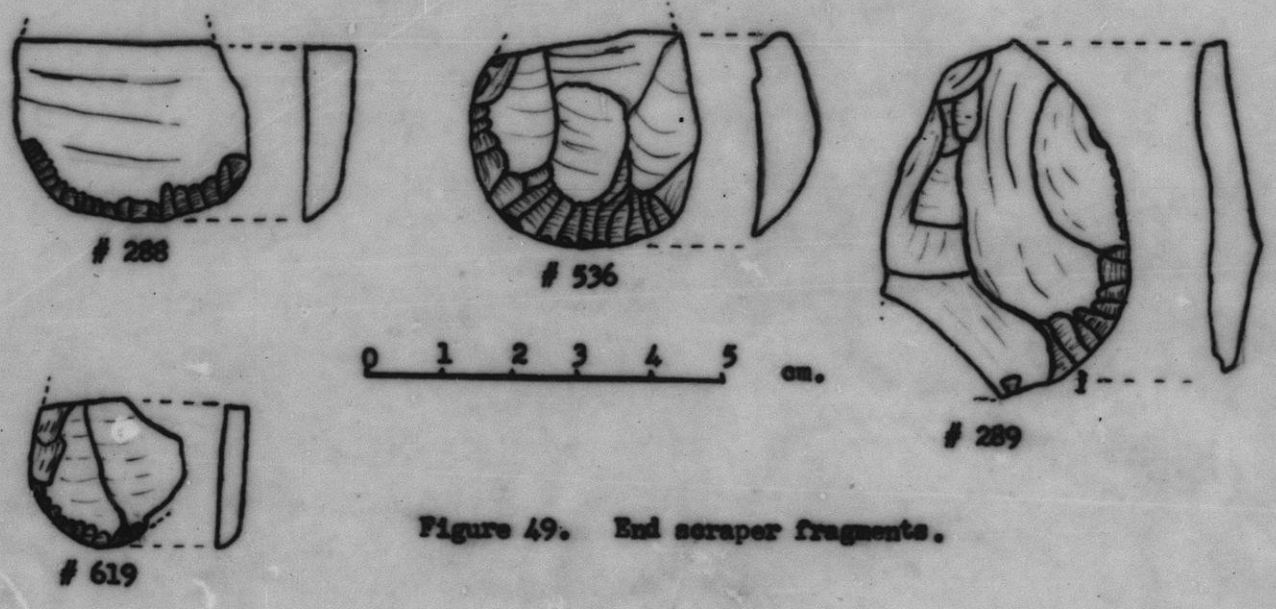


Figure 49. End scraper fragments.

Side Scrapers

The side scrapers are highly variable in form with the scraping edge present on the long side or sides of the flake which is plano-convex in cross section. The plane surface consists of a single flake scar which is unretouched except in the case of specimen # 285 which bears slight reworking near the pointed tip. This specimen is also retouched over the entire dorsal surface while the other two are retouched only at the scraping edge.

Provenience, Dimensions and Chert Color

#	Square	Level	Length	Width	Chert Color
129	0:1	top 2.5'	82	51	Mottled grey and white
285	2:6	7	47	35	Mottled grey
291	2:3	7	64	42	Banded grey

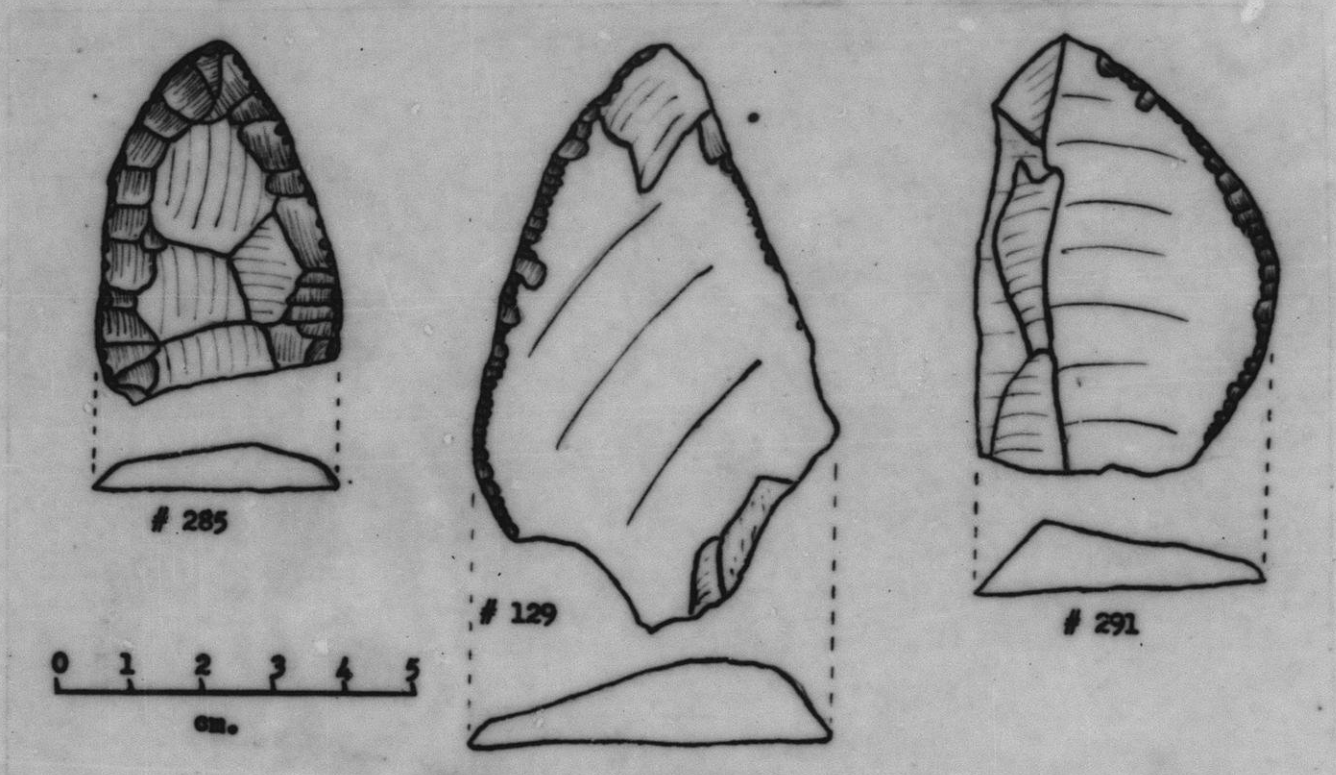


Figure 50. Side scrapers.

Type F Scraper

A single specimen, # 216, found in square 1:5 at level 4 is tentatively classified as a Type F scraper. The specimen, manufactured from a reddish-brown chert, is ovate acuminate in outline. Since the implement is bifacially retouched, resulting in a biconvex section, the pointed end is interpreted as being the butt end of the scraper while the broad, rounded end is turned to produce the scraping edge. The scraping edge is not as steeply retouched as in most carefully finished scrapers of the type but the battered appearance of the edge does appear to be the result of usage. The lack of clear definition of this sector of the implement, however, makes a classification somewhat provisional. The dimensions of the specimen indicate that it is a quite small implement for the category. The maximum length is 34 mm., the maximum width, 16 mm., and the maximum thickness is 6 mm.

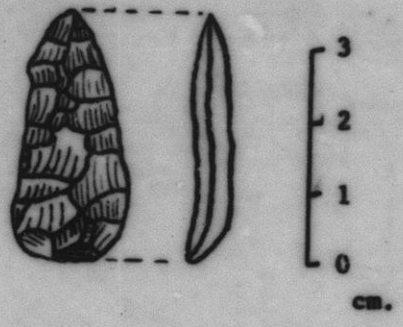


Figure 51. Scraper, Type F (?).

Scrapers of the Type F group have been previously described at one of the sites in Delaware County placed in the early archaic Grove Focus, D1-59 which was formerly designated D1CaI (Baerreis, 1951: 42-43). The single unbroken scraper of Type F at D1-59 was 43 mm. in length but

the two broken specimens (73 mm. and 50 mm. in length) indicate a substantially greater average length. Scrapers of Type F appear in much greater abundance at the Woodland sites on Honey Creek (D1-33 and D1-49) and may well be one of the distinctive implements of this culture complex. They are again substantially larger than the D1-47 specimen, ranging in length from 67 to 84 mm. If the D1-47 specimen belongs in the same type category, it clearly has undergone a reduction in size which would be in keeping with the smaller size range of many Neosho Focus scrapers.

Stemmed Scrapers

This group of scrapers consists of projectile points having the terminal portion of the blade modified to produce a scraping edge. In general this tip is not as steeply retouched as it is on the other groups of scrapers. Specimen # 80 would appear to be an exception to this generalization in that portion of the scraping edge which remains. Specimen # 591 may not belong in this category but instead consist of a modified bifacial blade.

Individual Specimen Provenience and Associated Traits

#	Square	Level	Length	Width	Point Type	Chert Color
80	0:1	top 2.5'	-	51	Cooper	Dark mottled grey
127	1:4	4	46	27	?	pink/grey
132A	1:6	5	44	30	Gary/Langtry	Light grey
293	2:3	8	70	32	Langtry A	White
442	0:5	10	--	31	?	White
591	2:1	19	--	50	?	Tan/white

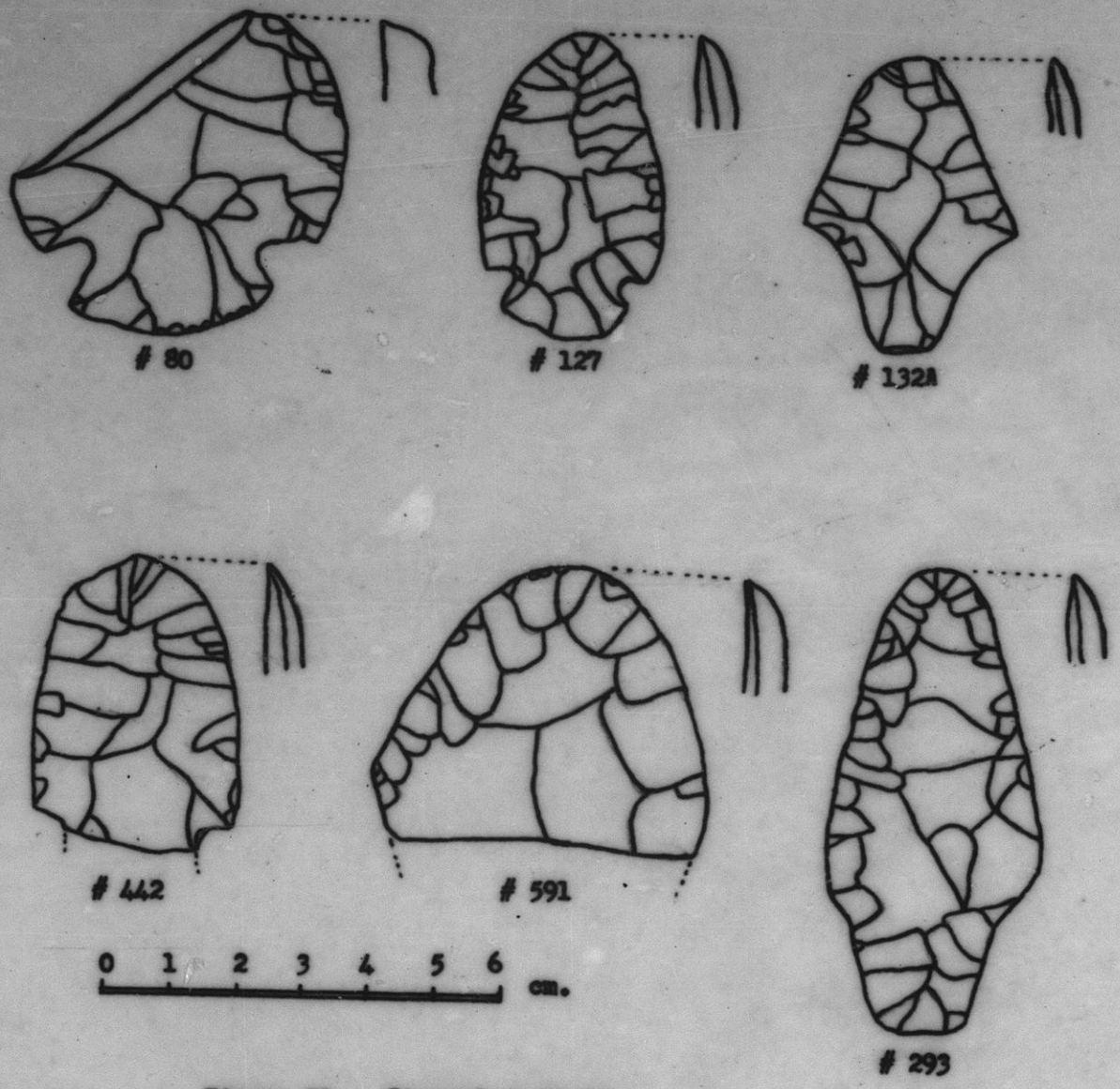


Figure 52. Stemmed scrapers.

Chipped Stone Drills

As the analysis of archaeological materials from Delaware County has proceeded, an attempt has been made to group the chipped stone drills into a series of categories based upon method of manufacture and form. Size has also been utilized to place the specimens within more restricted groups in some of the categories. It is not yet evident, since the number of drills which can be assigned to specific culture horizons is limited, whether the proposed groups are useful horizon markers. Since the available published literature in most instances is not sufficiently clear to permit an adequate distributional analysis, their status as possible indicators of a local tradition is also unclear. In view of this it is not expedient to propose the groups as types. They are simply presented as varieties--units which may have regional or temporal significance when fully investigated. Present knowledge suggests that they may be one of the implement forms suggesting marked cultural continuity in the area for similar varieties appear both in an archaic context as well as in late horizons.

The chipped stone drills from D1-47 do not provide an adequate base for the discussion of the major varieties since nearly all of the six specimens are fragmentary. Further, the tentative suggestions which may be made as to grouping in this instance suggest a limited range of varieties for this site.

Drill, Variant D. The most common drill shaft found in the Delaware County sites is proportionately long and tends to have sides that are either parallel for most of the length and contract but slightly. Variant D, however, was established to accommodate those specimens having a drill shaft which expands abruptly and continuously to the junction with the

base of the drill.

One specimen, # 288 (Figure 53, a), is an excellent example of the small size group within this variant. The drill shaft expands continuously to a rounded base which consists of a flake, modified by retouching only at the edges. Although a small portion of the tip is missing this section probably does not exceed 1-2 mm. so that the present length of 23 mm. closely approximates the original.

The contrast between the drill shaft of Variant D and other varieties of drills is best seen when illustrated next to the other forms. The fragments from D1-47 (Figure 53, b-e), however, tend to have the same feature of shaft expansion.

Drill, Variant F. This variety was established to accommodate one of the forms which is prepared by modifying a projectile point. In Variant F, a portion of the original blade of the point below the drill shaft remains intact while in other varieties the modification proceeds to the shoulder area or even to the stem of the point. The single specimen placed in this category (# 534; Figure 53, f) was probably made from a projectile point with a contracting stem but a portion of the stem is missing. The drill shaft is much more carefully beveled than in the common specimens of the area and here again the tip is missing. The chert from which this specimen is made appears to be somewhat exotic in comparison to more common materials which may indicate that it is a trade specimen.

Drill Provenience and Associated Traits

#	Square	Level	Length	Width	Thickness	Chert Color
288	1:4	7	23+	18	5	Grey
534	1:7	8	57+	29	8	Pink/white
530	1:3	12	63+	—	6	Dark grey
536	1:4	13	42+	—	5	Grey
627	0:5	14	47+	—	9	Mottled grey
514	2:1	17	47+	—	6	Grey

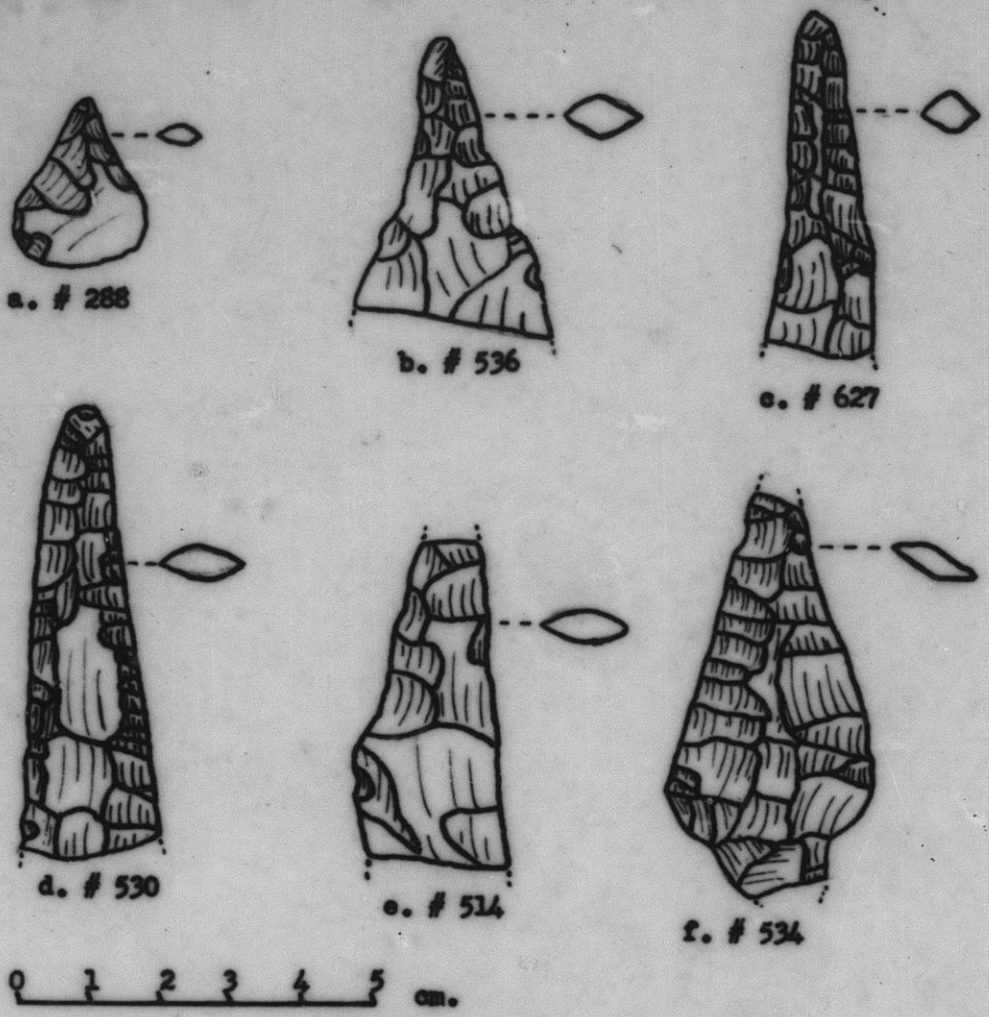


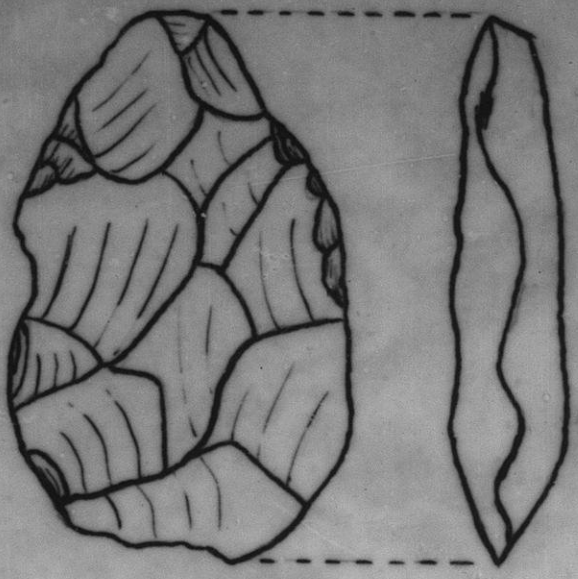
Figure 53. Chipped stone drills.

Core Tools (Figures 54-57)

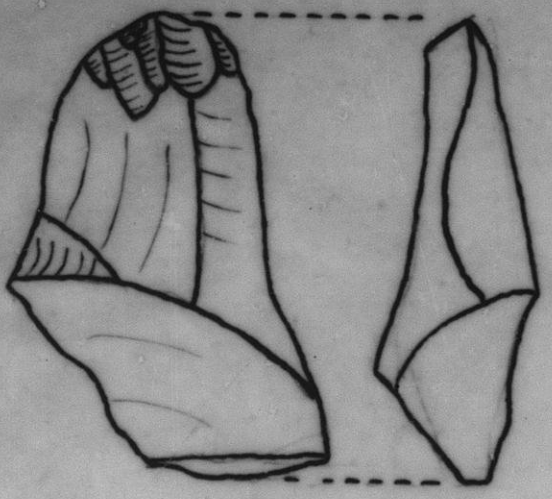
A group of fourteen artifacts are here listed simply as core tools. In an earlier report of specimens from Archaic sites in Delaware County, such artifacts were described as choppers and cores (Baerreis, 1951: 26-28). While some of these specimens may be the residual blocks from which flakes were struck, no clear identification of flakes or flake tools produced from them can be made. In general they do bear edges that show slight usage marks--either from chopping, cutting or perhaps scraping. The core tools appear to be implements that were used casually and then discarded, probably serving multiple functions and in no instance shaped to a standardized form or size. The tools are bifacial and shaped by bold percussion flaking.

Implement Provenience and Associated Traits

#	Square	Level	Length	Width	Thickness	Chert Color
130	0:2	top 2.5'	76	48	16	White
307	2:2	11	--	--	19	White/pink
307	2:2	11	74	61	21	Mottled grey
307	2:2	11	64	60	16	White/grey
382	1:5	9	99	52	15	White
436	1:1	11	81	54	29	White
437	2:1	14	83	62	20	Mottled grey
437	2:1	14	73	40	17	Mottled grey
527	2:2	13	75	48	26	White
527	2:2	13	79	41	18	White/grey
530	1:3	12	73	54	21	Dark grey
530	1:3	12	79	38	17	Grey
530	1:3	12	108	61	20	White
697	test pit		61	51	17	Grey



130



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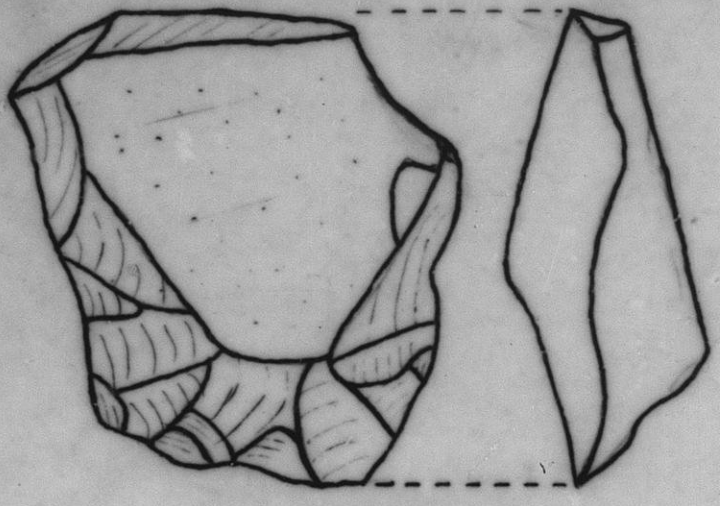

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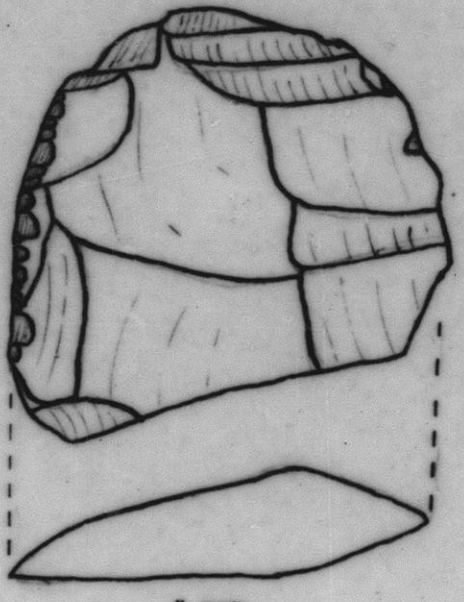


307

Figure 54. Core tools.

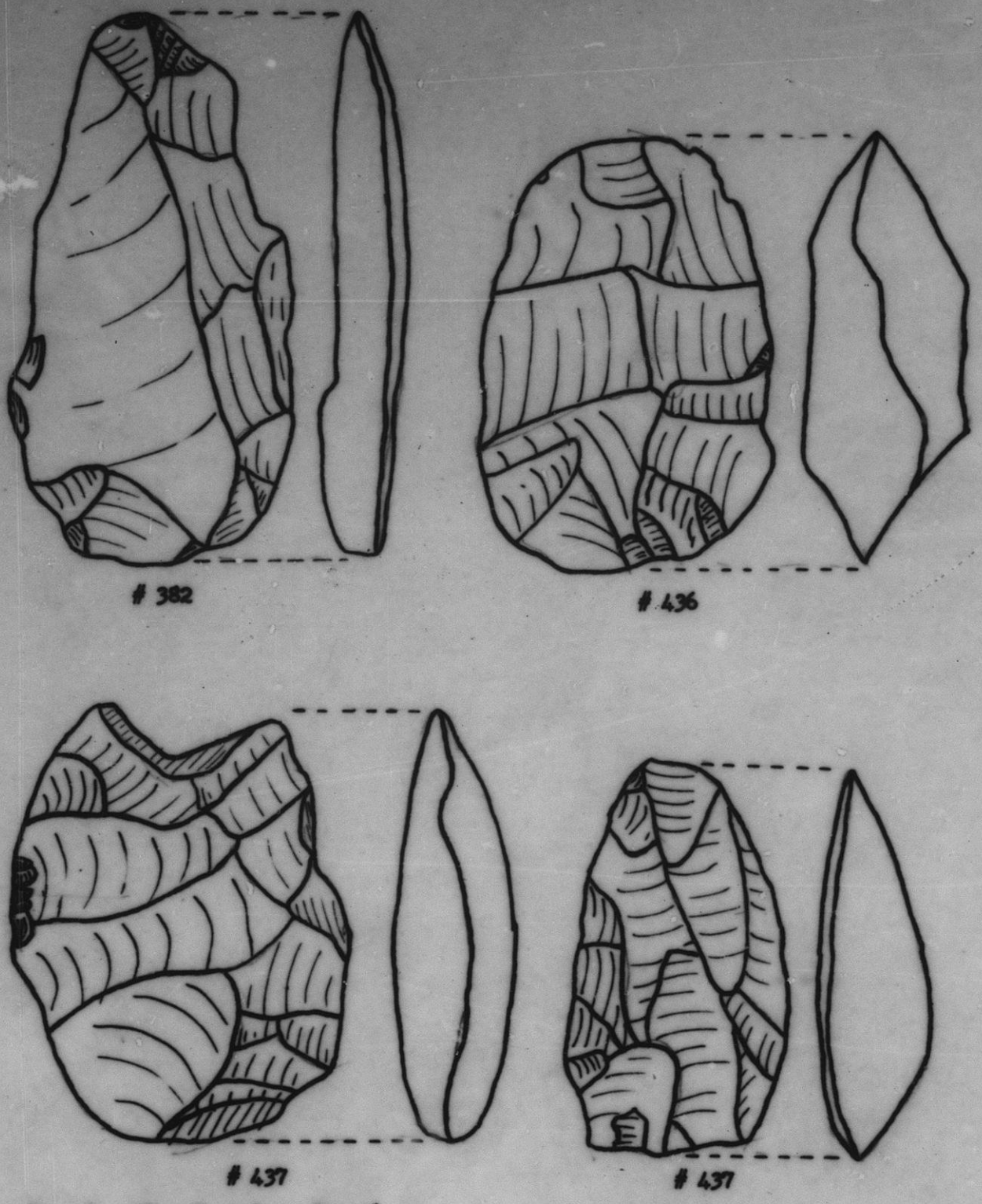


Figure 55. Core tools.

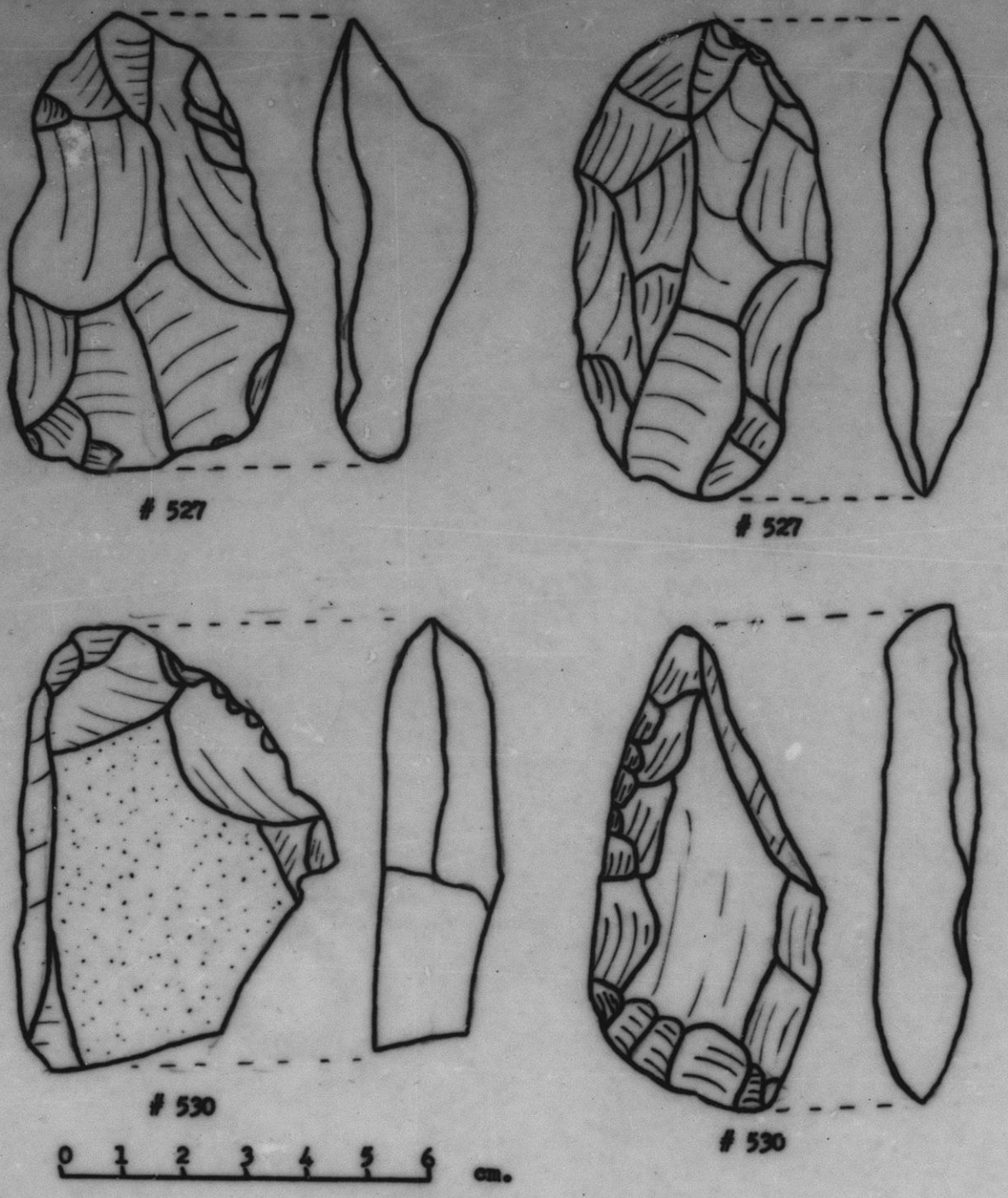
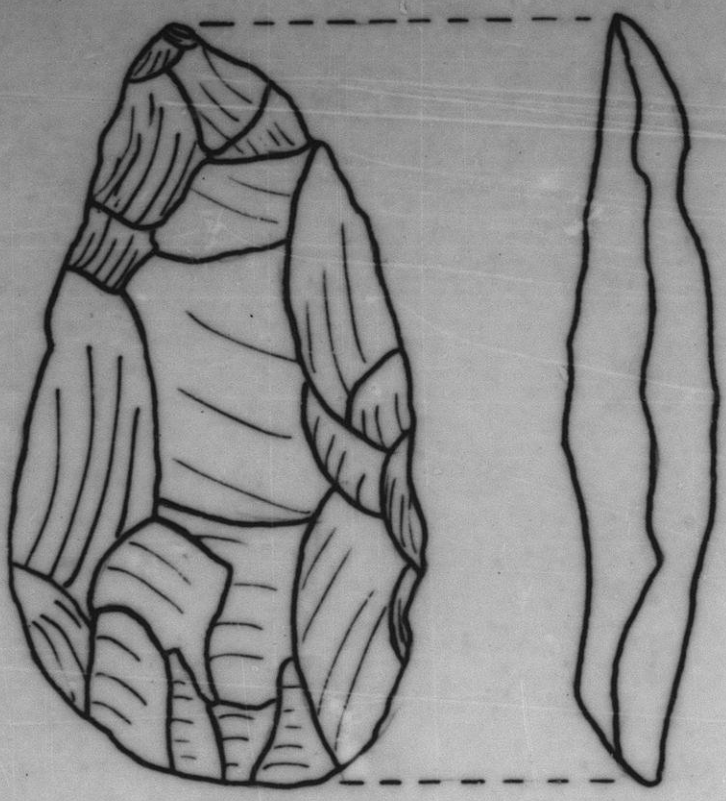


Figure 56. Core tools.



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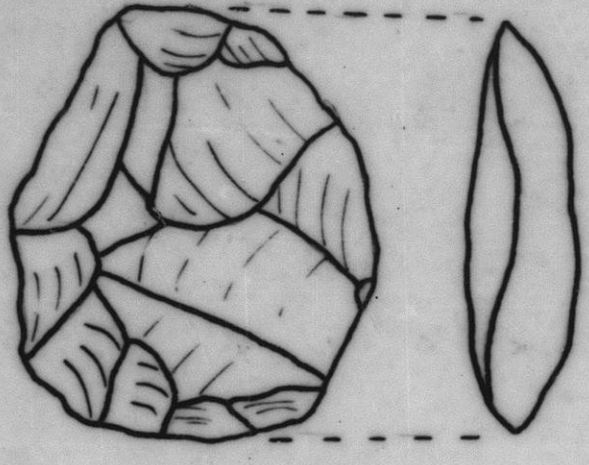

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Figure 57. Core tools.

Utilized Flakes (Figures 58-59)

Many of the flakes found at the site show evidence of use on their margins, either through a delicate retouch or usage marks. No uniform size or shape is evident. The specimens illustrated in Figure 58, a-l, and Figure 59, a-b, i, are unifacial while the remainder show bifacial retouching, flaking on alternate edges (Figure 59, c-d) or on all edges (Figure 59, e-h).

Specimen # 511 (Figure 58, g) is steeply retouched along one edge and thus approaches the form of a scraper. A scalloped edge has been produced by the retouching on specimen # 88 (Figure 58, l). Specimen # 534 (Figure 59, b) is steeply retouched along both edges and has a sharp tip, possibly for use as an engraving tool.

The maximum dimensions of the 21 utilized flakes ranges from 29 to 59 mm., with a mean of 41.9 mm.

Individual Flake Provenience and Chert Color

#	Square	Level	Chert Color	#	Square	Level	Chert Color
436	1:1	11	Mottled grey	88	2:4	6	Grey/pink
532	2:2	15	Pink	307	2:2	11	Tan
287	1:7	7	Mottled grey	534	1:7	8	White
536	1:4	13	Mottled grey	536	1:4	13	Red
536	1:4	13	Pink	68	1:6	3	Pink
536	1:4	13	Pink	241	1:5	7	White
511	1:5	12	White	530	1:3	12	Mottled grey
531	1:6	13	White	374	2:7	8	White
619	1:8	5	Pink				
288	1:4	7	Grey	374	2:7	8	Red/white
244	0:7	7	Grey	541	2:1	18	Mottled grey

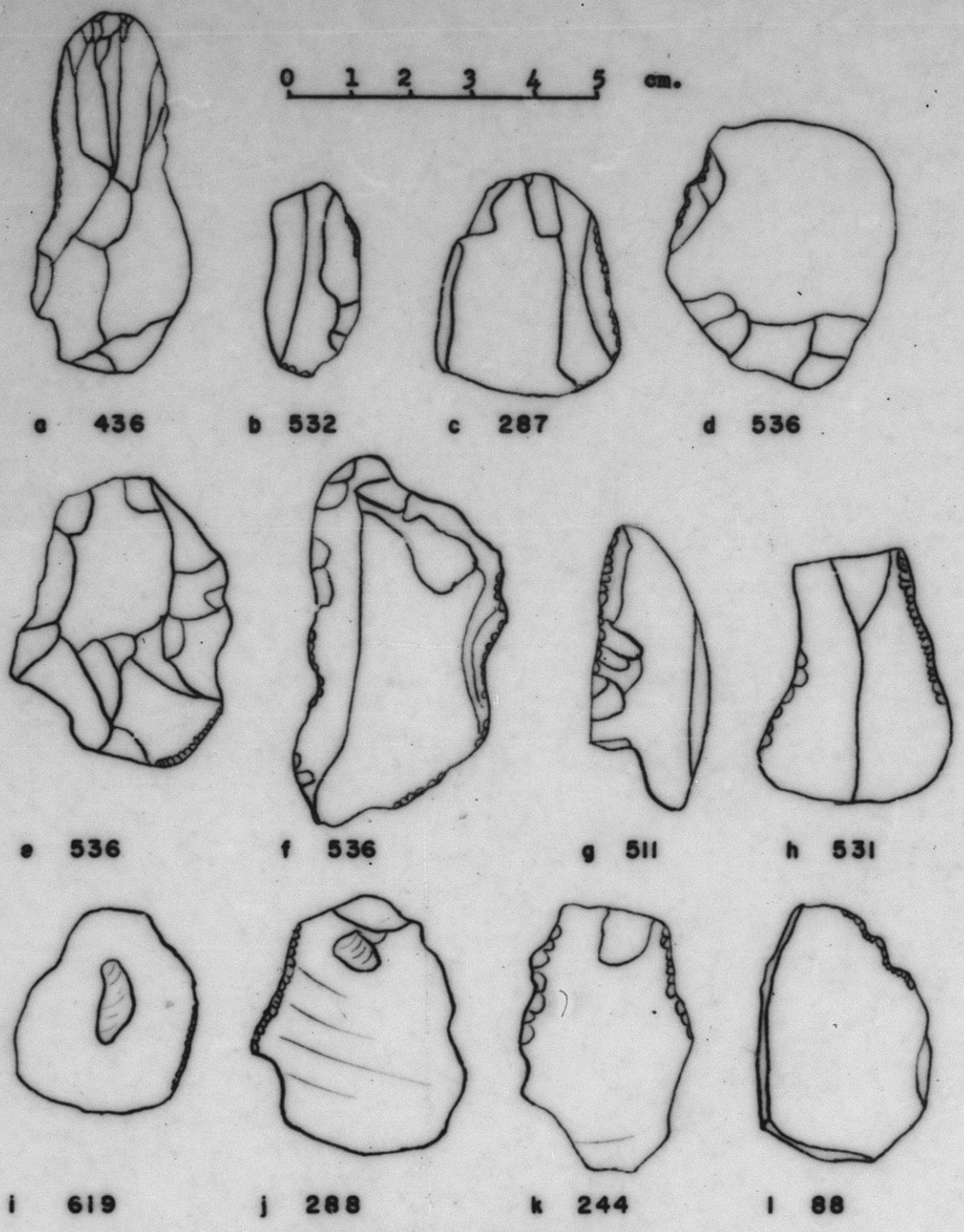


Figure 58. Utilised flakes.

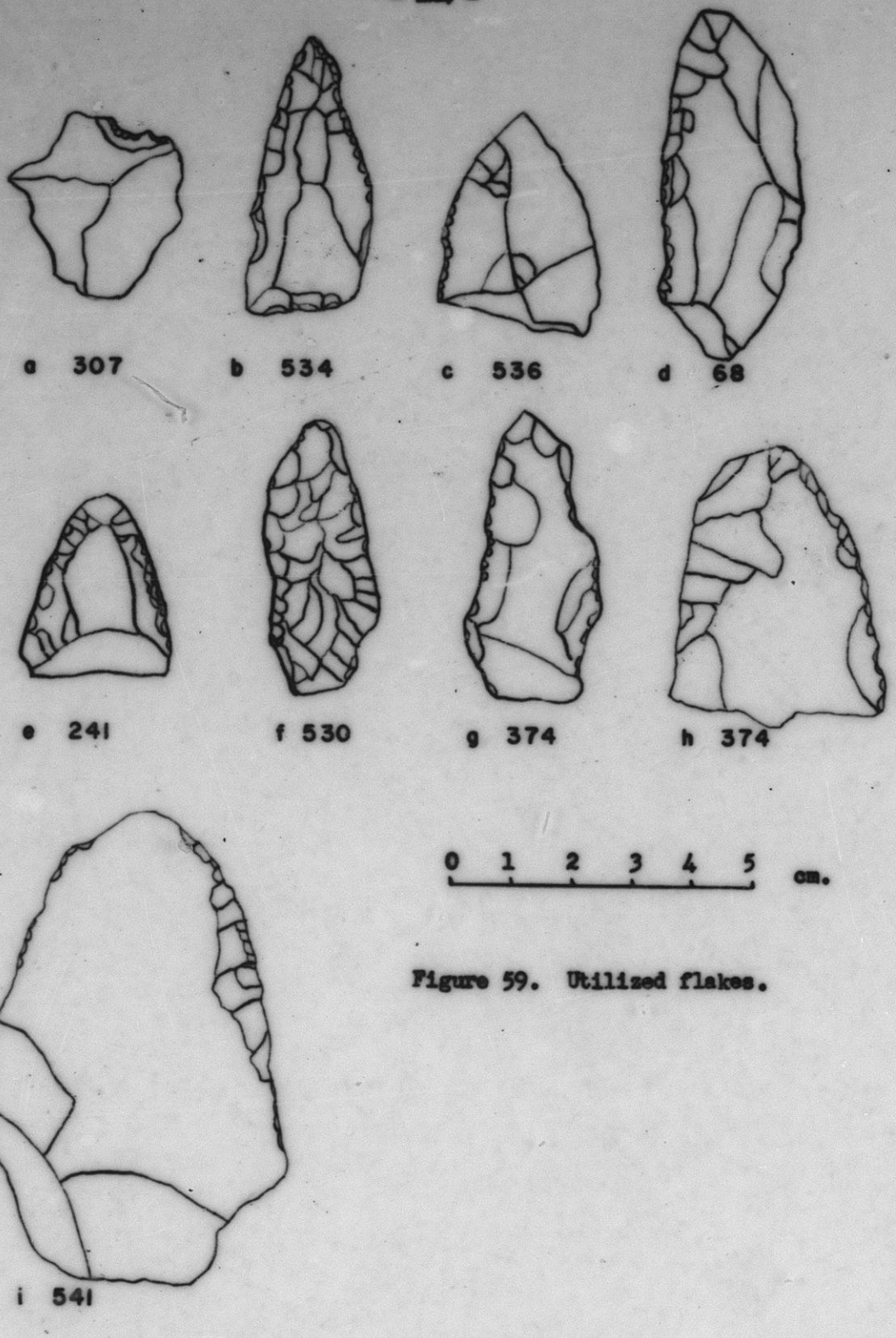


Figure 59. Utilized flakes.

Unmodified Flakes

Tabulated below are the unmodified flint chips found in the deposit. It is not, however, possible to say that this is the total number originally present since some may have been discarded in the field. It is assumed that they are a random sample of the flakes of substantial size present and therefore their relative frequency in the various zones will reflect the extent of flint knapping in the particular cultural horizon. The 75 flakes found in square 2:2 at level 11 certainly is clear indication of artifact fabrication at that particular spot.

#	Square	Level	#	Square	Level
16	outer ridge	top 2.5'	382	1:5	9
29	1:5	2	432 (2)	2:1	15
79	0:5	top 2.5'	434	0:4	9
198	1:2	7	441 (2)	0:5	11
199	2:2	7	443	2:1	14
224	1:4	5	521 (2)	1:5	11
225	2:6	6	527 (2)	2:2	13
238	2:2	5	529	1:4	12
243 (2)	0:5	7	530 (2)	1:3	12
286	1:7	7	534 (2)	1:7	8
287	2:7	7	536 (2)	1:4	13
293	2:3	8	618 (2)	0:8	4
303	2:4	1	619 (2)	1:8	5
307 (75)	2:2	11	620	2:8	6
346	2:4	8	621 (2)	1:8	8

Unclassified Chipped Stone Implements

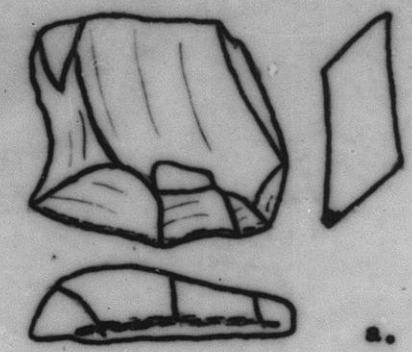
Three specimens do not fit readily into the categories previously discussed. In view of the absence of comparative information that would suggest that the implements are standardized tool types, they are provisionally placed in this broad category.

Specimen # 621 (Figure 60, a) resembles in its general outline and in the retouch on one edge the end scraper category. The sinuous outline of the retouched, edge, however is not in keeping with the scraper category. The irregularity of this edge is due to the use of the tool since the concave areas are battered and fractured as a result of striking the implement against a hard surface. Only this limited sector of the implement shows these usage marks. They resemble the battering that could be found on an extensively used gun flint or on the flint from a strike-a-light. Since the shape and the native variety of mottled grey flint do not conform to a gun flint interpretation, possibly the implement served in the same capacity as a strike-a-light. Its dimensions are 36 x 33 x 12 mm. The specimen was found in square 1:8 at level 8.

Specimen # 289 (Figure 60, b) may have had a use similar to the preceding implement though it differs considerably in shape. The implement was shaped from a flake struck from a pebble of dark grey chert, the cortex of the original pebble remaining at one end. Like the preceding implement it is planoconvex in section but in this instance with a greater amount of percussion flaking on the plane surface. In its elongated form it resembles a small side scraper but the section of the implement that shows extensive usage marks is an area 18 mm. in length adjacent to the cortex at what might seem to be the butt end of the implement.

Here we find extensive battering as on the edge of the preceding specimen. The dimensions of the implement are 50 x 25 x 10 mm. It was found in square 1:3 at level 7.

The third specimen (# 226; Figure 60, c) is not to be placed in the same functional category. The implement, carefully manufactured from a grey-white chert, is a small bifacially flaked tool which perhaps may be a small knife. If so, it would not seem to be an efficient tool unless it was designed to be used in a handle. The dimensions are 36 x 23 x 9 mm. It was found in square 1:6 at level 6.



a. # 621

b. # 289

c. # 226

Figure 60. Unclassified chipped stone implements.

GROUND STONE

Grinding Basins

The deposits contain a small series of artifacts comprising stone slabs on which seeds have been ground in the preparation of flour by means of a smaller, upper stone. Some of these slabs have a depression which is circular in outline suggesting the possiblility of a rotary or pestle-like action in the grinding process. Such basins, however, are not deep and no instances of pestles themselves--implements of an elongate or modified cylindrical shape with the grinding surface on one end--have been found. More commonly, speaking in terms of the total distribution of these artifact forms, are found those artifacts with a shallow, oval depression which have been frequently designated basin metates. Recently Krieger (1945: 51) has proposed that this term be dropped since "the simple unshaped slabs in which round or oval basins are worn by a rotary motion should . . . not be called "metates" at all, but by some such term as "seed slab." Whatever appropriate term will be established by usage, it is by no means clear that the oval basin form is achieved through the use of a rotary motion as seems to be the case with the specimens having a circular outline. The Delaware County specimens appear to be closely comparable to many of the block and slab metates of Ventana Cave in Arizona (Haury, 1950: 305-8). In the discussion of these specimens, Haury states:

> "Many showed only a slight worn surface and those used over a longer period of time developed elliptical grinding depressions. What should be noted is the freedom of the grinding axis. This could be either straight down through the center or by curving strokes to the right or left. A true rotary motion was not used." (ibid, p. 306)

A perceptive functional analysis by Albert Mohr of a comparable form in California designated a "deep-basined metate" comes to similar conclusions about the use of a reciprocal motion (Mohr, 1954). These analyses would be equally appropriate for many of the Oklahoma specimens which do demonstrate the presence in the area of a mano and metate technique in the preparation of flour. The individual specimens found at D1-47 are described below.

(1) A small, mortar-like grinding basin with a depression roughly circular in outline, present on both faces, was found in square 0:2 in the top 2 1/2 feet of the deposit. The artifact was manufactured from a fine-textured limestone and had overall dimensions of 20 x 18 x 8 cm. The grinding surfaces attain a depth of 1.5 and 2.0 cm.

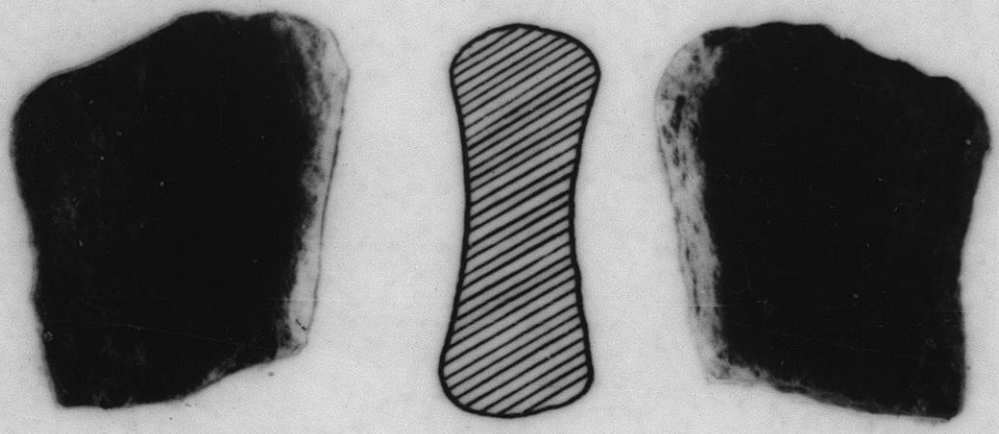


Figure 61. Grinding basin from square 0:2. Max. length - 20 cm.

(2) A second small, mortar-like grinding basin was found in square 0:5, level 9. The basin is unifacial, the side opposite the grinding surface being rough and unmodified. The artifact was manufactured from a fossiliferous limestone which is still fine in texture. The overall dimensions are 30 x 27 x 8 cm. with the grinding basin 14 cm. in diameter and 2 cm. deep.

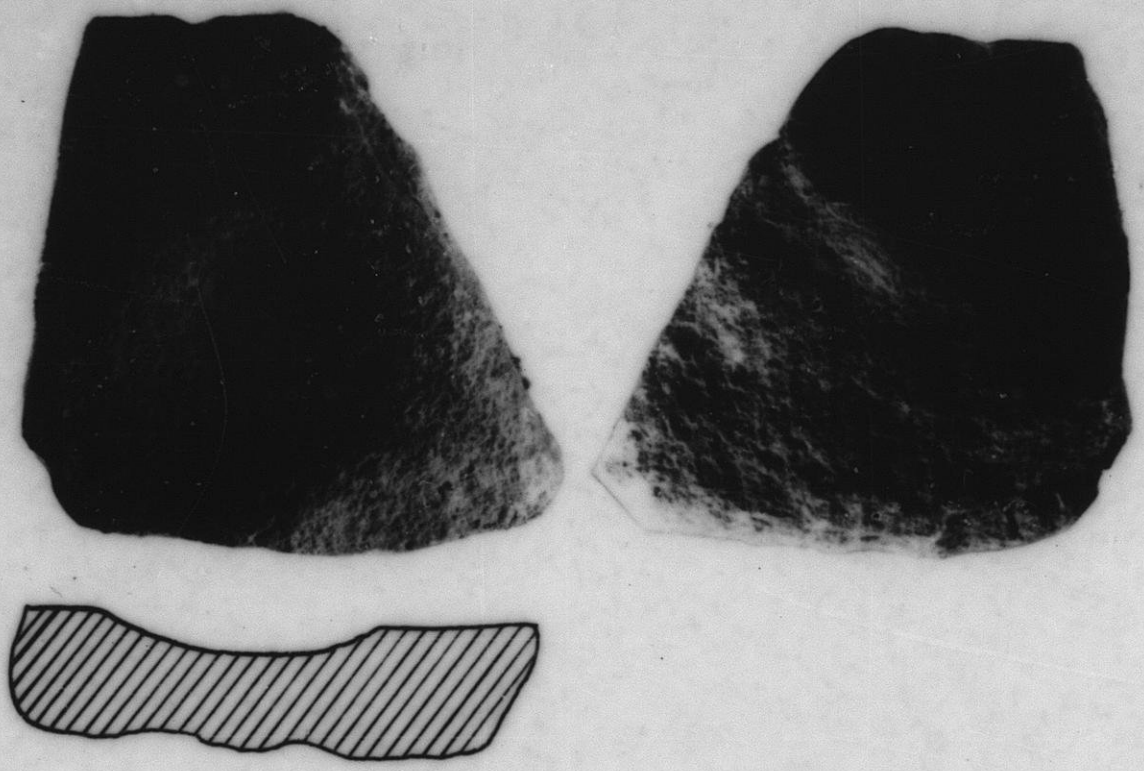


Figure 62. Grinding basin from square 0:5.

(3) A grinding basin found in square 2:4, level 11, shows a multiple use in that one face has a small mortar-like depression which is 11 cm. in diameter and about 2 cm. deep while the opposite face bears a portion of a large elliptical basin. Since this latter grinding surface is clearly but a portion of the original grinding area, it would appear that the specimen is broken and only a portion has been preserved and perhaps re-used in connection with the smaller depression. The large grinding area has a maximum depth of 3 cm. and the overall dimensions of the specimen are 29 x 23 x 7 cm. The artifact is manufactured from a crystalline limestone.

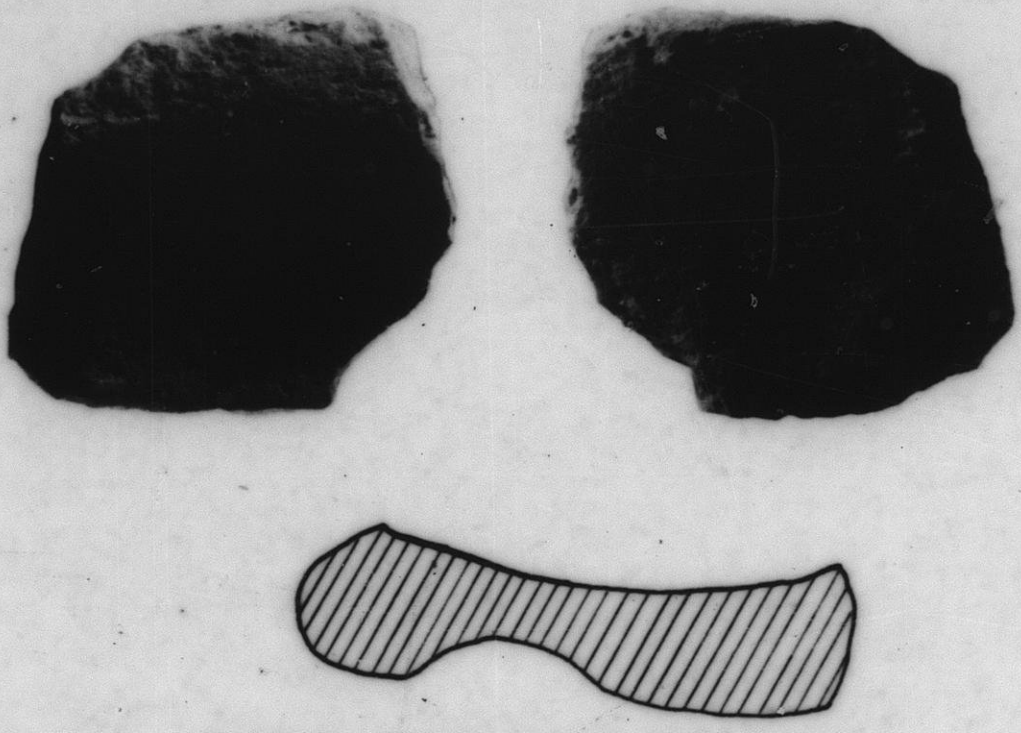


Figure 63. Grinding basin from square 2:4.

Nutting Stones (Figure 64-65)

A flat slab of fossiliferous limestone found in square 2:5, level 6, bears on one face a series of five circular holes about 2 cm. in diameter and 1 cm. deep. The opposite face is flattened but shows no clear evidence of use. The circular depressions in the stone would have been of considerable aid had the specimen served as an anvil in cracking nuts. The overall dimensions of the stone are 21 x 17 x 4 cm. Both faces of the artifact are illustrated in Figure 64.

In addition a series of smaller stones, comprising blocks of sandstone or limestone, are placed in this category because of small pits present on one or more faces or edges. The dimensions of the cavities vary widely about the size described for the first specimen, ranging between 16 and 41 mm. The number of pits varies as follows:

(1) single pit on one face (Figure 65, f-g);

(2) two pits on one face (Figure 65, e);

(3) two pits on one face, one on opposite face (Figure 65, d);

(4) single pit on one face, three on opposite face (Figure 65, c);

(5) two pits on each face (Figure 65, b);

(6) two pits on each face and on each edge (Figure 65, a);

No uniform size or shape is to be seen. C and d have irregular outlines, b is sub-rectangular and g is oval in form. The edges of a and b are battered as if these stones served the dual purpose of nutting stones and hammerstones. The single pit on one face of d is large and shallower than any of the others, suggesting that it may have served as a small grinding basin. Specimen # 297 (Figure 65, a) is basically similar to the manos in its shape characteristics and may be a reworked specimen of this category.

Provenience and Associated Traits of Small Nutting Stones

#	Square	Level	Length	Width	Material	Diameter Cavities
128	1:3	4	112	112	limestone	41, 33, 22
232	1:4	6	151	107	limestone	16, 26
231	1:7	6	136	112	sandstone	20, 24, 35, 25
306	1:5	8	79	77	limestone	27
297	2:6	8	140	82	sandstone	21, 28, 18, 25, 25, 21, 24, 17
308	2:4	9	137	111	sandstone	22, 17, 25, 28
524	0:3	11	84	58	limestone	23

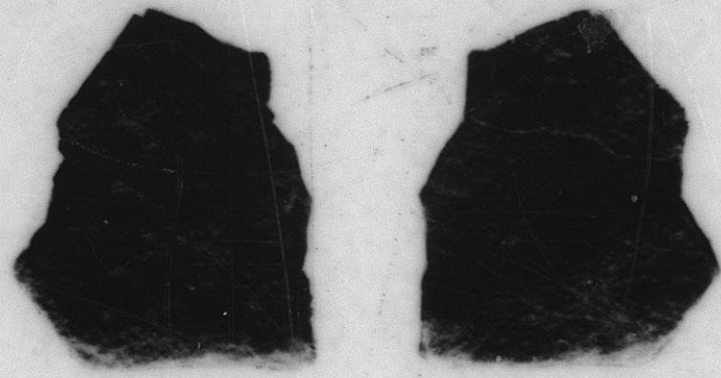
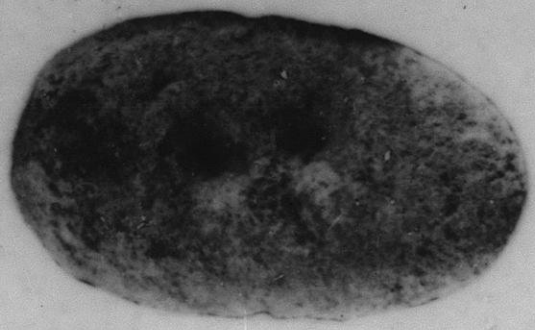
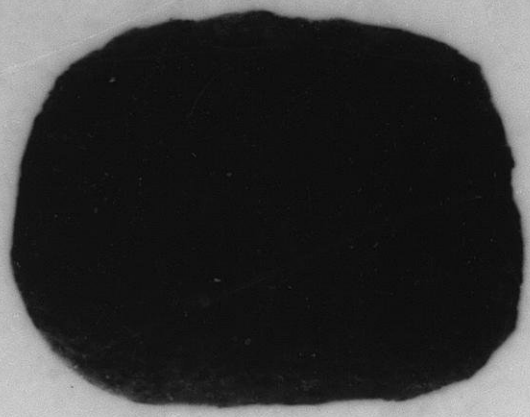


Figure 64. Nutting stone from square 2:5. Maximum length - 25 cm.

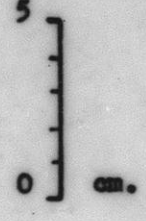


a. # 297



b. # 308

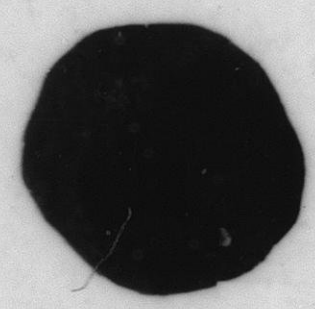
c. # 231



d. # 128

e. # 232

f. # 524



g. # 306

Figure 65. Nutting stones.

Manos (Figures 66 - 69)

The bulk of the manos from the site were probably held in one hand and used with a back and forth motion on a grinding slab. All are too short to have been comfortably held with both hands. They have been grouped according to the number and position of the grinding surfaces on the implements.

Manos with two opposed grinding surfaces

Both faces of the manos have been used for grinding. Either one face was used until the surface became too smooth for effective use and then the mano was flipped over to the other face, or both faces were used alternately. The result of such use is that the faces are roughly parallel except on two specimens which have a wedge shaped transverse cross section.

The manos have either oval, sub-rectangular, irregular, sub-elliptical or circular outlines. The specimen with a circular outline (Figure 69, # 230) represents a deviant form in that it is the single specimen for which a rotary grinding motion can be suggested. The edges and ends of all specimens were carefully shaped by pecking before use as was the surface.

In transverse cross section the manos are oval except for two (Figure 66, # 237 and # 232) which are wedge shaped. The wedge shape probably results from raising the far edge of the mano to catch the corn or seeds, thus applying the greatest pressure to the near edge, an interpretation suggested by Woodbury (1954: 69). The thicker edge of the wedge shaped manos is flat, while the thinner edge is rounded. The edges of the parallel faced manos are rounded to slightly flattened.

The longitudinal cross section of the manos is also oval through the combination of nearly parallel faced and rounded ends except for specimens # 337 and # 529 which have a more strictly rectangular section.

Over half of the manos have small, shallow pits in the center of one or both faces, a feature which may have had a functional connection with the grinding process.

Specimen A3-1 is an example of a newly made and barely used mano. One of the grinding faces is pecked and shows little wear while the center of the opposite face still retains part of the cortex of the block of limestone from which the implement was manufactured. This, as well as the greater thickness of the specimen, tends to confirm the suggestion of lack of extensive use.

Provenience and Associated Traits

#	Square	Level	Length	Width	Thickness	Material	Pit
30	0:1	3	123	85	34	limestone	X
237	1:3	5	-	90	43	sandstone	X
232	1:4	6	149	84	49	sandstone	X
A3-1	2:1	6	158	111	64	limestone	X
291	2:3	7	-	-	40	limestone	-
298	2:4	8	-	95	33	limestone	-
337	1:6	8	-	76	30	limestone	X
299	1:3	8	122	101	42	limestone	X
529	1:4	12	-	85	35	sandstone	-
529	1:4	12	-	84	41	sandstone	-
230	1:5	5	77	71	38	sandstone	X

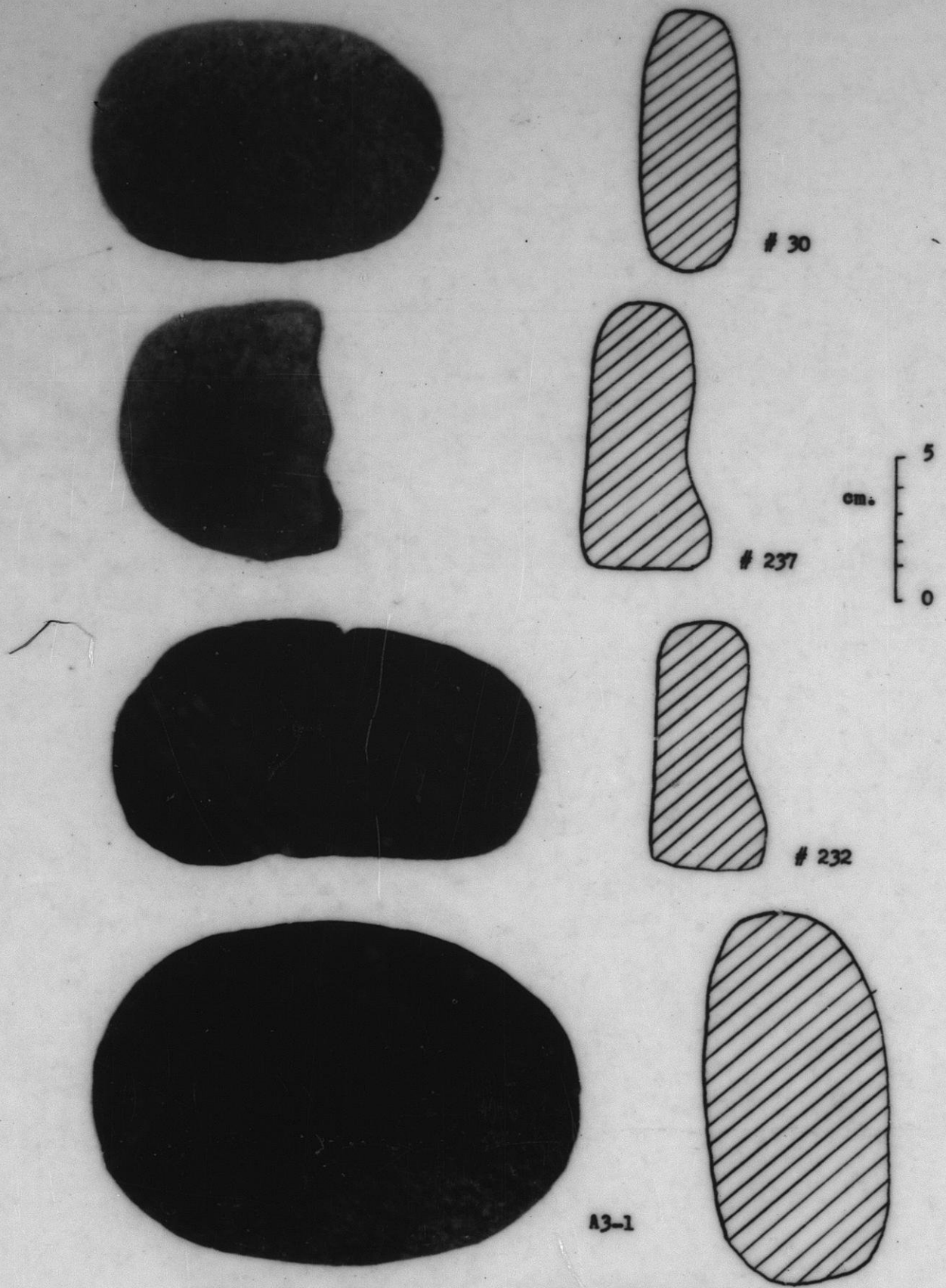


Figure 66. Manos with two opposed grinding faces.

Figure 67. Manos with two opposed grinding faces.

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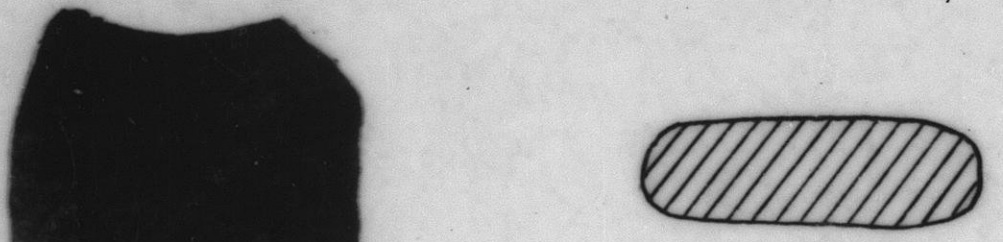

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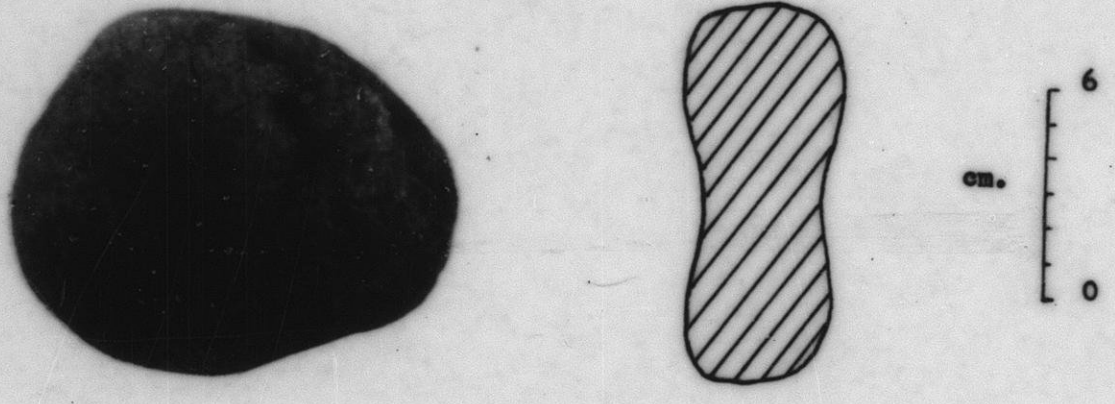


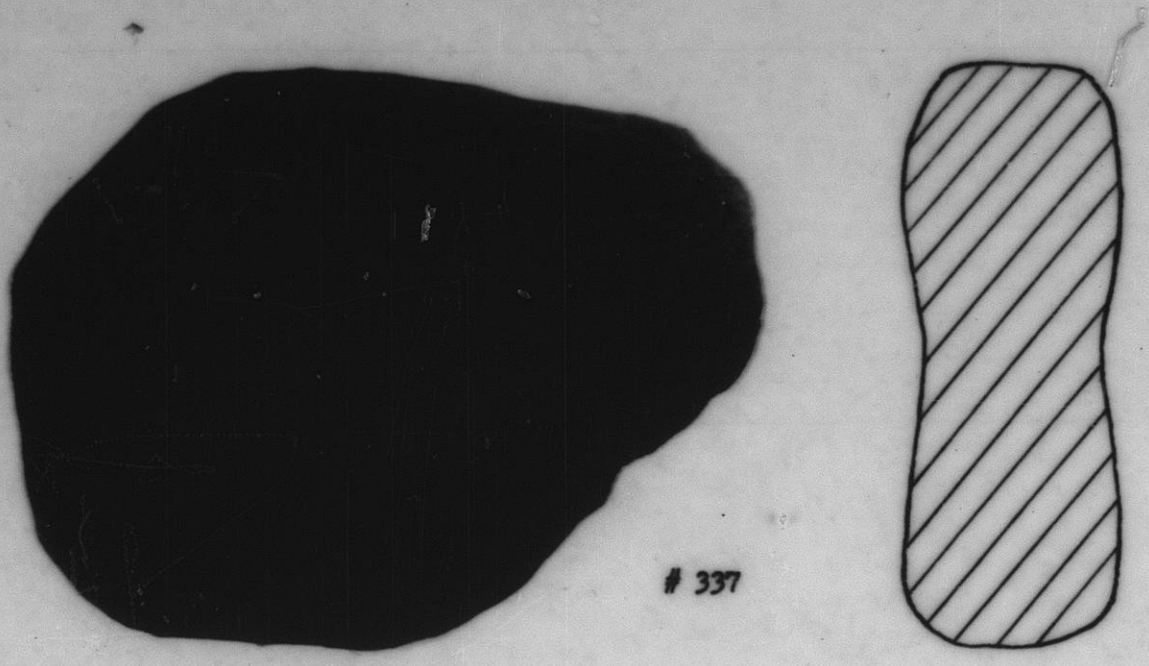
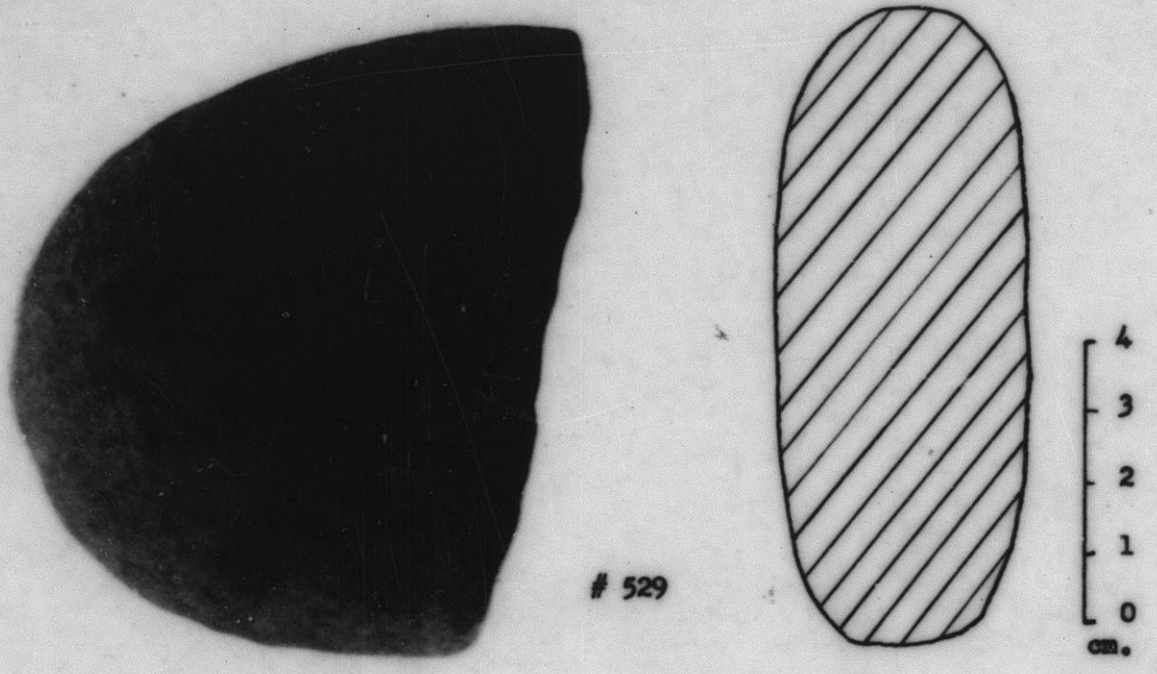


Figure 68. Manos with two opposed grinding faces.



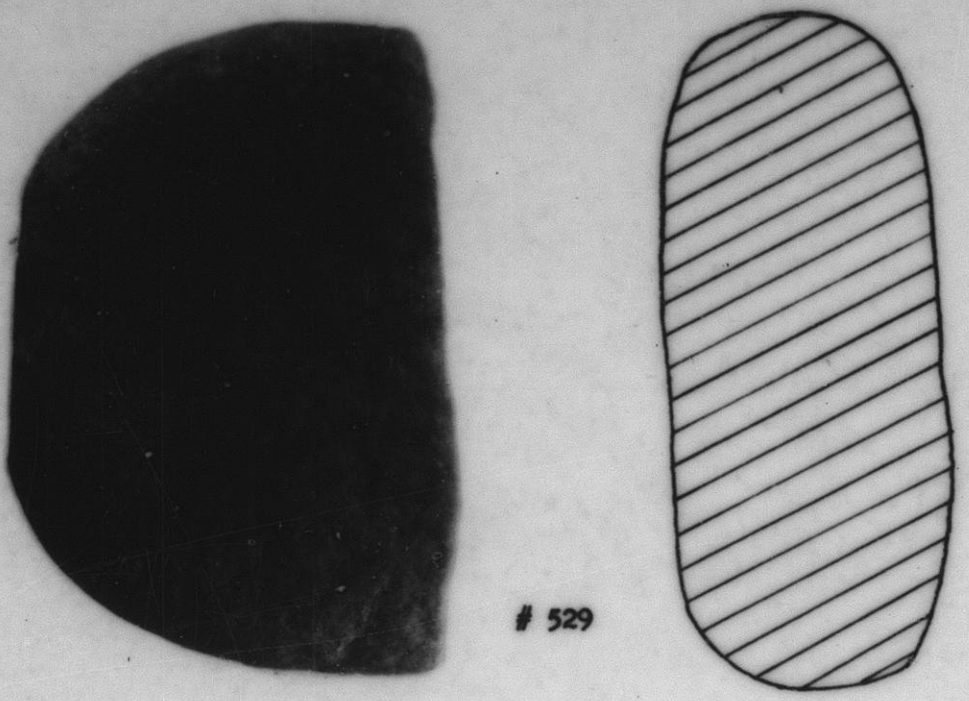
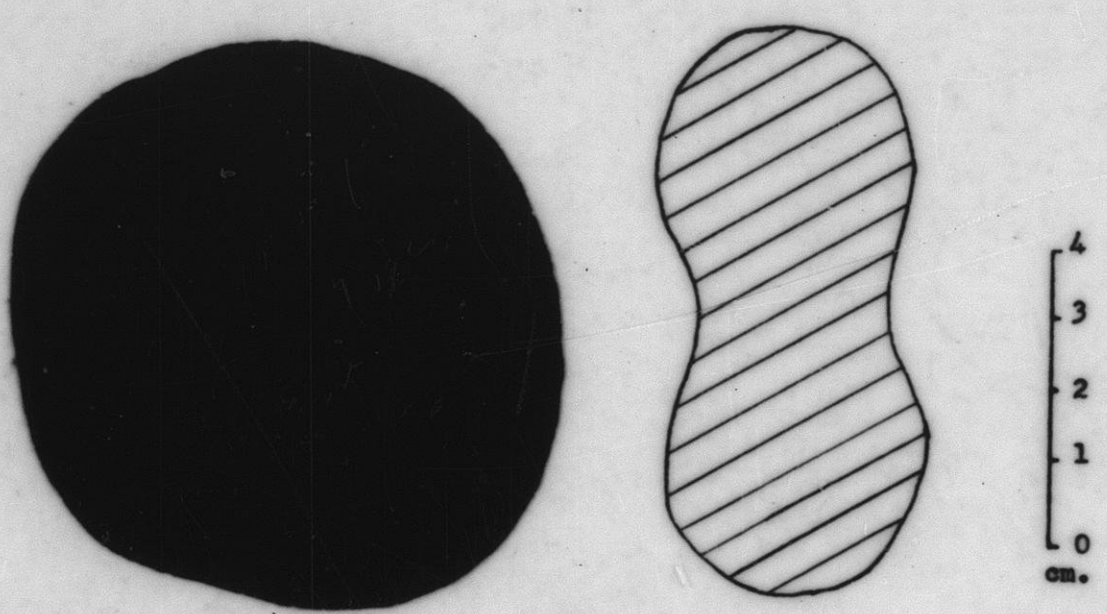


Figure 69. Manos with two opposed grinding faces.



Manos with single grinding surface

Only one mano, with an irregular outline, has a single grinding surface. This face is slightly convex while the other face is more markedly convex and bears no indications of usage. The edges and ends are rounded. It was manufactured from a compact sandstone. The specimen (# 540), found in square 2:1 at level 16, is 107 mm. in length, 81 mm. wide, and 62 mm. thick.

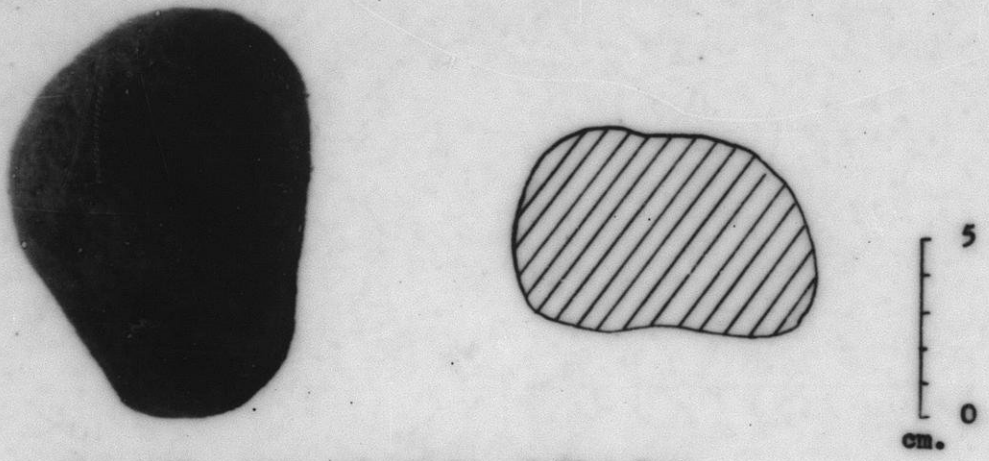


Figure 70. Mano with single grinding face.

Mano blank

Specimen # 239 is probably a mano blank. The two parallel faces, and the flat edges and ends have been pecked to shape the stone but there are no indications of smoothing through use as a grinding tool. The specimen is of limestone and was found in square 1:3 at level 6. Its dimensions are 123 x 84 x 53 mm.

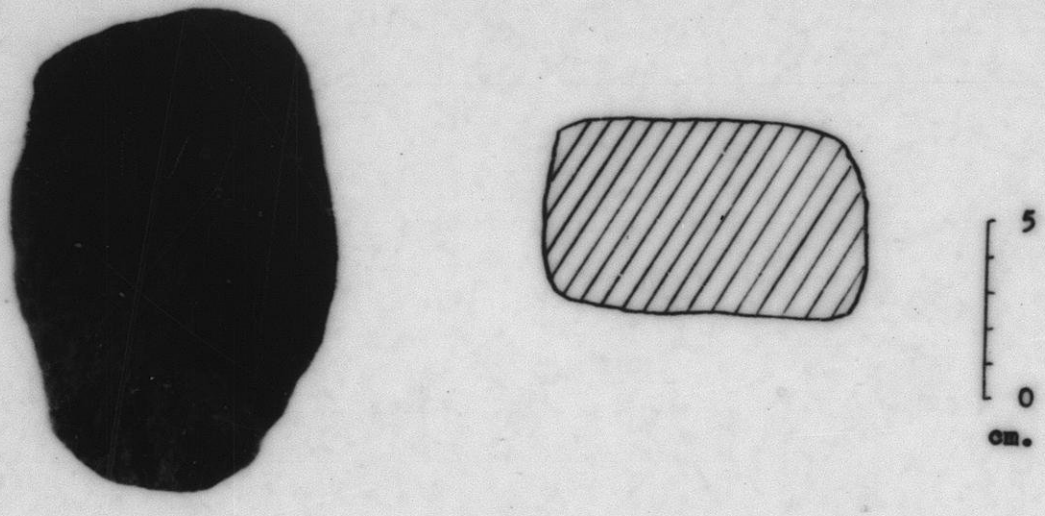


Figure 71. Mano blank.

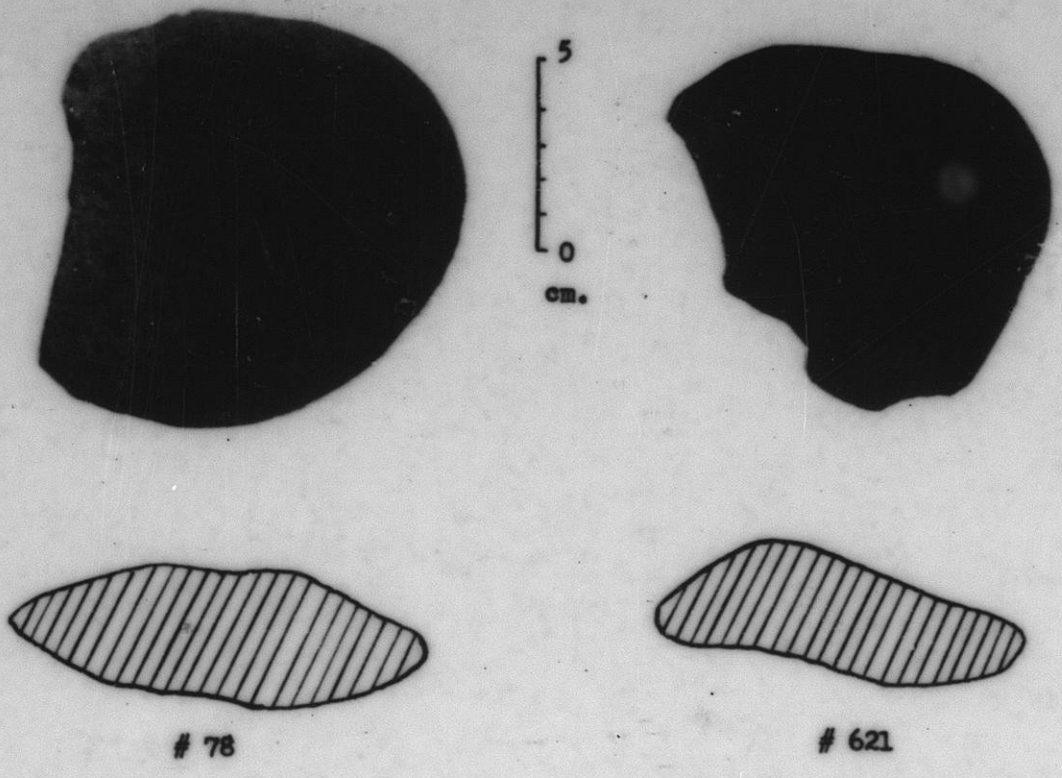
Miscellaneous Grinding Stones

Two sandstone blocks of irregular shape have smooth surfaces suggesting use in grinding or abrading. Wear facets, however, are not sufficiently pronounced for classification with the manos.

One specimen, # 78, has two pits on one face and one on the opposite face which resemble both the cavities on the nutting stones and the pits pecked in the face of manos. This specimen is biconvex in cross section and both faces appear to show some smoothing through use. The implement was found in square 0:7 in the top 2.5' and has dimensions of 112 x 116 x 36 mm.

A second specimen, # 621, has what appear to be two adjacent grinding surfaces on one face producing a generally wedge-shaped cross section. It was found in square 1:8 at level 8 and has dimensions of 112 x 103 x 35 mm.

A small fragment, probably of a mano (# 383) has two grinding faces and evidence of shaping through hammering on the unbroken side. One face and part of the broken edge have remnants of red pigment on them. Since the paint is found on the broken portion, it suggests the possibility of use to grind pigment after the original implement was broken. The fragment was found in square 2:1 at level 9 and measures 50 x 30 x 28 mm.



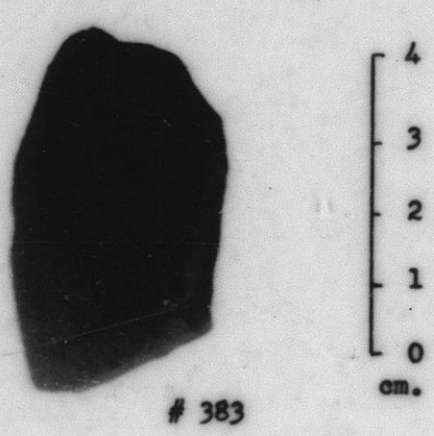


Figure 72. Miscellaneous grinding stones.

Hammerstones

Two hammerstones were recovered from the site. One specimen (# 77) is made from a compact sandstone and bears hammering facets on the somewhat pointed end shown in the upper left corner of the illustration as well as on the more bluntly rounded basal end. It measures 77 x 52 x 31 mm. and was found in square 0:3 at the top 2.5'.

The other hammerstone (# 525) appears to have been a river worn pebble of reddish-brown quartzite. Some hammering scars can be seen at one edge of the pebble and more extensive marks of use are present on portions of the faces adjacent to this end. The opposite end is broken, evidently through use. One face of the stone is fire blackened. The dimensions of the specimen are 75 x 59 x 33 mm. and it was found in square 1:2 at level 14.

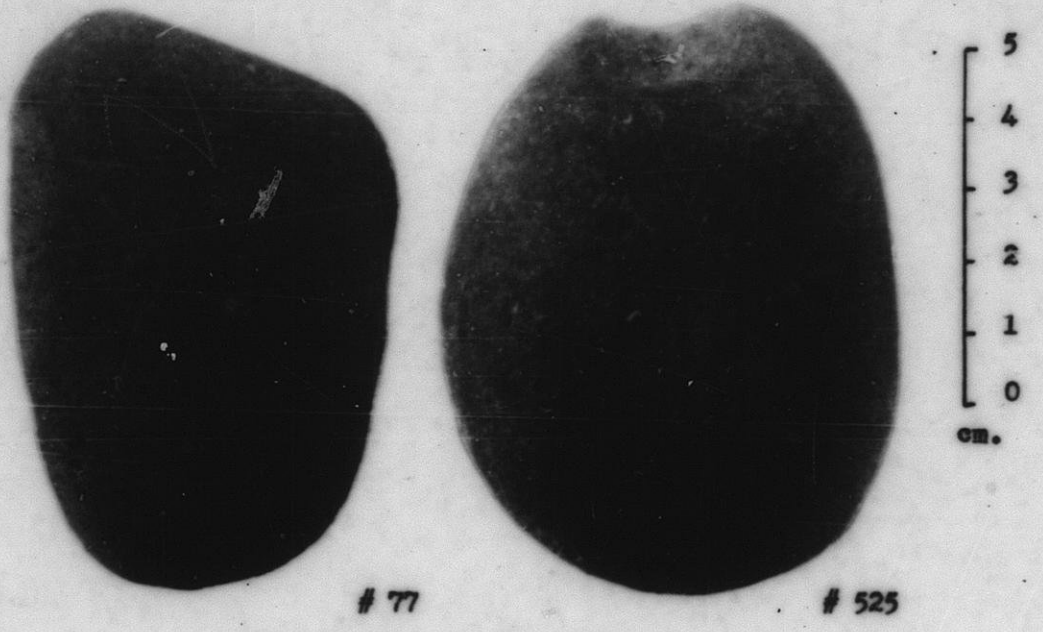


Figure 73. Hammerstones.

Shaft Smoothers (Figure 74)

A total of ten pieces of sandstone bear grooves on one or more faces, designed to smooth or polish the shaft of a dart or arrow or to sharpen the point of an implement. It appears desirable to separate, if possible, these two distinct functions--the smoothing of a shaft as opposed to the sharpening of an implement. R. B. Woodbury in his analysis of the stone implements of northeastern Arizona, differentiates between the term "grooved abrader" and "shaftsmoother":

> "First, those with little or no intentional shaping have been called Simple Grooved Abraders. The grooves vary greatly in number, size and shape. Second, those of intentionally produced shapes have been called Shaftsmoothers. A variety of materials is included, but the grooves are all rounded in cross-section, and of a size and shape that could have accommodated a slender wooden shaft, either for abrasion or for heating and bending (1954: 101)."

While the distinction in shape or the degree of modification of the basic shape of the stone block is doubtless of considerable importance in typological studies, it is suggested that greater stress should be placed on the character of the groove in the segregation of the two categories. In the description of the Oklahoma specimens, if a straight-sided groove which is U-shaped or rounded in cross section is present on the specimen then it is classified as a shaft smoother since this would appear to be the primary function, irrespective of whether the block of stone has been carefully shaped or not. On the other hand, if the block of sandstone bears grooves that are V-shaped in cross section or rounded yet do not continue across the entire face of the implement so that it would not seem possible to use it as a shaft smoother or polisher, then the implements

are classed as grooved abraders. Such forms appear to be the primary component of Woodbury's Simple Grooved Abraders although, he would in addition, include those whose grooves are "identical with those on shaftsmoothers" (ibid: 102). The use of the term shaft smoother is established in the literature of Plains archaeology (e.g. Hill and Wedel, 1936: 45-7). Hill and Wedel conclude in the study just cited that the small shaft smoothers of irregular shape with multiple grooves, which are comparable to the D1-47 specimens, are broken and re-used fragments of the larger, paired shaft smoother bearing but a single groove. We are inclined to the opinion that these are rather distinct types, an interpretation suggested by W. D. Strong's use of the designation "nail buffer" type as opposed to the paired variety (1935: 141).

D1-47 Specimens

A total of seven specimens are placed in the shaft smoother category (Figure 74). Although somewhat irregular, all tend to have a generally rectangular outline. A tendency toward a rounded section, suggests a resemblance to the "nail buffer" category previously mentioned. The length ranges between 31 and 53 mm. but some of the specimens may be fragments of originally larger implements. Indications of supplemental use are also present. # 290 bears a smaller V-shaped groove on the face opposite that bearing the primary U-shaped groove. Specimens # 229, 227 and 623 bear one or more grooves on the sides which may have been intended for sharpening purposes rather than for use as a shaft smoother. The color of the sandstone from which the implements were manufactured is also variable. Specimens # 229 and 227 are manufactured from a light tan sandstone; # 290 from a mottled red and brown sandstone; # 293 from a dark grey

sandstone; and # 623, 625, and 227 are manufactured from a reddish sandstone.

Shaft Smoother Provenience and Dimensions

#	Square	Level	Length	Width	Thickness
229	2:7	6	53	22	17
227	1:4	6	36	19	17
623	1:8	6	43	28	25
625	2:8	9	36	35	25
290	2:4	7	44	20	13
293	2:3	8	31	20	17
227	1:4	6	53	30	13

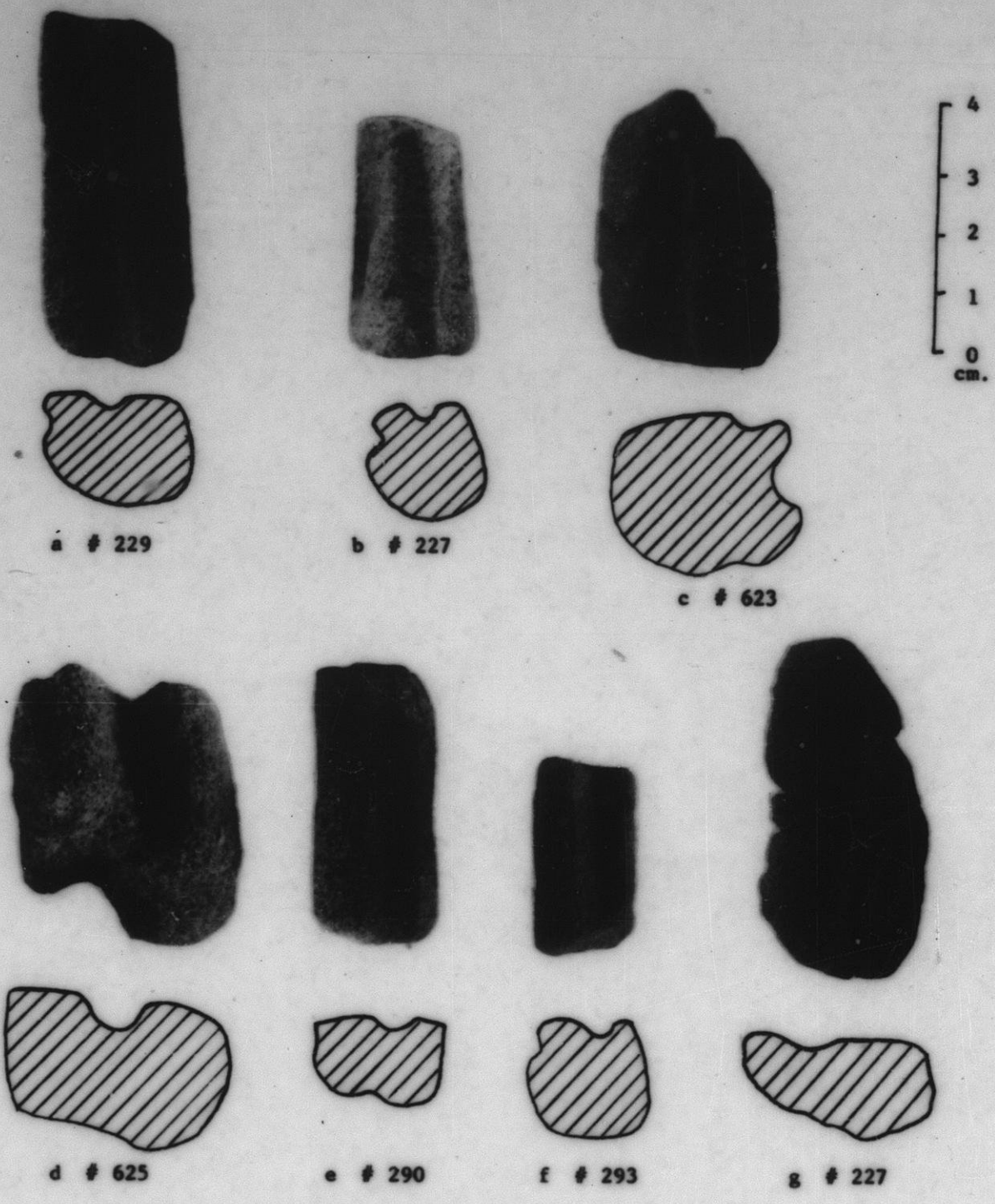


Figure 74. Shaft smoothers.

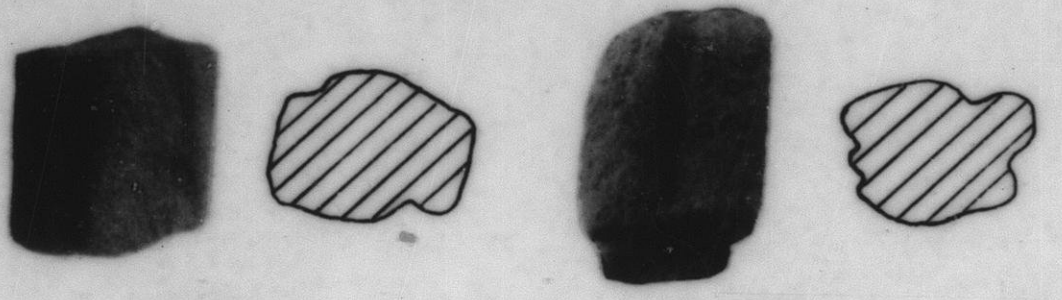
Grooved Abraders (Figure 75)

Three specimens are classed as grooved abraders. Two of these are small implements (# 240 and 296) quite similar to the shaft smoothers in appearance. In each instance, however, they lack the deep, U-shaped groove which characterizes this artifact category. In specimen # 240, traces of what appear to be a U-shaped groove appear on the rounded face and the area adjacent to this has been broken off. It is possibly a shaft smoother which, subsequent to breakage, has been utilized as an abrader. The groove present on the flat face is straight sided but considerably shallower and more variable in depth than those of the shaft smoothers. This implement was manufactured from a grey sandstone. Specimen # 296 has also been broken and may similarly be a reworked shaft smoother. Four grooves are present which are most distinctively broad and V-shaped in section. This implement is manufactured from a light tan sandstone.

The third abrader, # 125, is a large, irregularly rectangular block of reddish sandstone (89 x 67 x 26 mm. in dimensions) with multiple V-shaped grooves on the two opposite broad faces and single grooves on each of the two long edges. While the longitudinal grooves are broad and deep, the area of greatest depth is in the central portion of the specimen, the ends being considerably shallower. On the face opposite from that illustrated, the grooves terminate abruptly in a rounded end before the margin of the implement is reached. Implements such as this specimen are clearly not modified shaft smoothers.

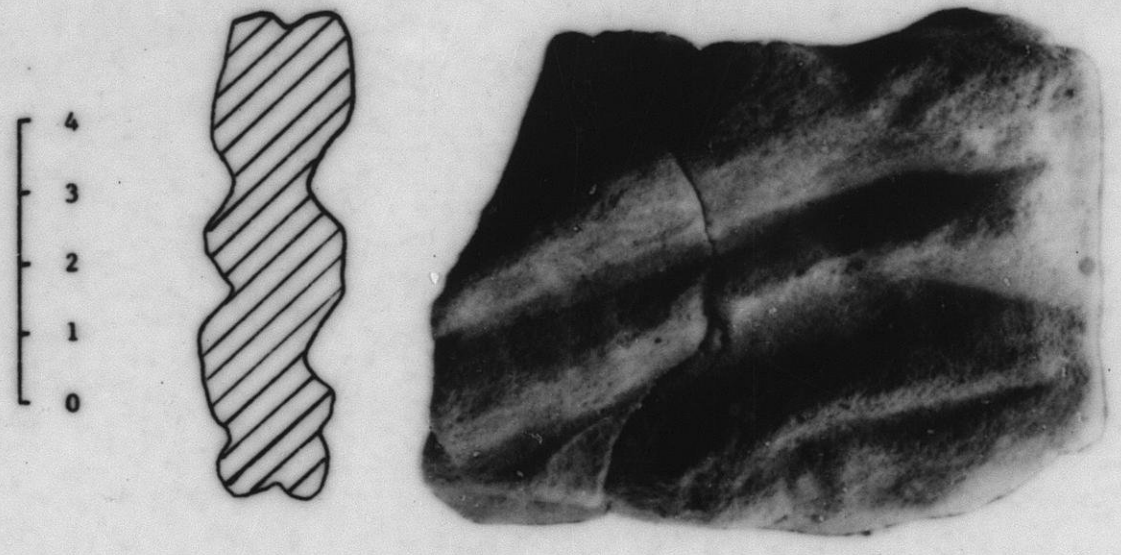
Grooved Abrader Provenience and Dimensions

#	Square	Level	Length	Width	Thickness
240	0:2	6	30	26	19
296	1:4	6	34	24	--
125	1:4	4	89	67	26



a # 240

b # 296



c # 125

Figure 75. Grooved Abraders.

Abrader

Specimen # 296 consists of a small rectangular block of mottled red and brown sandstone with dimensions of 43 x 37 x 23 mm. which was found in square 1:4 at level 8. One face is smoothed while the others are slightly irregular. It is possible that the one smoothed face might have been utilized as an abrader or that the object represents an unfinished grooved abrader or shaft smoother in which the grooves have not yet been produced.

Hematite

One small piece of hematite having an irregular outline (# 344) is ground on three adjacent flat faces and has one concave face. Marks of abrasion indicate clearly that the specimen was used as a source for red pigment. The specimen is 25 x 16 x 7 mm. in dimensions and was fouhd in square 2:4 at level 1.

A second lump of hematite does not bear such clear marks of usage but one face does seem to have slight smoothing marks upon it. This specimen (# 57) was found in square 0:3 at level 6.

Boatstone (Figure 76)

A fragment of a single boatstone (specimen A1) was found in square 1:3 at level 4. The terminology used in the description of the boatstone follows that proposed by J. T. Patterson (1937: 11).

The specimen is manufactured from a fine, grey sandstone and consists of a portion of one end, perhaps one-third of the original object. The base has been excavated to produce a smoothly rounded cavity. The convex surface comprises a smooth and continuously curved surface except for a flattened facet at the end. Obviously the variety lacks a keel. On the flattened facet at the end a perforation has been drilled which is

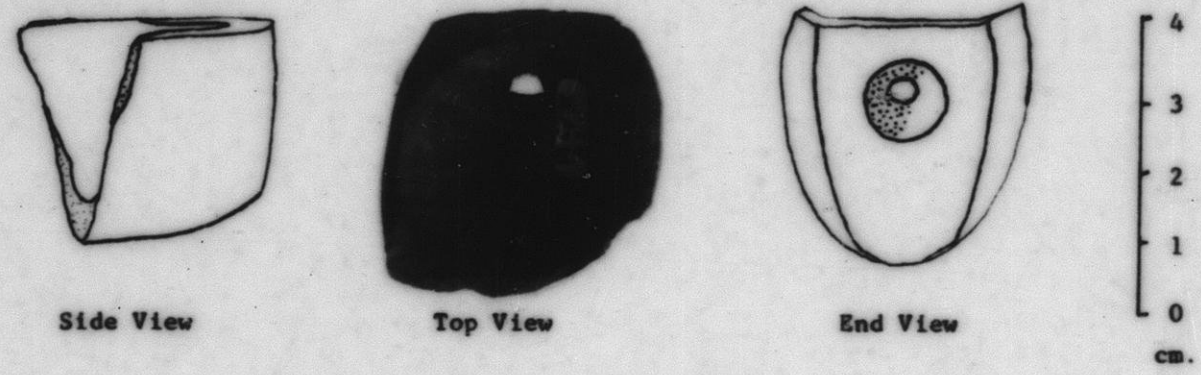


Figure 76. Boatstone

directed at a slight angle toward the base. The perforation has been drilled entirely from the convex surface and tapers in diameter from 13 mm. to a diameter of 5 mm. in the cavity. The fragment is 35 mm. long, 34 mm. wide, and 29 mm. in height. The distinctive and variable form of the boatstones suggests that these artifacts, presumably weights for spear throwers, may be of considerable utility as horizon markers if they are carefully classified as to type. The absence of adequate comparative material from Oklahoma sites precludes such an attempt at the present time.

Miscellaneous (Figure 77)

A roughly boat-shaped piece of limestone was recovered from square 2:1, level 6. The exterior of the stone is irregular and shows no indication of extensive shaping, though slight modification in shape and form may have taken place. The interior cavity, however, does show signs of abrasion over the entire oval surface. The function of the implement is not clear. The object measures 53 x 34 x 19 mm.

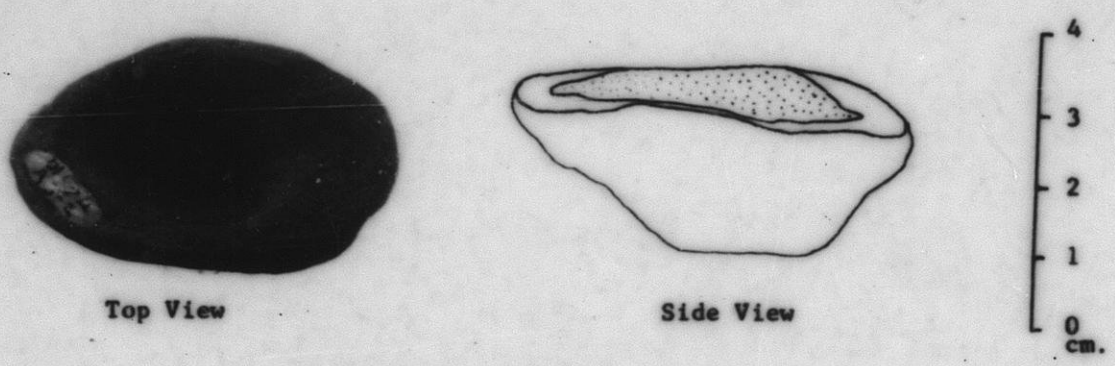


Figure 77. Boat-shaped stone.

BONE IMPLEMENTS

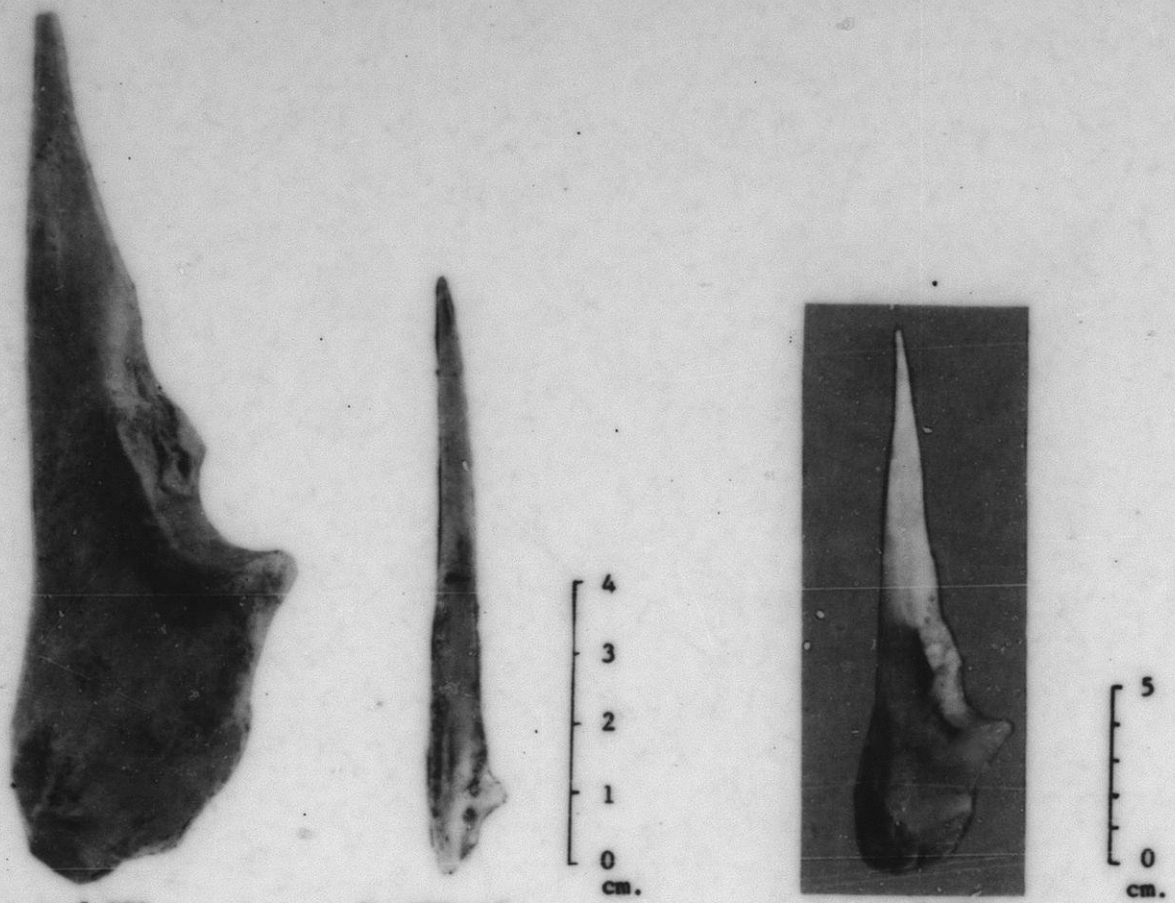
In the description of the bone implements, as in other categories, we have attempted to conform to typological groups established by prior archaeological analysis. In addition, we have preferred to select descriptive names wherever possible rather than types designated by letter or number because of the inevitable confusion caused by a multitude of different varieties designated "Type 1". Precision in the description of bone implements is further facilitated by the use of a proper nomenclature in reference to the landmarks of the bones from which the implements were manufactured. As a standard guide, we have made use of The Anatomy of the Domestic Animals by Sisson and Grossman. This abundantly illustrated handbook is both readily available and widely used in comparative anatomy and veterinary science.

Ulna Awls (Figure 78)

Awls manufactured from the ulna had the shaft thinned and ground to a sharp point. Aside from a polish and smoothing of the surface, which perhaps was largely derived from use, the shaft is the only section of the bone modified to form the awl. Two specimens were manufactured from deer ulnas and one from the ulna of a racoon.

Provenience and Length

#	Square	Level	Length	Species
253	2:4	7	120 mm.	deer
250	2:4	7	151 mm.	deer
A19-2	2:1	9	81 mm.	racoon



a # 253 b A19 - 2 c # 250

Figure 78. Ulna awls.

Rib-Edge Awl (Figure 79)

The single specimen (# 464) in this category consists of the butt end of the awl. The implement is triangular in cross section with smoothed cancellous bone exposed on one of the faces. The butt end proper is bluntly rounded. The fragment is 85 mm. in length and has a maximum width of 8 mm. The specimen was found in square 0:5 at level 9. Although we have retained the name "rib-edge awl" (Kidder, 1932: 216-7) for this distinctive Plains artifact, we recognize the possibility of it being a misnomer since the source, as Wedel has suggested, could be the anterior margin of the dorsal spine of the thoracic vertebrae of the bison (Wedel, 1955: 119-20).

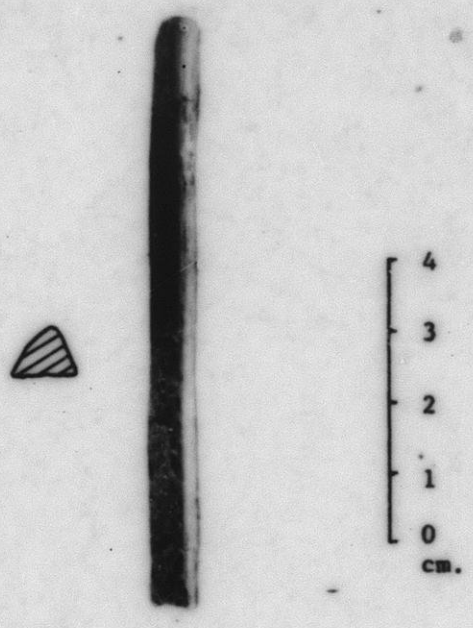


Figure 79. Rib-edge awl.

Cannon-bone Awls (Figure 80)

The term, cannon-bone awl, is reserved for those bone awls manufactured from the cannon-bone (metacarpal or metatarsal) where the distal end is left intact to serve as a handle. The technique used in their manufacture was to trim away a portion of the anterior or posterior surface of the bone and then to dress the cut section laterally to form a sharp point. An alternative manufacturing technique is to be seen on specimen # 642 consisting of the more slender bone of a deer fawn. Here the tip is produced by cutting diagonally from the side of the bone.

In specimen # 365 the sharpened end appears to have been produced by initially deepening the vascular groove and then trimming away a portion of the posterior surface. The tip of this awl is missing. In specimen # 465, a sharp, transverse cut has been made on the posterior surface and the bone neatly trimmed away to about half the thickness of the bone. In this specimen the ridges of the distal end have also been trimmed. A transverse groove has also been cut across the posterior surface 34 mm. below the distal end. The modifications described may have been designed to allow the addition of some kind of covering to the handle. Another specimen, # 406, is manufactured from an immature deer in which the epiphysis had not consolidated and is not present. A fragmentary specimen, # 587, may be of the same variety but the distal end, most of the shaft, and the tip are missing. The specimen has been burned.

Cannon-bone Awl Provenience and Length

#	Square	Level	Length	#	Square	Level	Length
365	2:1	11	199 mm. +	642	2:1	19	83 mm.
465	2:1	15	89 mm.	587	1:8	3	55 mm. +
406	0:7	9	84 mm. +				

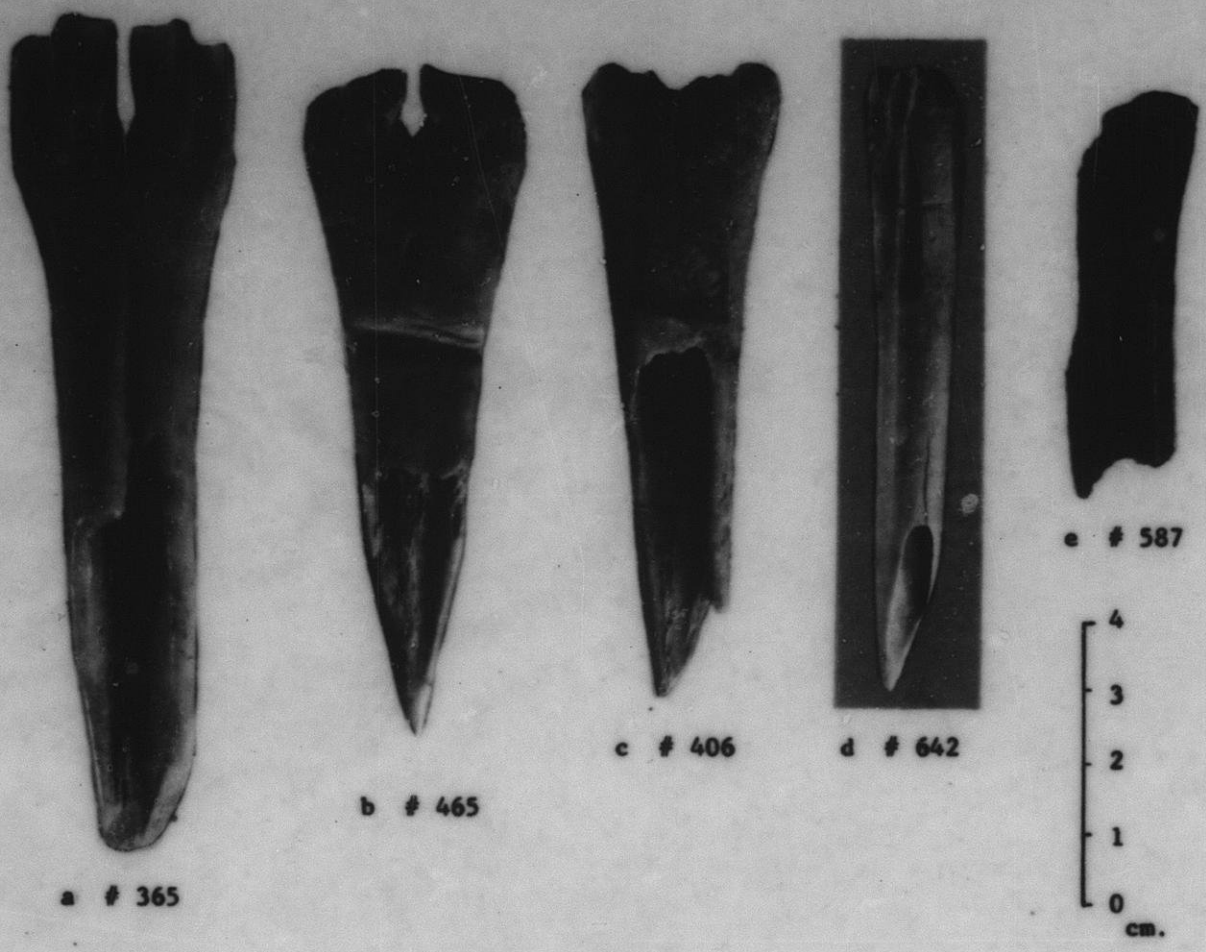


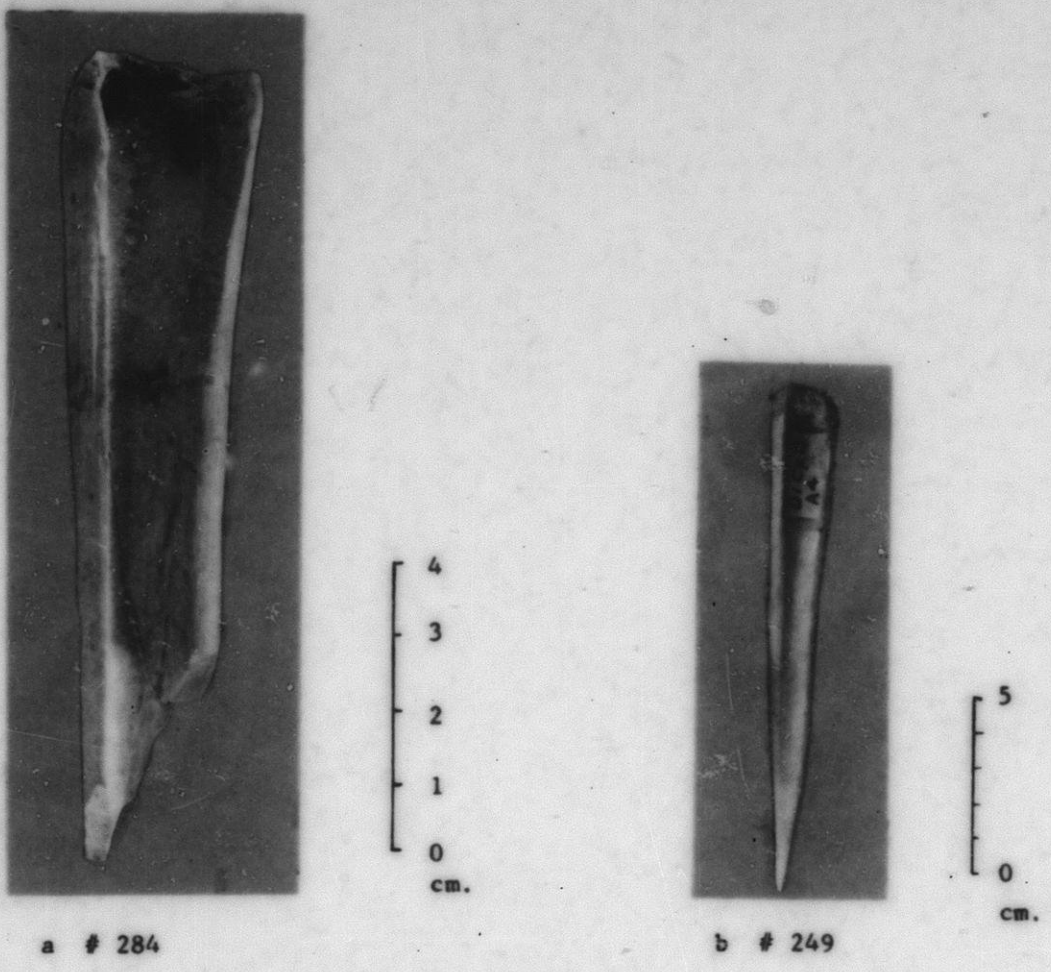
Figure 80. Cannon-bone awls.

Flat Split Awls (Figure 81)

The awls of this category are comparable to those placed by A. V. Kidder in his category b, "Head of bone unaltered except by original splitting" (1932: 211). This group is described by Kidder as follows:

> "Awls of this type, as is shown by the illustrations, are stout and heavy-butted. Almost all of them were produced by splitting a deer metapodial and using the resultant half, third or quarter, of the articular end as a butt; the shaft has been tapered by grinding and the tip brought to a sharp, but seldom extremely keen, point" (ibid.)

Two specimens from D1-47 conform to this category which for the purposes of classifying the Oklahoma specimens might be further delimited. While made from the split cannon-bone, all make use of the proximal end of the bone as a handle. It might be noted that this is probably the only end of the bone which could conveniently be split into thirds or quarters. While the edges of the awl retain their original shape with little modification, they are smoothed for the entire length of the specimens. In one specimen (# 284 from square 1:3, level 8), the manufacturing process involved splitting through the vascular grooves. The second specimen (# 249 from square 1:3, level 5) is the only complete one and measures 142 mm. in length. While probably split in the same fashion, the edges are more extensively worked.



a # 284

b # 249

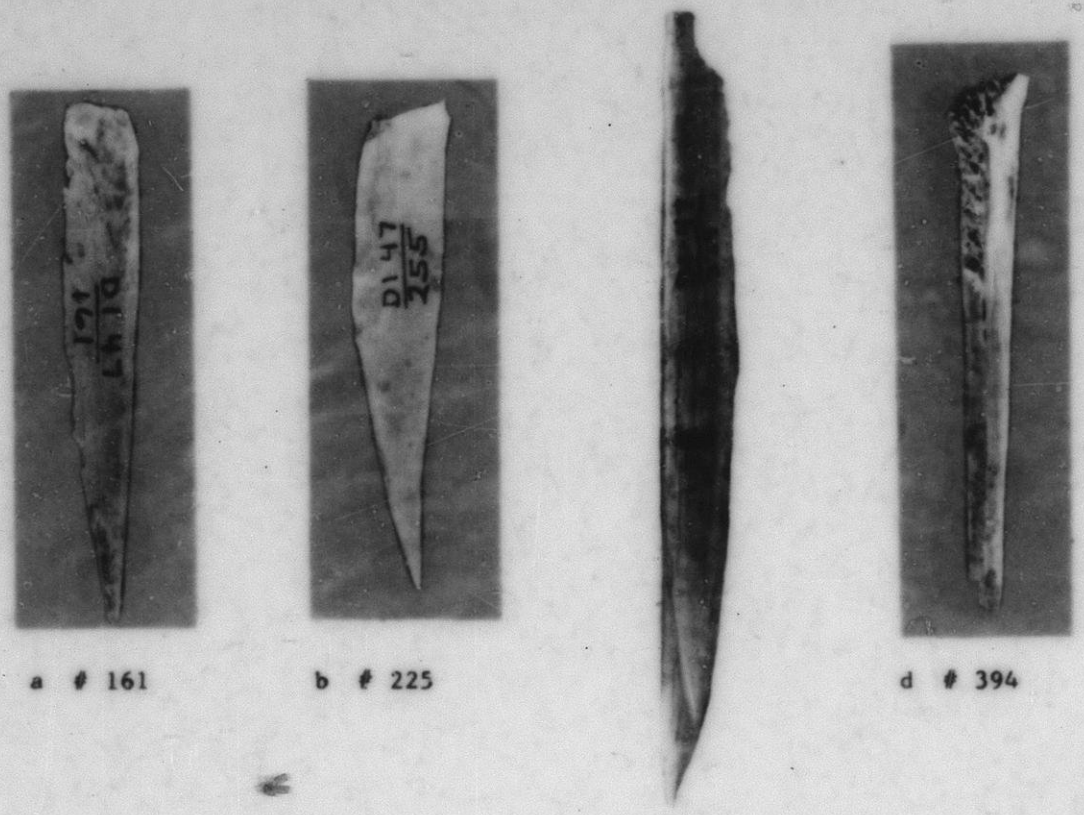
Figure 81. Flat split awls.

Splinter Awls (Figure 82)

Dr. A. V. Kidder also makes use of the term splinter awl to designate those bone awls which are manufactured from a splinter of long bone and where the only shaping or sharpening occurs at the tip of the specimen (1932: 213). As Dr. Kidder has suggested, the raw material for such awls probably came from bones split for the extraction of marrow or from waste products in the manufacture of the larger awls. A feature of the group from D1-47 would appear to be the rather abrupt taper of the pointed end of the implement. The specimens do not appear to have the long slender tip which is frequently found in other specimens. One specimen, # 161, retains a portion of the proximal end of a deer cannon bone at its butt end. Despite this, it is not grouped with the flat split awls because there is no sharpening or smoothing of the specimen except at the worked tip.

Splinter Awl Provenience and Length

#	Square	Level	Length
161	1:3	4	70 mm.
255	2:7	7	65 mm.
339	1:2	11	113 mm.
394	2:1	14	74 + mm. (tip missing)



a # 161 b # 225 c # 339 d # 394

Figure 82. Splinter awls.

Minute Awls (Figure 83)

A further category recognized by A. V. Kidder which is also present as a single example at D1-47, is one designated as "minute awls." This group is described for Pecos as

> ". . . really in a class by themselves, for while they are not very much shorter than the shortest examples of the types described above, they are so slender and so carefully made that they must have had an entirely different function. One has been prepared by pointing a thin splint-bone; two are thin slivers, presumably of long-bone; and one is worked from the little dew-claw of the deer, the only case from Pecos in which this bone has been used as an implement." (Kidder, 1932: 213)

The thin, slender awl of this variety from D1-47 is specimen # 643 which was found in square 1:2 at level 19. The implement is 52 mm. in length and manufactured from a thin splinter of long bone. It has been smoothed and polished over its entire length. Possibly it has been manufactured from bird bone in view of the thin walls of the bone.

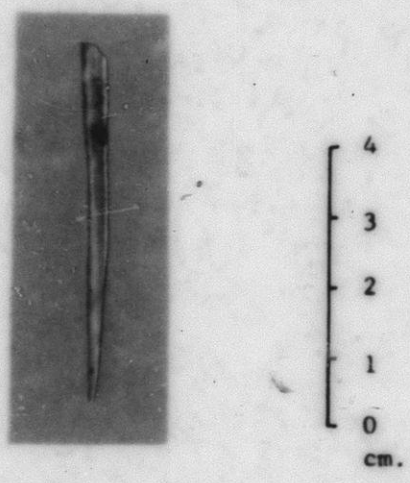


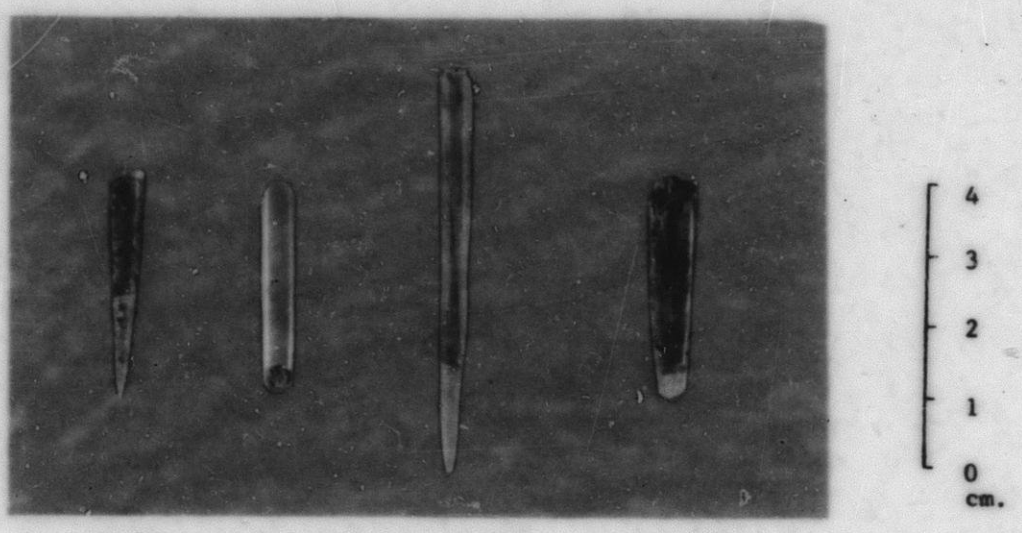
Figure 83. Minute awl.

Rod-like Awls (Figure 84)

Unfortunately all four specimens which may be placed in this category are fragmentary so that full details on shape and size can not be provided. They comprise a group of awls manufactured from a bone splinter in which the entire surface is modified, smoothed and polished to produce a shaft which is circular to oval in cross section. Since the butt end is not present this feature can not be described.

Provenience and Associated Traits of Rod-like Awls

#	Square	Level	Cross Section
133	0:4	top 2.5'	circular
187	1:2	9	oval
260	1:4	7	circular
577	2:6	9	oval



a # 133 b # 187 c # 260 d # 577

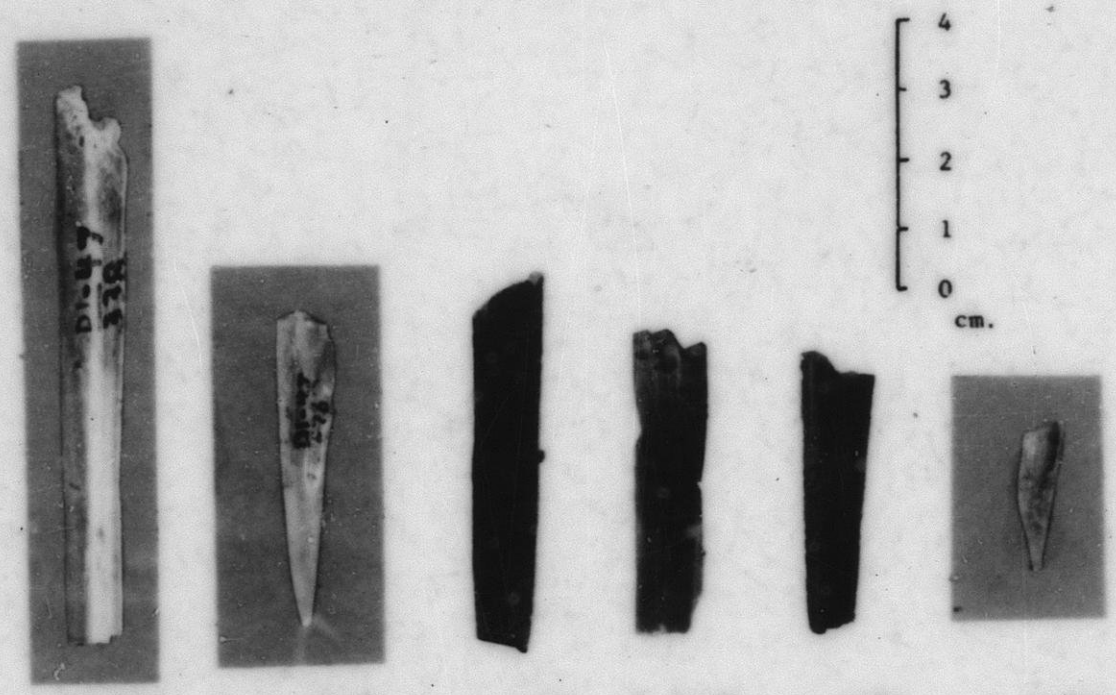
Figure 84. Rod-like awls.

Awl Fragments (Figure 85)

The remaining artifacts grouped in this category are fragments of awls which cannot with certainty be placed in the previously described groups. They represent either sections of the shaft or tip of the awls. # 600 is burned.

Fragment Provenience

#	Square	Level	#	Square	Level
46	1:5	2	575	1:2	16
338	0:4	11	576	1:2	12
481	1:4	13	600	1:8	6



a # 338 b # 576 c # 481 d # 575 e # 600 f # 576

Figure 85. Awl fragments.

Deer Cannon-bone Beamers (Figure 86)

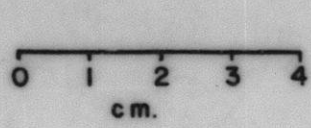
Seven beamers, all recovered in fragmentary condition, were manufactured from deer cannon-bones. The technique of manufacture involved the deepening and widening of the vascular groove with the central portion of the shaft cut to give a shallow concavity to the working edge. A working edge, sharply beveled inward, is present on both sides.

Two specimens (Figure 86; # 613 and 27) are fragments at the proximal end of the bone, while two additional specimens (Figure 86; # 160 and 269) are from the distal end. Specimen # 269 has been broken in such a fashion that a beveled working edge remains only on one side near the end of the fragment. Specimen # 27 has just the beginning of the beveling visible at the point where the break occurs. It may be noted that the groove on the plantar surface has been widened and extended toward the condyles. That specimen # 276 was manufactured from the bone of an immature deer is indicated by the absence of the condyles. Specimens # 102 and 157 are shaft fragments that were broken both longitudinally and transversely but each still retains one beveled edge to document their use as beamers.

Beamer Provenience

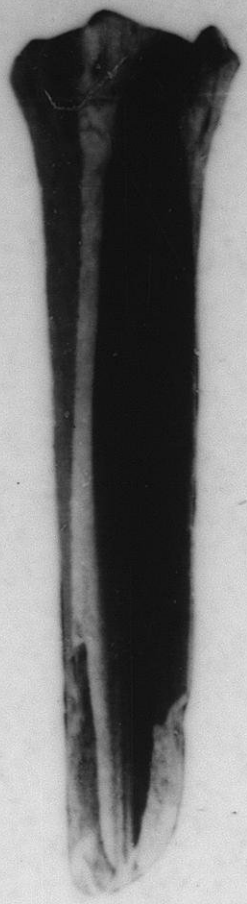
#	Square	Level	#	Square	Level
102	0:2	top 2.5'	269	2:4	8
157	0:3	top 2.5'	276	2:2	11
160	1:2	2	613	0:5	14
27	0:3	6			

Figure 86. Bone Beamers.



a 102

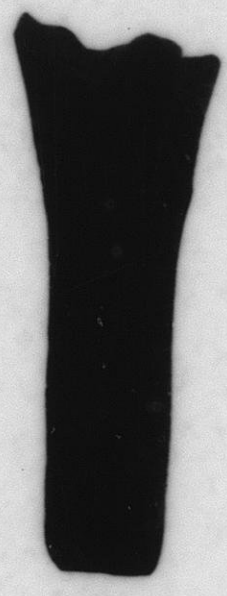
b 157



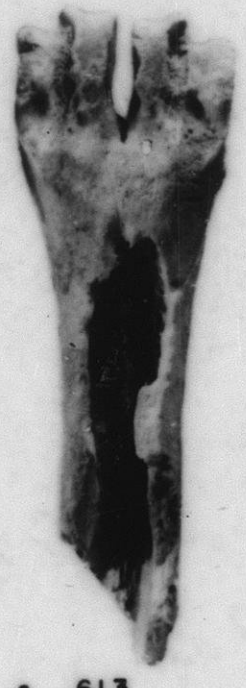
c 160

d 27

e 269



f 276



g 613

Neural Spine Beamer (Figure 87)

One beamer, also a fragment, was manufactured from the neural spine (thoracic vertebra) of a bison. The concave working edge, the sides having a sharp inward bevel, was produced on the posterior edge of the spine by removing the cancellous tissue and shaping the compact surface bone. This specimen (# 356), now 184 mm. in length, was found in square 2:5, level 7. The normal edges of the bone and a portion of the worked edge are obscured by extensive rodent gnawing.

Figure 87. Neural spine beamer.

Worked Deer Mandible (Figure 88)

The right half of a deer mandible, specimen # 496, lacks the vertical part of the ramus, probably through breakage rather than by intentional modification. The incisor teeth have been removed by cutting through the body of the ramus which in addition removed some of the symphyseal surface. The cut edge has been smoothed and subsequently polished through use. The most extensive modification on the mandible is to be seen on the ventral border which retains the original curvature but has been flattened from the angular process to the symphyseal surface by removing part of the border with a knife. Numerous longitudinal knife marks are visible on this flattened border although it has been polished through use as has been the medial border. The buchal surface of the cheek teeth has also been slightly worn and polished. Since the amount of teeth wear is minimal, the specimen cannot with certainty be identified as a device to remove kernels of corn from a cob. Such a function would not appear to account for the extensive reworking of the ventral border. The specimen is 180 mm. in length and was found in square 2:3 at level 13.

Figure 88. Worked deer mandible.

Bison Scapula Implement (Figure 89)

One spatula-shaped implement, manufactured from a bison scapula was found in square 2:1 at level 9. The implement is 223 mm. in length and 45 mm. in width. The longitudinal axis of the implement comprises the base of the spine which has been removed by chopping and is present only as a low ridge of cancellous bone. The width of the specimen has been attained by removing a portion of the anterior border near the anterior angle and by trimming through the infraspinous fossa close to the spine. Fine knife marks may be seen in this area. The sides of the implement are thick, blunt and smoothed and polished through use. The rounded end is slightly thinner and would appear to be the major functional sector of the implement. The opposite end, near the neck of the scapula, is roughly trimmed and bears little smoothing. Such a specimen obviously does not fit into the traditional scapula hoe category of the Plains, but may have been used as a digging tool as was suggested by Wedel in connection with a somewhat similar specimen found at the Steed-Kisker site (Wedel, 1943: 80).

Figure 89. Bison scapula implement.

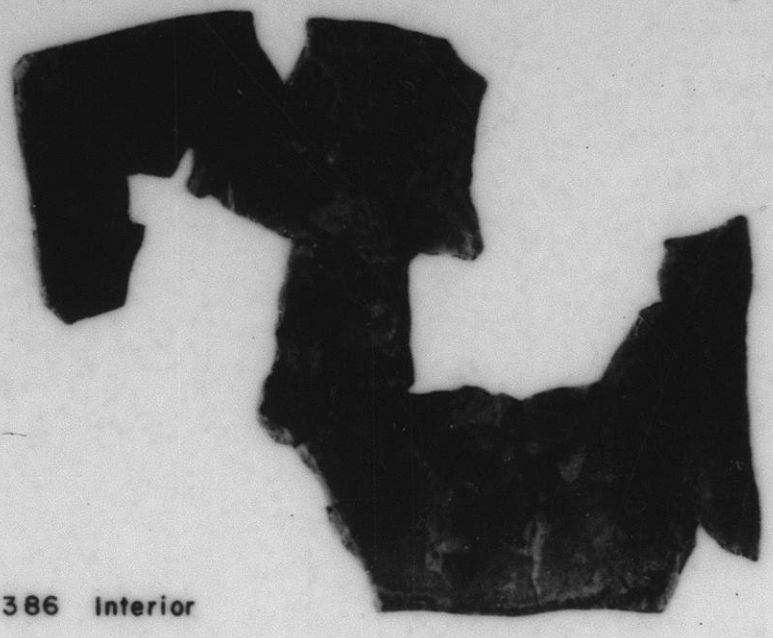
Turtle Carapace Bowls (Figures 90-91)

Only a single turtle carapace bowl was found at the site in a nearly complete condition (Figure 90). The edges of the shell were cut and ground to form the container. All projections on the interior of the carapace were cut off and ground down to give a smooth surface. Numerous knife marks and a slight polish are visible on the interior and the exterior is polished near the edges.

Eleven fragments of turtle carapace have many of the same features as the complete bowl (Figure 91, a-k). The interiors are cut and ground to remove projections except for specimens # 190 and 112 which have polished interiors but lack grinding. All were probably portions of bowls. It is interesting to note that none of the turtle plastron fragments from the site show any signs of work or use.

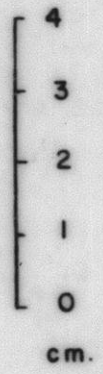
Individual Carapace Provenience

#	Square	Level	#	Square	Level
112	0:7	top 2.5'	413	0:4	8
99	0:6	"	353	1:4	10
109	1:7	5	387	0:5	11
188	1:2	7	475	1:3	12
190	2:2	7	386	2:1	13
265	1:6	7	389	2:1	15

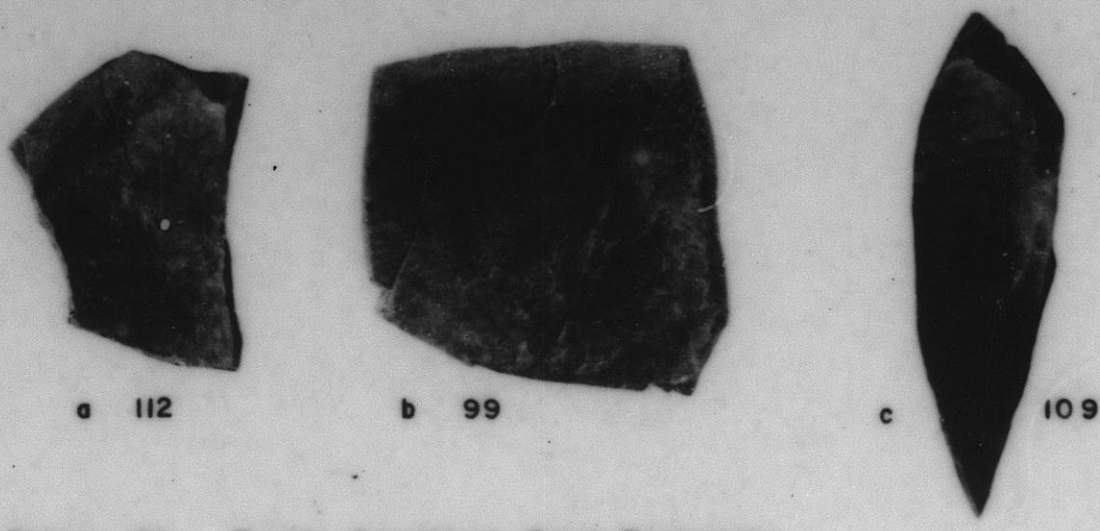


386 Interior

Figure 90. Turtle Carapace Bowl.

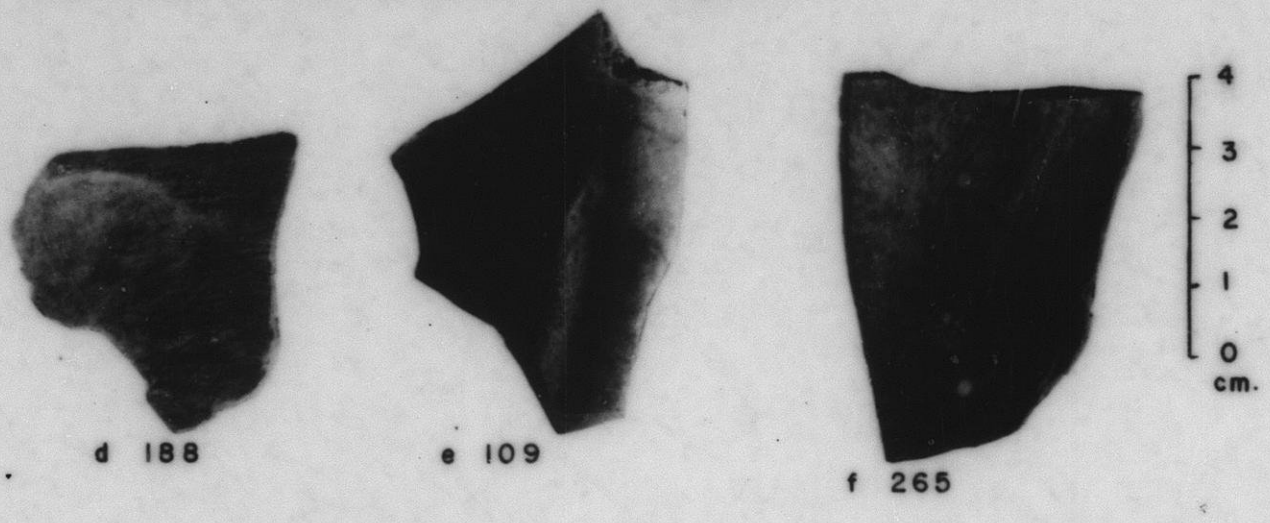


386 Exterior

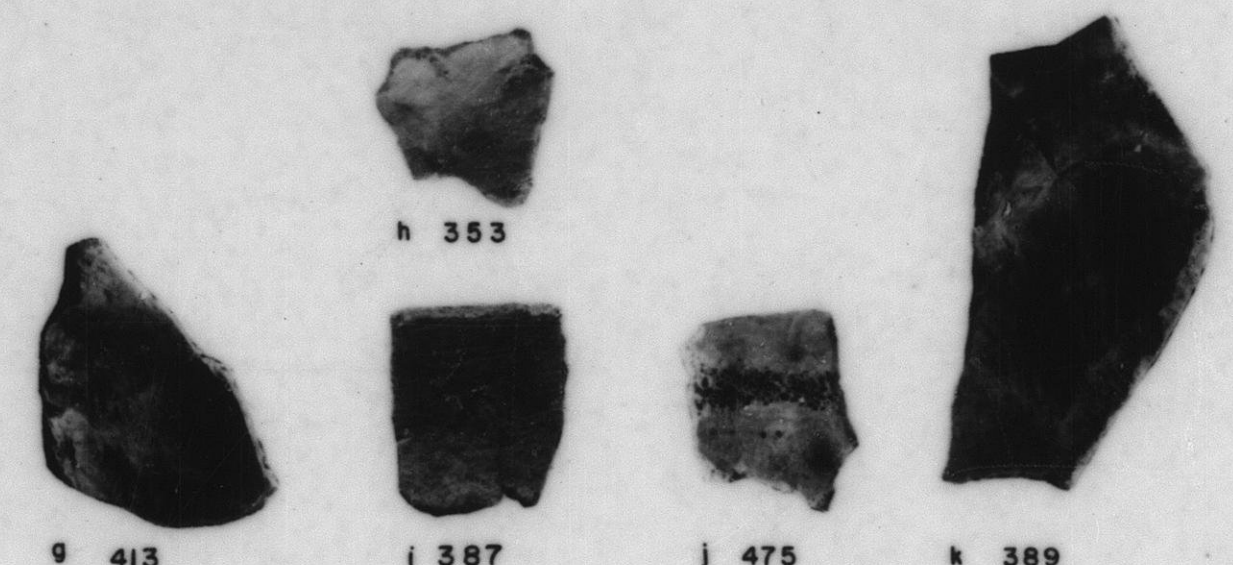


a 112 b 99 c 109

Figure 91. Turtle Carapace Bowl Fragments



d 188 e 109 f 265



h 353

g 413 i 387 j 475 k 389

Antler Flakers (Figures 92-93)

Twenty-six antler tine sections, probably used to flake stone implements, were recovered in the deposit. All were cut or broken from a longer piece of antler leaving an irregular or angled butt end except for two (Figure 92, d,h) which have straight fractures at the butt. It would appear that there was no effort made to finish the implements at the butt end for all signs of work or wear appears at the tip. The cancellous tissue on some flakers is missing at the butt end, but this is probably the result of rotting rather than any attempt to hollow out the flaker for hafting. The length of the specimens is variable (37 to 157 mm.) however, some have fresh breaks at the butt suggesting that the flakers were originally longer.

The tips of the flakers either exhibit an angular wear facet and show some battering from use (Figure 92, a-d); are rounded off and are battered (Figure 92, e-l); or are rounded or pointed and exhibit wear facets (Figure 92, m; Figure 93, a-k). A few are polished at the tip or along part of the shaft, but many are so worn or lime encrusted that polishing is no longer visible, if it was ever present.

Also placed in this category are two polished antler tips, 23 and 24 mm. in length (Figure 93, l-m). Both are burned grey and black, and have a high polish on the surface. The tips are faceted and bear usage marks. It might be noted that 10 of the group of 24 listed above also show extensive burning. While it is possible that any bone splinter or implement might accidentally be burned, this is a very high percentage and perhaps indicates the use of fire to harden the antler implements.

Two additional flakers (# 112, 463) of similar characteristics, are not illustrated. The scale at the top of Figure 92 refers to all flakers except #'s 119, 254, and 493 which have scales immediately to the left.

Figure 92. ANTLER FLAKERS.

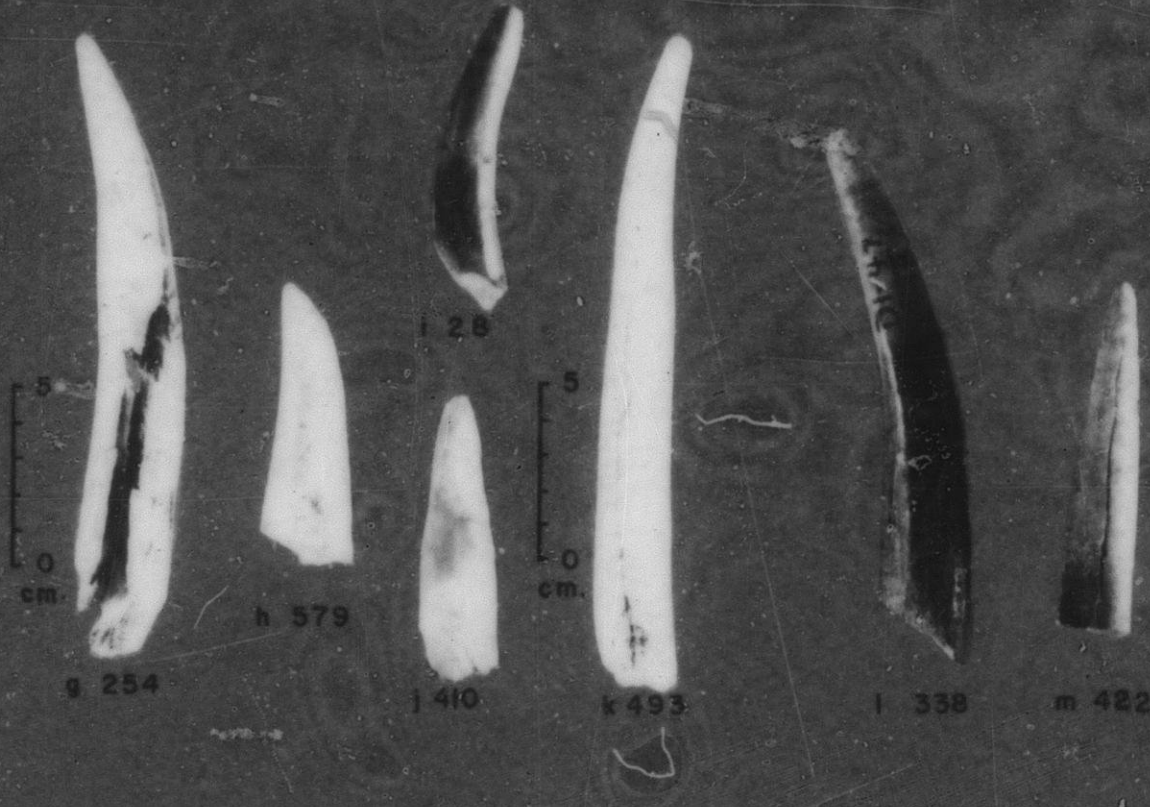


Figure 33. ANTLER FLAKERS

Antler Flaker Provenience and Length

#	Square	Level	Length	#	Square	Level	Length
119	0:1	top 2.5'	132	493	1:7	9	157
97	0:5	top 2.5'	115	422	0:4	9	48
112	0:7	top 2.5'		279	1:3	9	45
63	1:7	2		353	1:4	10	63
49	1:6	4	44	471	2:5	10	38
172	1:4	5	44	426	2:4	11	94
173	1:4	6	77	276	2:2	11	24
168	1:5	6	58	269	2:4	12	47
38	1:5	6	23	475	1:3	12	41
254	2:3	7	149	416	2:1	13	65
579	2:1	7	38	394	2:1	14	74
28	1:4	7	44	613	0:5	14	63
338	1:4	8	78	501	1:1	18	84
410	1:7	8	37	617	0:6	18	85

Thinned Antler Tips (Figure 94)

Three sections of antler shafts near the tip of the antler but unfortunately with the actual tips broken off, suggest use as flakers or perhaps awls. Two (Specimens 21 and 419) have been thinned toward one end by the removal of thin sections of the outer layer. Both have irregular butt ends. The third specimen (# 255) has been thinned along one side so that it is planoconvex in cross section. A very small portion of the tip of this specimen remains. It appears to be rounded and somewhat battered as are those implements classified as flakers.

Provenience:	#	Square	Level
	21	1:7	4
	255	2:7	7
	419	0:6	9

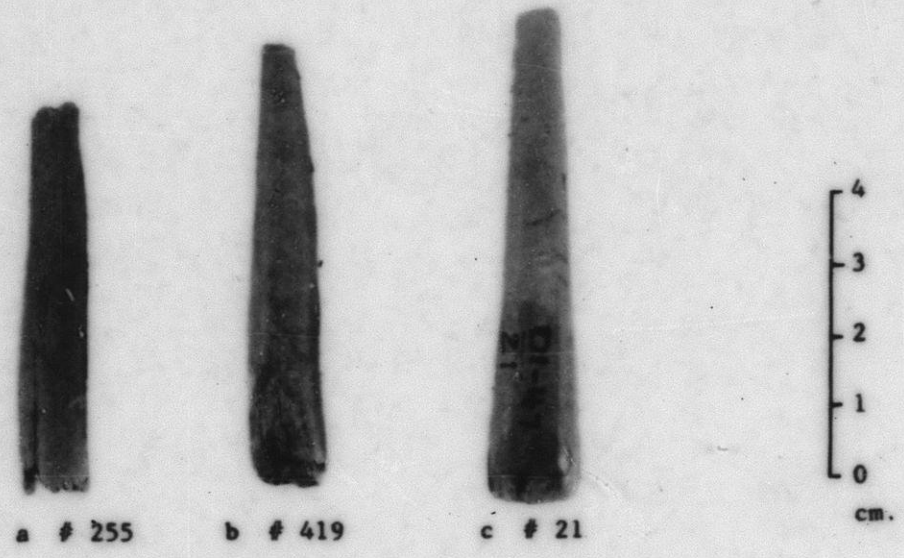


Figure 94. Thinned antler tips.

Worked Antler Shafts (Figure 95)

While in the preceding group designed "thinned antler tips" the manufacturing techniques are such that the normal taper of the antler tip is retained, the three artifacts placed in this category have a nearly uniform diameter for the length of the shaft. However, since all three are small fragments a precise description of the total form is not possible. All have round to oval cross sections with a portion of the spongier bone exposed on one side. Two have what appears to be a blunt tip remaining which is slightly faceted and suggests an assignment to the flaking tool category. Since this blunt end occurs on the slightly narrower end of the shaft it does not appear likely that this represents the butt end.

Provenience:	#	Square	Level	Max. Diameter
	168	1:5	6	9 mm.
	252	1:7	7	7 mm.
	265	1:6	7	10 mm.

Figure 95. Worked antler shafts.

Deer Ulna Flakers (Figures 96-97)

The deer ulna was also used as a flaking tool. To produce a flaker the shaft was shortened and rounded to a blunt tip. Continued use of the implement appears to result in a gradual shortening of the shaft. The tip of the shaft on all twelve specimens placed in the category is worn and battered through use as are the tips of the antler flakers.

The shaft of specimens # 33 and 32 (Figure 96, a-b) illustrate the extreme degree of wear which may be found, the shaft of # 32 having been split in use. Specimen # 501 (Figure 96, f) has also been broken and shattered through use. Four of the flakers (Figure 97, a-c, Figure 96, e) were made from the ulnas of immature deer as evidence by the lack of epiphyseal union.

Flaker Provenience and Size

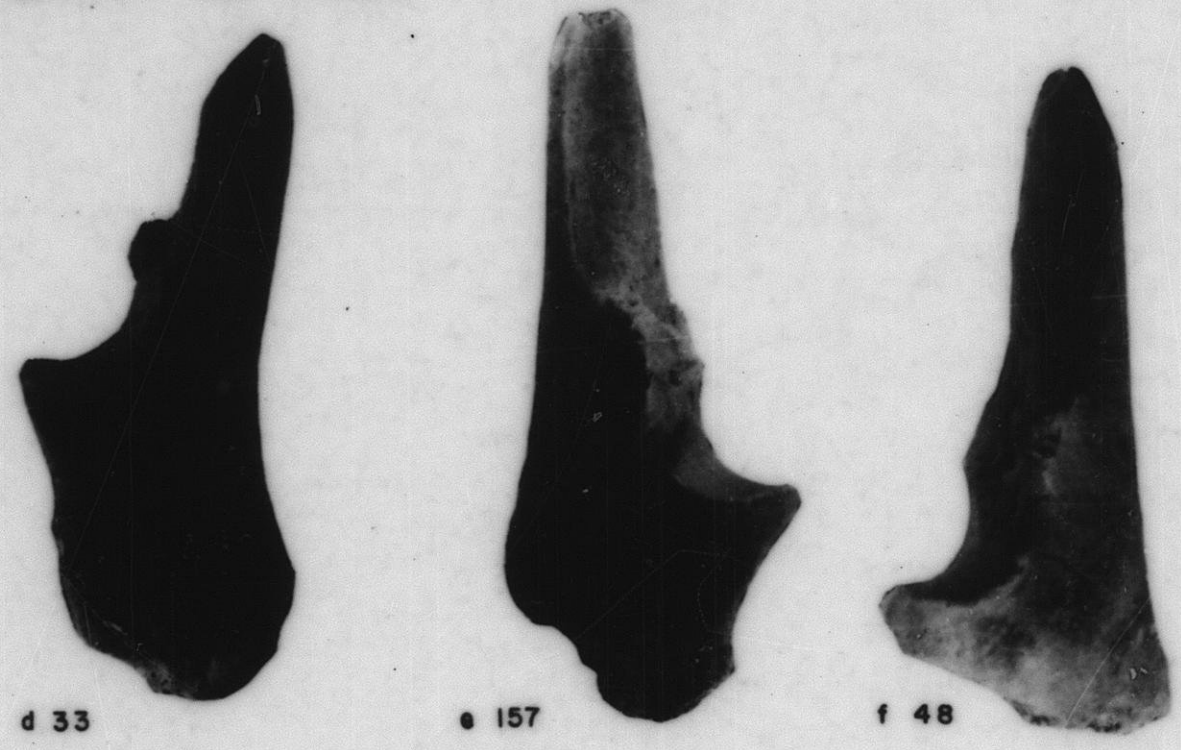
#	Square	Level	Length	#	Square	Level	Length
158	0:4	top 2.5'	92 mm.	48	1:5	3	88 mm.
97	0:5	"	115 mm.	32	1:4	3	73 mm.
99	0:6	"	104 mm.	166	2:6	5	98 mm.
33	0:7	"	88 mm.	475	1:3	12	-
33	0:7	"	95 mm.	617	0:6	18	87 mm.
157	0:3	"	89 mm.	501	1:1	18	82 mm.

a 33 b 32 c 166

Figure 96. Ulna Flakers.

d 475 e 617 f 501

Figure 97. Ulna Flakers

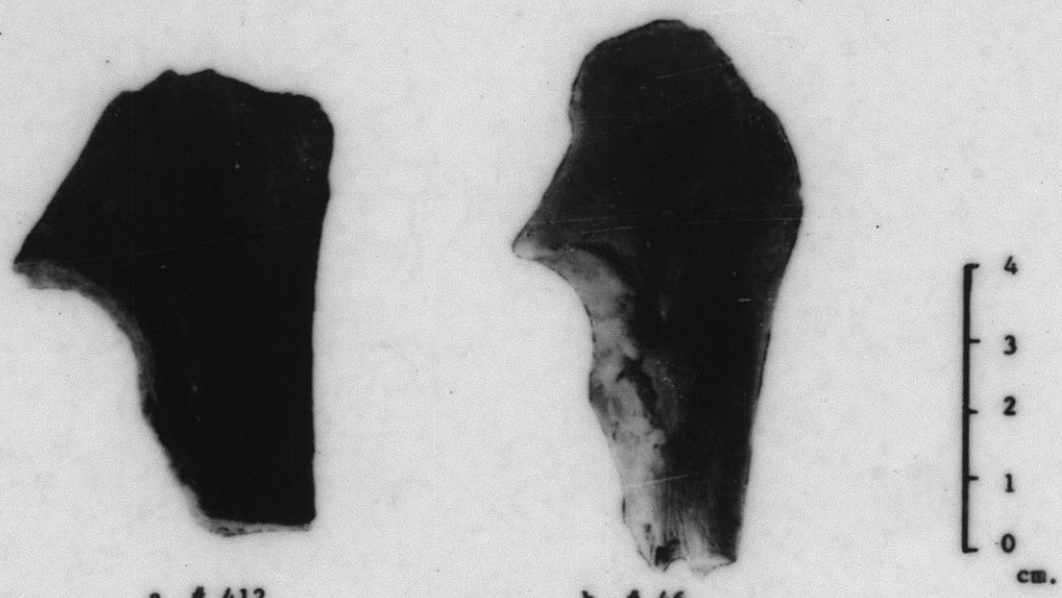


Worked Deer Ulnas (Figure 98)

Two deer ulnas bear evidence of transverse knife cuts across the shaft below the semilunar notch. It would appear that the shaft had been snapped off after a deep notch was made. Indications of longitudinal knife marks in this same area are also present. Evidence of polish through use is also present over most of the surfaces. While the two specimens might be regarded as discarded sections of ulna from which the usable portion of bone has been cut, it is clear that they very likely functioned as implements prior to this action. They could, of course, have been either ulna flakers or awls.

Specimen Provenience

#	Square	Level	Length
412	0:5	12	56 mm.
46	1:5	2	79 mm.



a # 412 b # 46

Figure 98. Worked deer ulnas.

Narrow Antler Bracelets (Figure 99)

Two specimens placed in this category resemble small animal ribs although it is likely that they are manufactured from an antler section. One piece of thinned antler (specimen # 470), roughly oval in cross section, has cancellous tissue exposed on one surface while the other consists of compact bone and is smoothed and slightly polished. The object has a slight longitudinal curvature and measures 47 mm. in length, 7 mm. in width and 5 mm. in thickness. Both ends are broken. The specimen was found in square 1:6 at level 10. The second specimen (# 171, from square 1:7, level 6) is more pronouncedly oval in cross section and while traces of what might be cancellous tissue appear on the interior, the entire specimen is compact. A more pronounced longitudinal curvature is present on this specimen. The polished exterior surface bears a section of a perforation drilled from the exterior immediately at the break on either end. The perforations would appear not to extend through the object, but may only be sunk on the exterior for decorative effect. This specimen is 40 mm. in length, 6 mm. in width and 3 mm. in thickness.

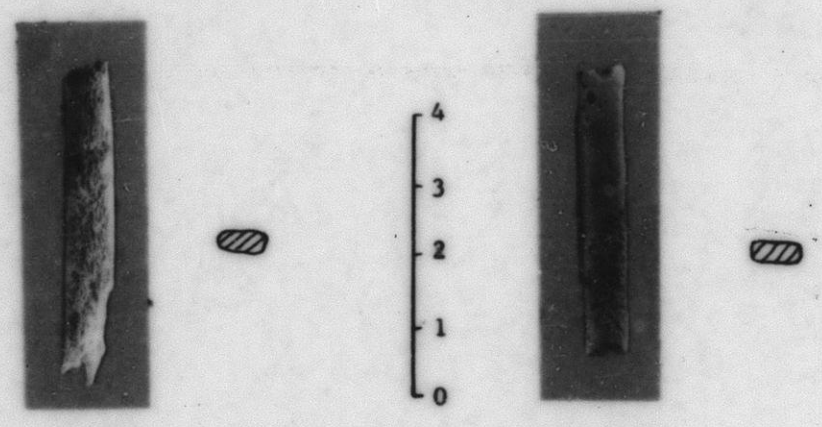


Figure 99. Narrow antler bracelets.

While the term bracelet is more commonly used in connection with the broad, thin bracelet or wrist guard of antler which frequently appears in Plains sites, it has also been used in connection with thinner forms described as being made from the rib bones of small animals (Will and Spinden, 1906: 172). What appear to be comparable objects are also reported from Nebraska sites (Hill and Cooper, 1936: 245; Hill and Metcalf, 1941: 200). It is possible too that objects that have been designated "needles" belong in the same category (e.g., Strong, 1935: 191).

Longitudinally Perforated Deer Phalange (Figure 100)

A distinctive artifact form is represented by a single worked deer phalange (specimen # 507) found in square 1:2, level 18. The proximal end of the phalange has been cut off and the cancellous bone removed. A notch has been cut in the groove between the two condyles of the distal end of sufficient depth to provide a small perforation to the interior. The specimen is identical to that described for the Steed-Kisker site in Missouri (Wedel, 1943: 80) and the Schrader site in Nebraska (Hill and Cooper, 1936: 245) and may also be classed with other materials in Nebraska (Strong, 1935: 192; Hill and Kivett, 1940: 163; Wedel, 1955: 127) and South Dakota (Hurt, 1951: 30). They have been variously identified as clothing bangles and as part of a ring-and-pin game.

Figure 100. Longitudinally perforated deer phalange.

Laterally Perforated Deer Phalanges (Figure 101)

Two deer phalanges (specimens # 192 and 37) have been perforated through the medial and lateral surfaces near the proximal end of the bone and the cancellous tissue removed. Specimen 192 was found in square 2:2 at level 6. Specimen 37 was found in the outer ridge in the top 2.5' of the deposit. The third phalange (# 410 found in square 1:7 at level 8), unlike the other two, has only been perforated through one surface, but again has been hollowed out.

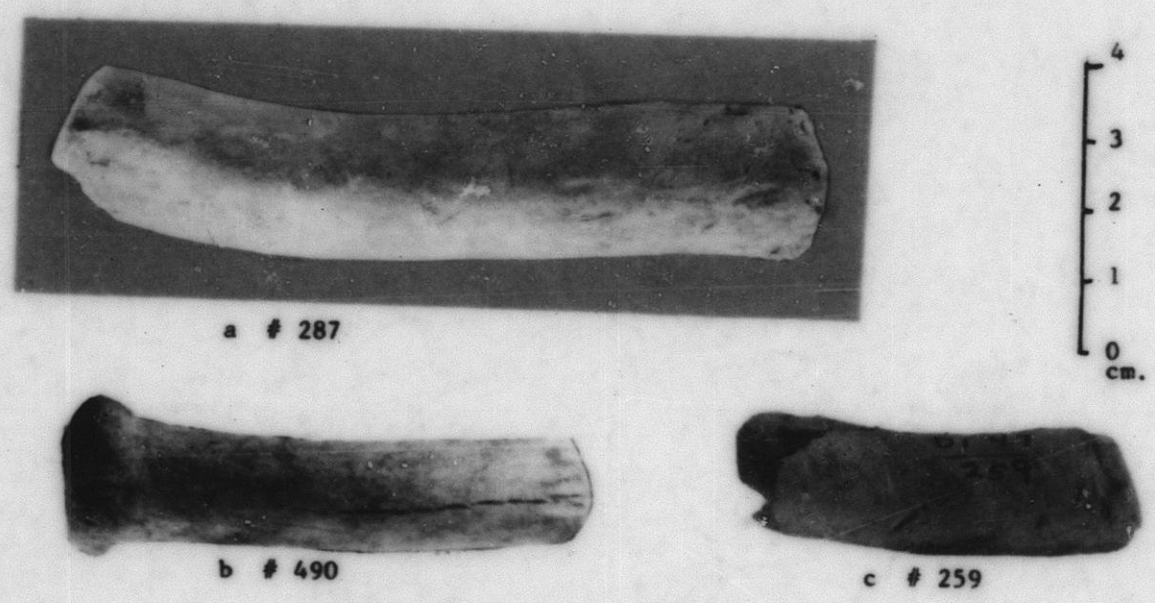
Objects similar to these, though made of a bison phalange, have been found in sites on the Plains (Wedel, 1935: 202; Hill and Kivett, 1940: 163; Hill and Metcalf, 1941: 199), but on these the perforation is through the ventral or dorsal surface and does not extend through the opposite surface. They are thus more like specimen # 410 from D1-47 than the other two phalanges from this site. Wedel (1935: 202) suggests that they were used in gambling games, the holes serving as markers. Hill and Metcalf (1940: 163) feel it unlikely that the perforation was made simply for marrow extraction and suggest the possibility of use as a rest for the base of a drill or awl. The partially perforated phalanges could have served the same purpose while those fully perforated could have been strung. However, since none of the surfaces of the bone are polished and the holes are carelessly made, it does not appear that the phalanges were used to a great extent.

a # 192 b # 37 c # 410

Figure 101. Laterally perforated deer phalanges.

Antler Drifts (Figure 102)

Three specimens consist of cylindrical sections of antler with rounded and smoothed ends and have been designated drifts. One (# 490 found in square 2:4 at level 12) is 69 mm. long and 14 mm. in diameter at the center of the shaft. One end is slightly larger than the other since it includes part of the burr. Sections of the exterior surface have been splintered from the shaft as though through hammering. The second specimen (# 259 found in square 1:3 at level 7) is 56 mm. long and 19 mm. in diameter and has been cut from the shaft proper with no section of the burr present. The antler is worn and some of the cancellous tissue has rotted way. No trace of splintering comparable to the other specimen is present. The third specimen (# 287 found in square 1:7 at level 7) also has a small remnant of the burr at one end. This drift is 183 mm. in length and 20 mm. in diameter.



a # 287

b # 490

c # 259

Figure 102. Antler drifts.

Shaft Straighteners (Figure 103)

Current archaeological literature in the Plains and adjacent areas is about equally divided in designating the common perforated bone tool whose primary function seems to have been to strighten a wooden shaft, as a "shaft straightener" or a "shaft wrench." They were designated an arrow straightener by Kaj Birket-Smith (1929: 105) who also cites the ethnological distribution of the trait. W. D. Strong (1935: 99) who also gives supplemental ethnological data pertaining to function, uses the broader term shaft straightener which would seem preferable for an archaeological context where the shafts might be either those of darts or arrows.

Three specimens were found at D1-47, all manufactured from deer long bone. All are fragmentary, the break occurring at the perforation, but it seems probable that only a single perforation was present. The perforations appear to be markedly elliptical in outline. The maximum width of the perforation can be determined on one specimen as 10 mm. This same specimen (# 586) is decorated by widely spaced engraved lines forming a diamond pattern. One end of the diamond terminates at the perforation, as can be seen on the illustration.

Specimen Provenience

#	Square	Level	Material
586	1:8	2	tibia (right)
166	2:6	5	radius (left)
466	1:4	14	radius (right)

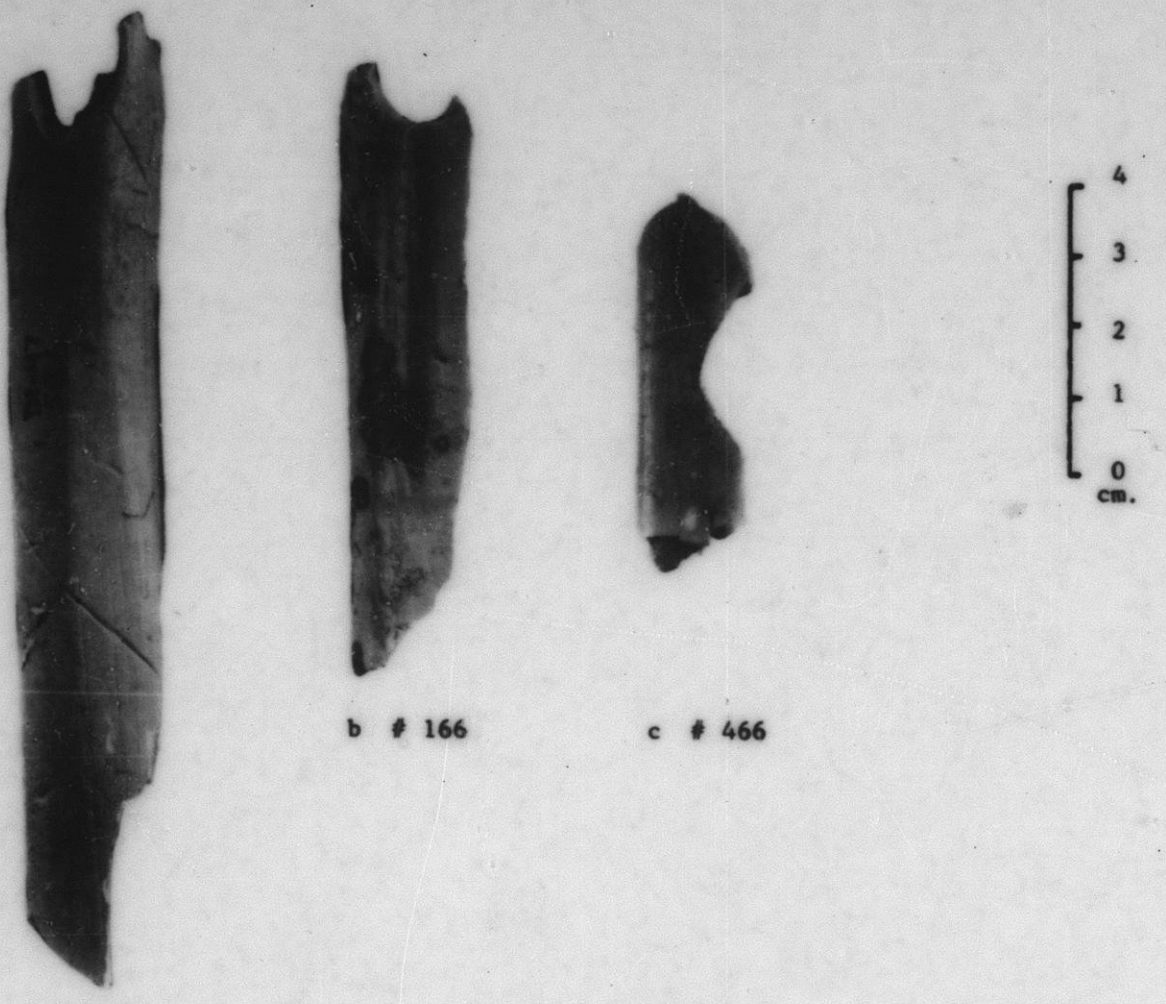


Figure 103. Shaft straighteners.

Miscellaneous Worked Bone

Bone Tube (Figure 104, specimen # 578)

A fragment of bird bone, 74 mm. in length, has a polished surface which also exhibits longitudinal knife marks. One end of the bone is broken while the other, and parts of the shaft, are so rodent gnawed that exact functional identification is impossible. The specimen was recovered in square 1:2 at level 15.

Patella (Figure 104, specimen # 359)

A burned patella has cancellous tissue exposed on one side suggesting preparation for use as a paint brush. However, the exposed tissue does not appear to be smoothed and no traces of paint stains are present so that the nature of its use is doubtful. The specimen was found in square 1:4, level 11.

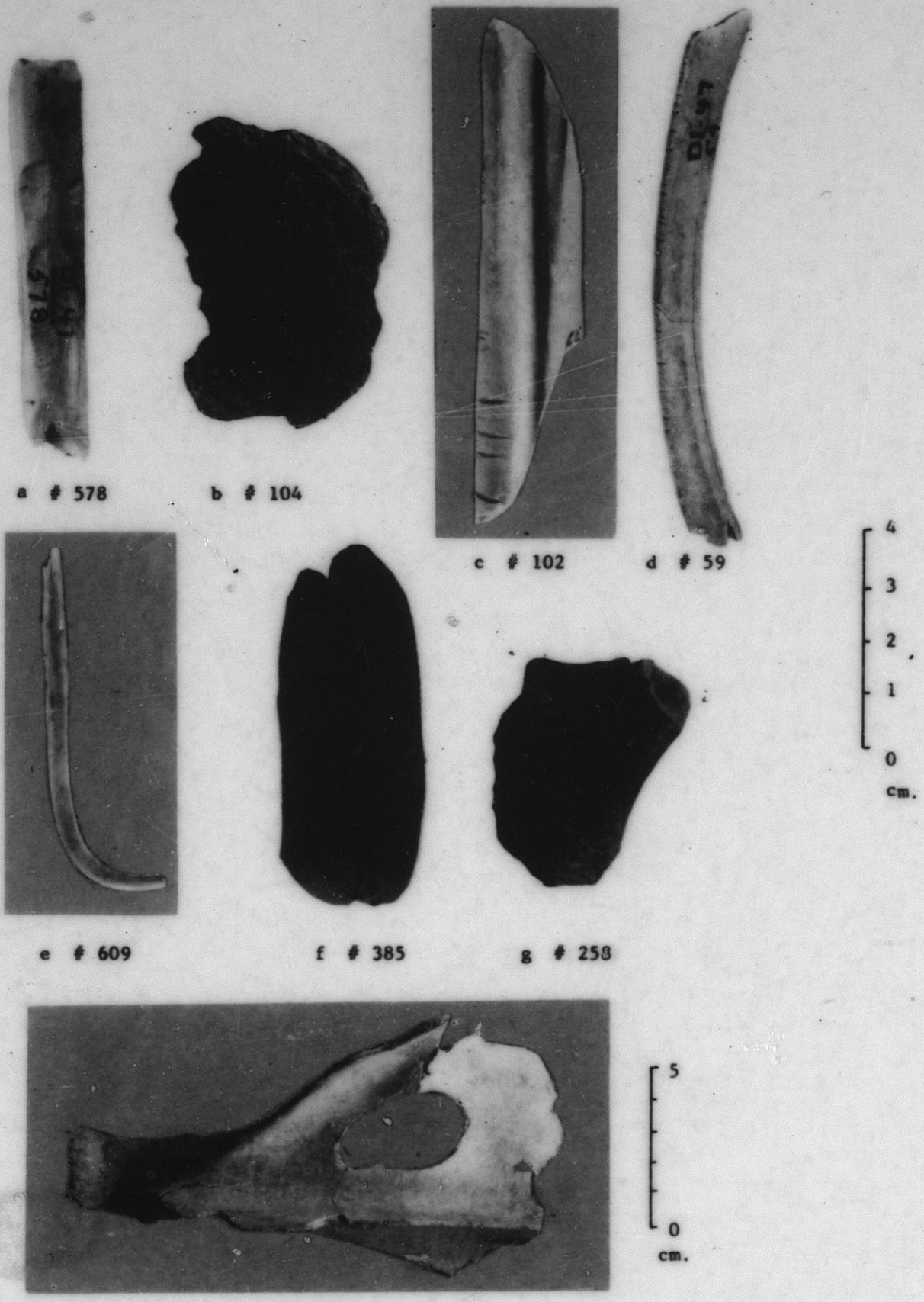
Perforated Deer Scapula (Figure 104, specimen # 161)

A deer scapula, found in square 1:3 at level 4, has a perforation with dimensions of 42 x 35 mm. in the blade. A very small portion of the edge of the perforation is smoothed and the anterior and posterior borders of the scapula are polished through use near the neck.

Notched Bones (Figure 104, specimens # 102 and 59)

A fragment of deer cannon-bone (specimen # 102) found in square 0:2 in the top 2.5' has had four transverse notches (8mm. long and about 1 mm. wide) cut into one edge of the bone. The notches are carelessly made and additional transverse knife marks are present.

A rib fragment, 97 mm. in length, has transverse notches 2 mm. in



a # 578 b # 104 c # 102 d # 59

e # 609 f # 385 g # 258

h # 161

Figure 104. Miscellaneous worked bone.

length and less than 1 mm. in width extending the length of the bone along one edge. The specimen (# 59) was found in square 1:2 at level 1.

Racoon Penis Bone (Figure 104, specimen # 609)

A section of the shaft of a racoon penis bone with both extremities missing bears a high polish and a few knife marks. The specimen was found in square 0:8, level 6.

Antler Sections (Figure 104, specimens # 385 and 258)

A cylindrical section of antler shaft, 62 mm. long and 25 mm. in diameter, has been produced by rough chopping at both ends. The ends are sharp and angular, not worn as in the case of the drifts. The artifact, found in square 0:3 at level 19, has been burned.

A flat section of antler from the point of juncture of two tines has been roughly hacked to this shape and bears numerous cuts on one surface suggesting use as an anvil. The specimen, found in square 1:4 at level 7, has also been burned.

Other Worked Bone (Figure 105)

Eleven fragments exhibit knife marks and/or polishing on the surface. Two are distal ends of cannon-bones. Of these, one (specimen # 51) has transverse cuts near the broken edge while the other (specimen # 467) bears longitudinal knife marks. Seven bone fragments (Figure 105, c-g) are polished and have longitudinal knife marks. Specimens # 253 and # 98 appear to be from cannon-bones and have widened vascular grooves. Specimen # 191 has transverse knife marks at one end of the fragment. Specimen # 353, a bone splinter, is smoothed and polished along the cut edge. Much of the material in this group may be raw material discarded in the production of tools.

Provenience of "Other Worked Bone"

#	Square	Level
467	0:2	top 2.5'
476 (2)	0:2	top 2.5'
157	0:3	top 2.5'
98	0:4	top 2.5'
51	1:6	1
48	1:5	3
408	0:7	7
253	2:4	7
191	0:5	7
353	1:4	10

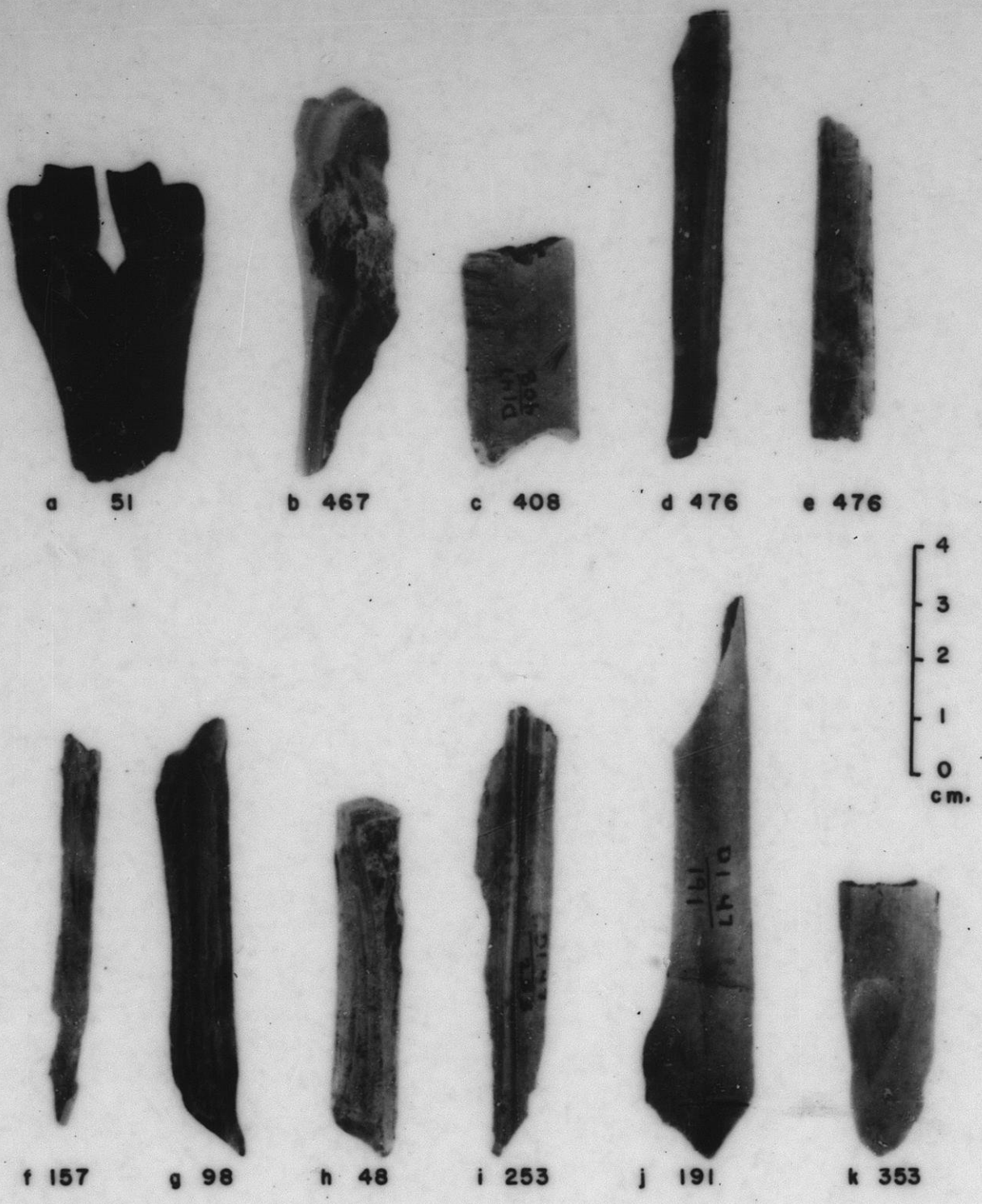


Figure 105. Worked Bone

SHELL IMPLEMENTS

Of the sixteen artifacts of shell at the site, fifteen comprise mussel shells with worn edges which we have designated scrapers. Either the right or left valve of the mussel shell was utilized. On all but one valve, the posterior portion of the ventral margin has been worn down and smoothed, probably through use rather than deliberate shaping. The scraping edge of two shells (both specimens numbered 134, Figure 106-7) is convex. On all others it tends to be straight and the wear tends to make the posterior edge pointed. On specimen # 261 the central portion of the ventral edge is worn and smoothed, leaving the anterior and posterior edges in their original condition.

One valve, # 118, has been perforated at the dorsal edge near the teeth. The oval perforation was made from the outer surface of the shell by cutting or sawing through to the inner surface (Figure 105). We are indebted to Mrs. Patricia Habeck for the identification of shell species.

Figure 105. Perforated mussel shell.

Shell Scraper Identification and Location

Catalog Number	Right Valve	Left Valve	Posterior portion of Ventral Margin	Ventral Margin	Length	Height	Identification	Square	Level
407	X		X		102	46	Ligumia recta latissima	0:3	9
246	X		X		118	49	" " "	1:4	6
118	X		X		84	43	Ptychobranchus fasciolarus	0:2	6
363		X	X		90	35	Ligumia recta latissima	1:1	9
363	X		X		69	35	Ptychobranchus fasciolarus	1:1	9
61	X		X		96	38	Ligumia recta latissima	1:6	1
134		X	X		80	48	Ptychobranchus fasciolarus	1:5	4
134		X	X		75	48	Actinonaias carinata	1:5	4
577	X		X		63	34	Ptychobranchus fasciolarus	2:6	9
192		X	X		88	48	" "	2:2	6
262	X		X		77	45	" "	2:3	9
261	X		X		84	44	" "	2:1	6
261		X		X	81	52	Actinonaias carinata	2:1	6
247	X		X		85	46	Ptychobranchus fasciolarus	1:3	6

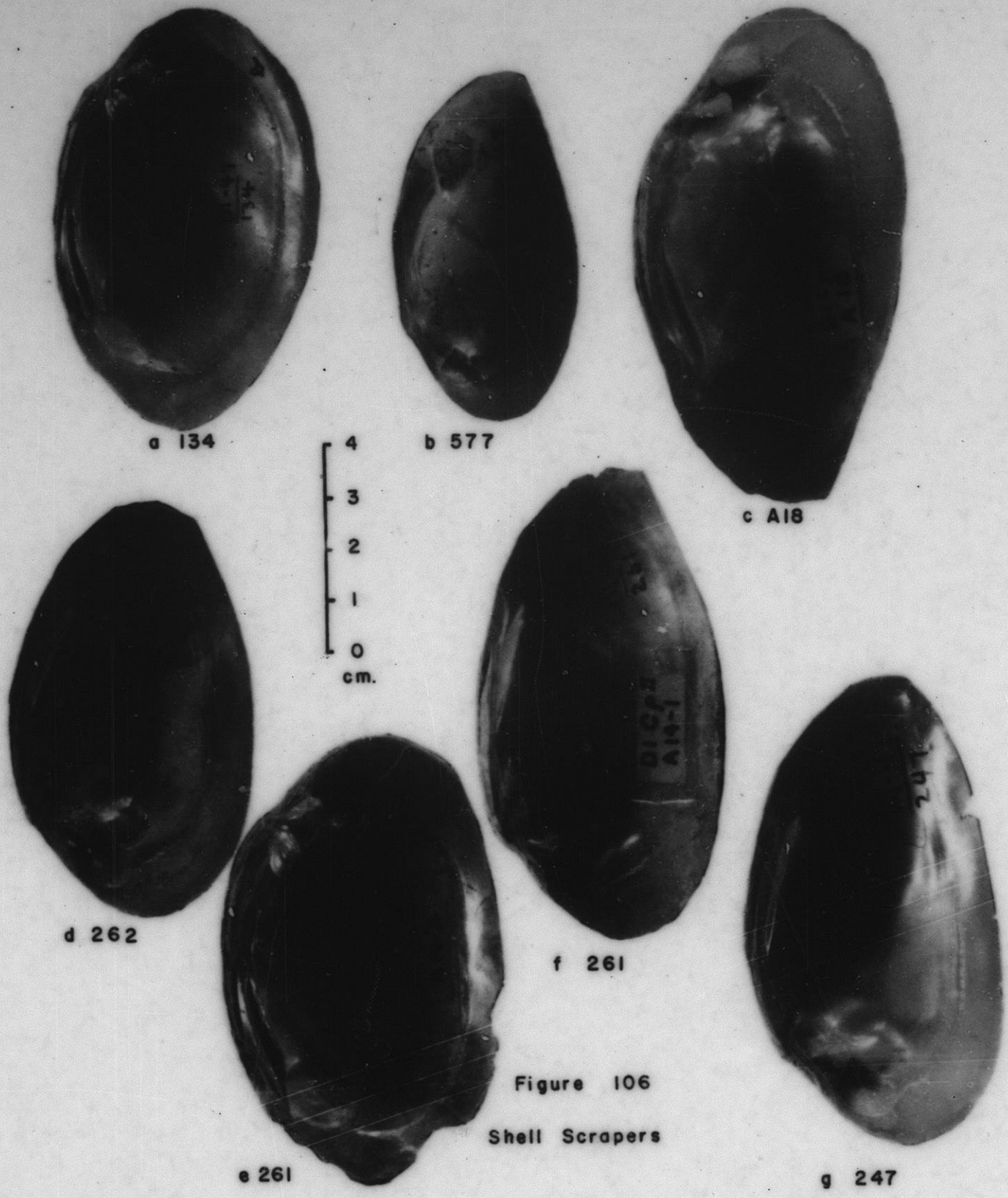


Figure 106

Shell Scrapers

a 407

b A17

c 118

d 363

e 363

f 61

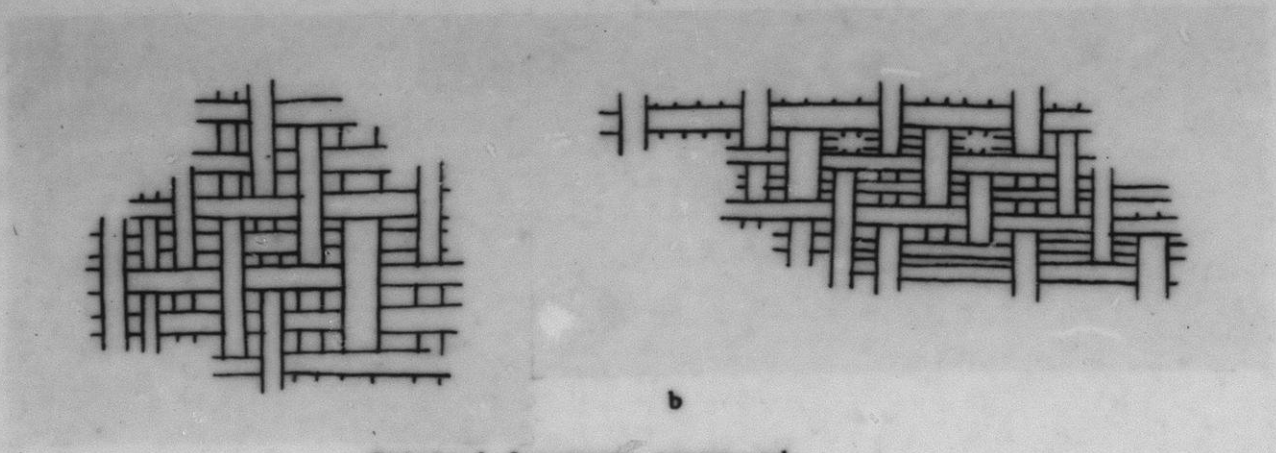
g 134

Figure 107.

Shell Scrapers.

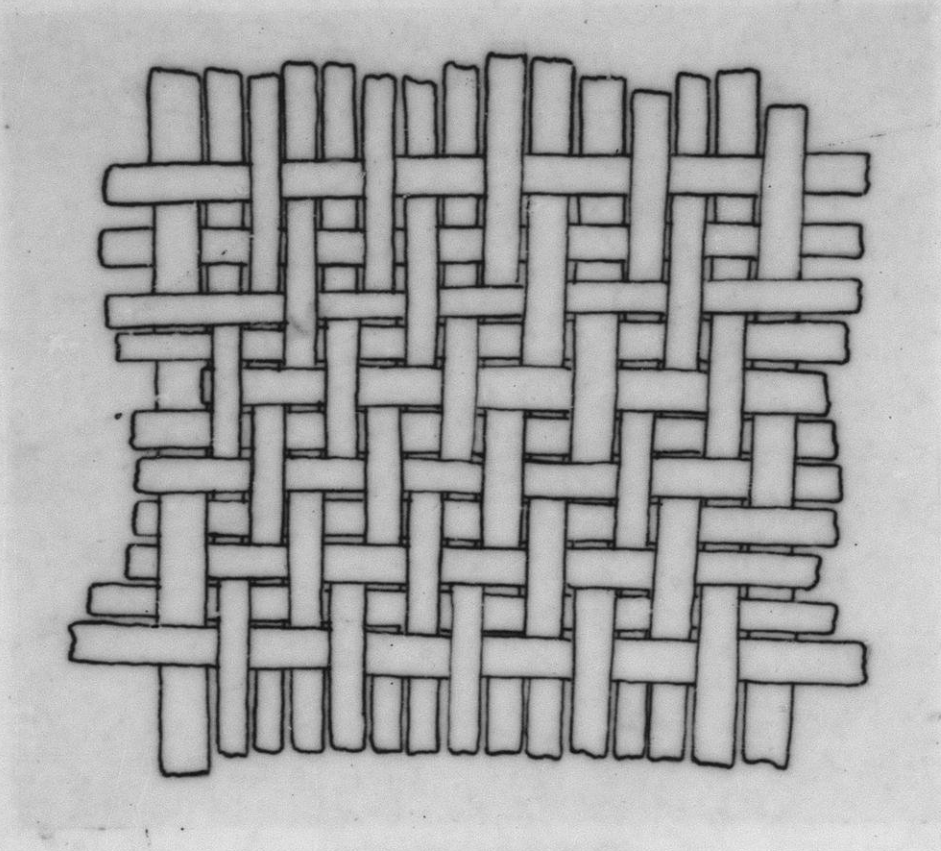
BASKETRY

A small fragment of twill plaited basketry was found in association with Individual 5 of Burial 1. Two small sections made from split cane (Arundinaria) were recovered, the largest being 43 x 23 mm. in dimensions, with the strands being from 2-4 mm. in width. A sketch of the two sections (Figure 108, a and b), permits a reconstruction of the weave (Figure 108, c). It will be seen that the basic pattern is over-three-under-three in a diagonal weave. There is a shift of two strands in each adjacent warp element to produce the diagonal. The result is that the weft pattern alternates between over-two-under-one and over-one-under-two.



a Original fragments recovered

b



c Reconstructed weave

Figure 108. Twill plaited basketry.

POTTERY

The ceramic sample from D1-47 consists of 1102 sherds and three partial vessels. It is evident that at least three distinct cultural complexes are represented by the ceramic material--Woodland, Caddoan and Neosho Focus--so that the descriptions are so grouped. Differences from established types are noted where they occur.

Woodland Ceramics

One partial vessel, one rim sherd, and twenty-seven body sherds are considered to comprise the Woodland ceramic complex at the site. Two previously represented types, Cooper Zoned Stamped and Cowskin Dentate Stamped, are present among these sherds though not in their classic form. A brief review of the nature of the Woodland ceramic complex as it is presently known in northeastern Oklahoma is presented as an aid in setting the material currently under discussion in proper perspective. As yet the contents of the Woodland village sites, of which the major components are located at the mouth of Honey Creek (D1-33 and D1-49), have not been fully described. However, a brief summary of the cultural complex has been published (Bell and Baerreis, 1951: 27-33) as well as a description of the major ceramic types based upon the two components listed (Baerreis, 1954). The two components do show a shift in ceramic types and by comparison with the sequences of other areas, D1-33 (DICoI) would be the older of the two. The ceramics at D1-33 have been described under the names Cooper Zoned Stamped, Ozark Zoned Stamped and Honey Creek Plain. At the later component, D1-49 (DICoV), Cooper Zoned Stamped and Honey Creek Plain continue as minor elements, but with the major type consisting of one designated Cowskin Dentate Stamped.

It will be noted from the foregoing statements, which can be supplemented by reference to the woks cited, that the one decorated type, Cooper Zoned Stamped, has been defined in such a fashion that it reflects continuity over a period of Woodland occupation in the area. Variations in decorative pattern, however, permit a more precise suggestion as to time placement within the Woodland horizon and use will be made of this approach in discussing the Woodland ceramics from D1-47.

Cooper Zoned Stamped

Three of the body sherds and the partial vessel are placed in this type. The vessel, # 335 (Figure 109), is incomplete, but a portion of the rim and most of the lower half of the body were available for reconstruction. As a result a complete vertical section from lip to base was present.

The presence of frequent fractures parallel to the lip of the vessel suggests the use of a coil technique in manufacture, in contrast to the suggestion in the type description, but markedly convexo-concave fractures are lacking. The temper is a sparse, fine (1-4 mm., av. 1 mm.) shell with an occasional particle of grit in contrast to sherds of this type from the village sites. The sparsity of the grit suggests that it was not intentionally placed in the clay. Vessels walls are compact although limited sections of the interior and exterior surfaces have flaked off. The hardness is 3.5. The exterior surface of the vessel is a buff color, ranging to a darker brown. The interior surface is buff, brown or reddish with limited blackened areas. The surface colors extend 1 to 2 mm. to the sherd interior which is either black or grey. The surface of the vessel has been smoothed and in some areas has a slight polish.

The lip of the vessel is slightly flattened. The rim is vertical and then expands gently to a shoulder area marking the maximum diameter of the vessel. Below the shoulder the walls contract gently to a sharply rounded base. Wall thickness is 7 mm. at the lip, 11 mm. at the shoulder and then thins to 8-8.5 mm. at the body. The maximum thickness, 14 mm., is found at the base. The diameter of the orifice is 17 cm., and at the shoulder, 19 cm. The vessel height from shoulder to lip is 4.3 cm., and the maximum height is 29 cm.

A diagonal band of straight dentate stamped elements (27 mm. in length) is found on the rim area and terminates at the shoulder. Whether this band initiates at the rim cannot be determined from the rim fragment present. Diagonal streaks of a black pigment extend over this same area and for some distance (c. 6 cm.) below the shoulder. Whether these are burned grease marks or intentional painting cannot be determined. Aspects of the decoration which should be noted are the absence of embossed nodes and a broad incised line bordering the band of dentate stamping. Their lack would tend to place the vessel in the latter part of the range of Cooper Zoned Stamped.

Two body sherds (specimens # 41 and 196) have a similar, temper, paste and surface finish to the vessel just described. Both bear a decoration of parallel impressions of a straight, dentate stamp. It is possible that these are a portion of the vessel previously described, or one of the same characteristics.

These paste characteristics are not shared by a third body sherd (specimen # 454) which is comparable in all aspects to the pottery of the type site. The paste is compact and tempered with fine grit ranging between

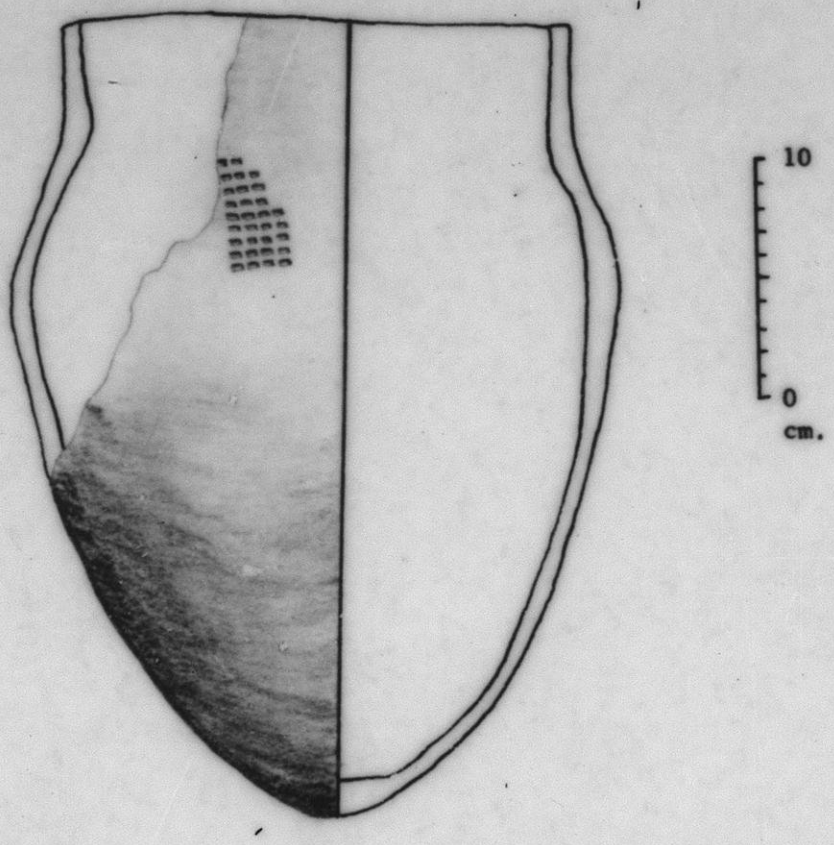


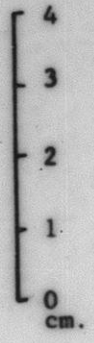
Figure 109. Drawing of reconstructed vessel (specimen # 335) of Cooper Zoned Stamped.

1-2 mm. in size. The outer surface is a dull brown-red which merges into a buff color in a zone less than 1 mm. in thickness, contrasting sharply with the black core. The surface is soft and worn and, although obscure, appears to bear a decoration consisting of dentate stamping bordered by a broad incised line.

The final sherd of this type (specimen # 319) is clearly a rim sherd although the lip is missing. The paste is more crumbly in texture as a result of abundant grit temper ranging between 1 and 2 mm. in size. Sparse flakes of fine shell are also present. The core is dark brown in color with the smoothed inner and outer surfaces of a black color. The vessel wall is 7 mm. in thickness. The vessel bore a decoration consisting of diagonal dentate stamped impressions at the upper rim, bordered below by embossed nodes punched from the interior. At the very bottom of this small sherd is the edge of a broad incised line which possibly originally bordered a band of dentate stamping.

Provenience of Cooper Zoned Stamped Sherds

#	Square	Level
335	2:2	11 (partial vessel)
41 (2)	0:1	3
196	2:2	6
454	2:4	11
319	2:2	10



a Rim sherd of recontructed vessel, # 335

b # 319

c # 196

d # 41

Figure 110. Cooper Zoned Stamped sherds.

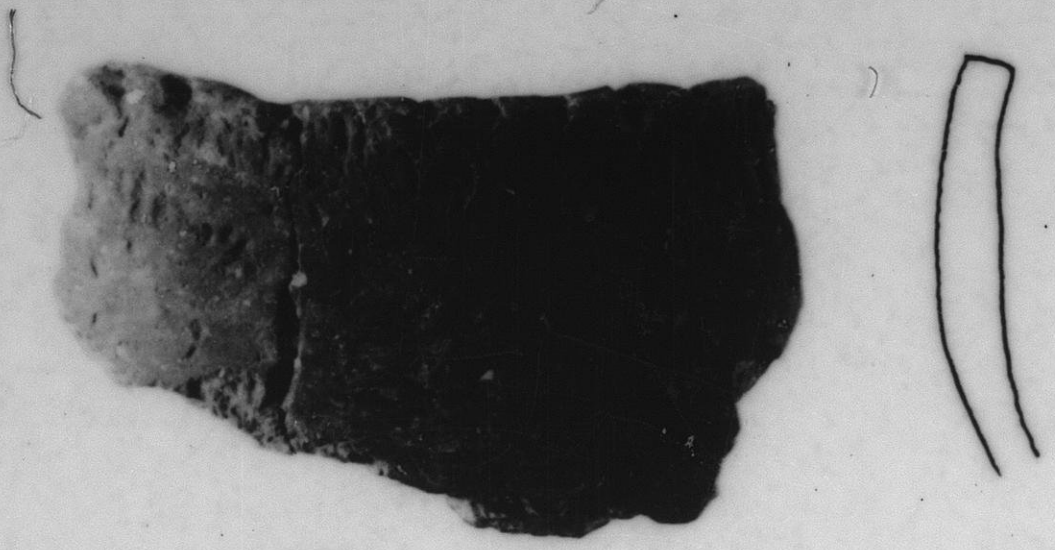
Cowskin Dentate Stamped

A single rim sherd consisting of two sherds (specimen # 451) is placed in this category. Like several of the Cooper Zoned Stamped sherds it is atypical in temper in primarily having inclusions of shell (ranging between 1-5 mm. in size) as well as sparse fine grit. The surface and core are a dark brown color with the interior black. The paste is compact with a surface hardness of 2.5. The outer surface is smoothed except on the rim adjacent to the lip where traces of cord roughening remain. The diameter of the vessel at the orifice is 16 cm. and the rim curves gently outward from this point toward the shoulder. The vessel wall has a uniform thickness of 7 mm. The sole decoration consists of a series of notches across the lip formed by a cord-wrapped stick or by the edge of a cord-wrapped paddle. The notches, placed on a slightly flattened lip, are 5 mm. in width. This specimen was found in square 1:1 at level 11.

Woodland Body Sherds

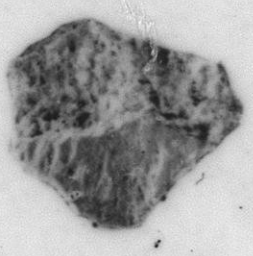
A series of 22 sherds are classified as Woodland primary on the basis of paste and temper characteristics. A difficulty encountered in such a segregation is that body sherds of a vessel comparable to that described in the Cooper Zoned Stamped type would be extremely difficult to separate from the shell tempered Woodward Plain type of the Neosho Focus. The body sherds here segregated are those which have predominantly grit temper or a substantial amount of grit mixed with the shell temper.

A group of four sherds (in the total of twenty-two), however, may also be differentiated through the possession of a cord roughened surface. The paste is compact, the temper a mixture of fine shell and grit, and the surfaces grey to grey-brown in color. This group is uniformly 6 mm. in thickness, somewhat thinner than the average range of the other



a # 451

b #'s 336 & 330



c # 535

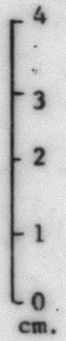


Figure 111. Woodland pottery from D1-47. a. Cowskin Dentate Stamped; b - c., cord roughened body sherds.

sherds classified as Woodland. The count of four sherds is reduced to three by the joining of two specimens (# 330 and 336). Specimens # 553 and 515, however, are from a different vessel.

The remaining sherds are smooth surfaced and are variable in surface color ranging through buff, red and dark brown. Coarse grit temper associated with sparse shell, a single example of grit alone, and a combination of grit and shell represents the temper range. Hardness is uniformly 3.5 and the range in wall thickness is between 7 and 12 mm. A group of seven sherds, 3 of which join, appear to be from the same vessel. The distribution of the sherds is as follows:

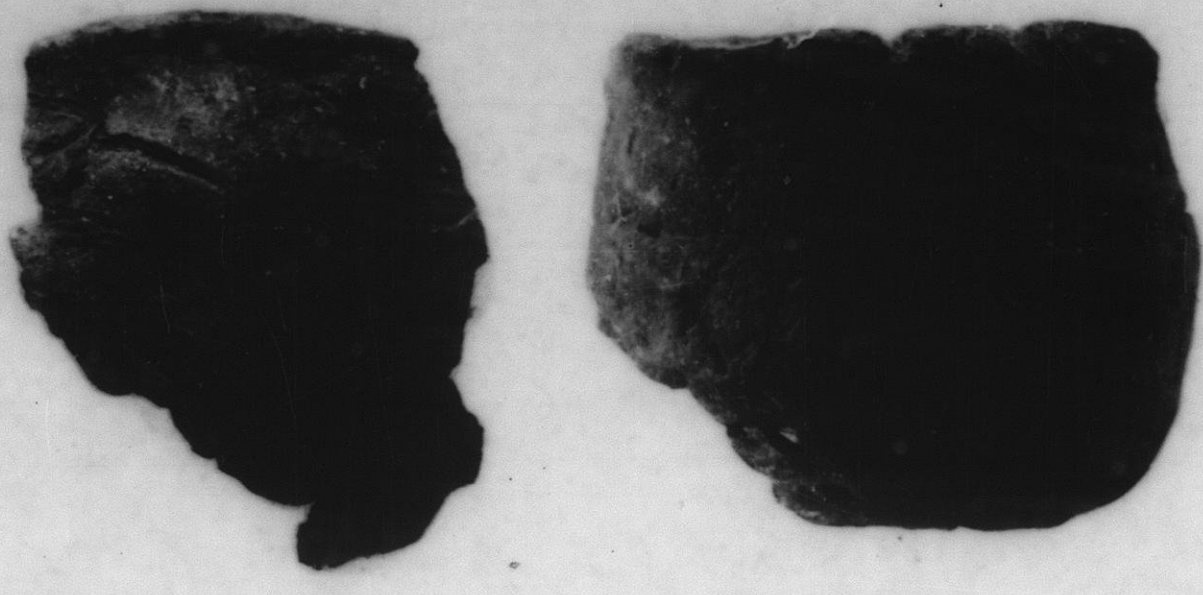
#	Square	Level	Temper
555 (7)	1:1	17	predominantly grit
568 (2)	1:1	18	predominantly grit
562	1:5	14	grit
325	1:6	7	predominantly grit
550	1:3	13	predominantly grit
446 (2)	2:1	14	predominantly grit
555	1:1	17	grit and shell
332	1:4	9	grit and shell
544	0:3	11	grit and shell
451	1:1	11	grit and shell
565	1:4	13	predominantly grit (cord roughened)
553	1:3	15	predominantly grit (cord roughened)
336	2:2	11	predominantly grit (cord roughened)
330	1:3	9	predominantly grit (cord roughened; joins # 336)

Unclassified Vessel (Figure 112)

One vessel, as reconstructed from four sherds, cannot strictly be classified as a piece of Woodland ceramics, but deserves consideration with this group. The four sherds join to form two large sherds to produce a small cup-like bowl which appears to have been beaten out from a lump of clay in view of the absence of coil fractures and surface irregularity. The temper is shell (1-6 mm. in size) in moderate amounts. The sherds are compact in texture and 3.5 in hardness. Surface color varies considerably, particularly on matching sherds, suggesting that there has been considerable modification subsequent to breakage. A grey to reddish brown appears characteristic. The surface is generally smooth, despite its irregular contours. The lip or the vessel is rounded and the maximum diameter of 95 mm. occurs at this point because of a slight outward thickening of the lip. The vessel walls are generally straight and merge with a rounded base. The height of the vessel is about 80 mm. The walls increase in thickness from 8 mm. near the lip to 10 mm. near the base.

A design, crudely incised on the surface, is reminiscent of the zoned technique found on Cooper Zoned Stamped though in the latter case executed with dentate stamping bordered by incised lines. Nearly vertical incisions form a zone 20 mm. in width below the lip which is bordered by an incised line. Below this is another zone of diagonal lines bordered by incisions to form another band. The entire area from lip to base is decorated.

The sherds comprising the vessel were found at the following locations: # 326 - 2:3, level 9; 334 - 2:3, level 11; 462 - 2:3, level 11; 331-2:4, level 9.



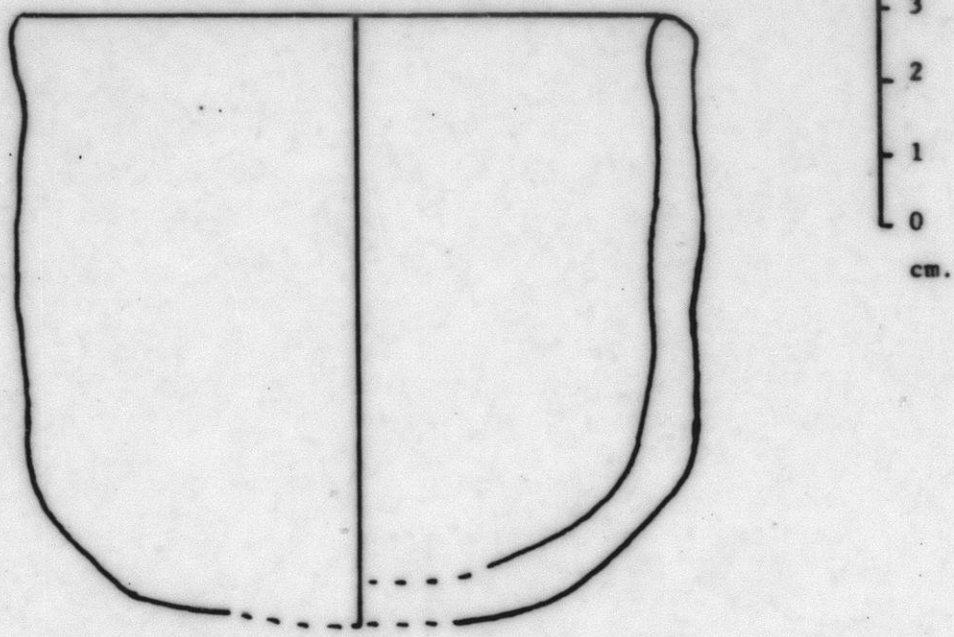


Figure 112. Unclassified vessel (sherd #'s: 326, 334, 462, and 331).

Discussion

It has been previously noted in connection with the description of some of the Woodland ceramics, particularly the Cooper Zoned Stamped vessel and sherds, that the Woodland pottery deviates from the type specimens in paste characteristics and particularly in the abundance of shell temper. If the significance of the vessel just discussed is properly assessed, the two lines of evidence may converge to indicate that the Woodland occupation witnessed the impact of a new tradition of shell tempering in pottery manufacture and that in part we see evidence for acculturation. The decorative attributes of the Woodland pottery in themselves appear to be late in that horizon so that such an interpretation is not incongruous.

Since the vertical distribution of the Woodland sherds containing shell temper (see table, Site Inventory by Assigned Cultural Zones) primarily fall in what is regarded as an Intermediate Zone or in levels that cannot be assigned to particular horizons, the latest Woodland occupation in the shelter may overlap in time with that of the Neosho Focus.

While such an interpretation aids in the general time placement of the Woodland horizon and in conjunction with other evidence leads to a belief that the Woodland peoples visited the shelter intermittently over a considerable period of time, it again draws attention to the difficulty of segregating this hybrid pottery--at least in undecorated body sherds--in the cultural complexes present at the shelter.

Caddoan Pottery (Figure 113)

The general term "Caddoan pottery" is here used to designate ceramic material from cultural complexes normally placed within the Gibson or Fulton Aspects. It is used as a convenient label for a small series of sherds, clearly exotic to D1-47, which can be identified as of Caddoan origin but because of the small size of the sherds cannot with certainty be placed in a more specific pottery type at this time. Labeling this limited body of material as Caddoan leaves unresolved the question of whether some of the plain shell tempered pottery classified as Woodward Plain might not also be considered as part of the Caddoan ceramic tradition. This point is treated further in connection with the discussion of Woodward Plain.

Specimen # 82. A smooth surfaced sherd with a brown exterior and interior and a black core. The temper (below 1 mm. in size) appears to be a fine grit with an occasional speck of what might be bone. The sherd, 5 mm. in thickness with a hardness of 3.5, appears to be a section of the body of a bottle and bears a fine engraved decoration consisting of two parallel, curved lines (concentric circles ?) spaced 7 mm. apart.

Specimens # 223 and 457. Two sherds, possibly from the same vessel, having a smooth, dark brown exterior and a grey core and interior. The paste, but not the exterior surface, is speckled with small particles of shell temper less than 1 mm. in size. The two sherds are 3.5 to 4 mm. in maximum thickness and have a hardness of 3.5. The decoration on the exterior surface is engraved, consisting in one instance of a single engraved line (# 223) and in the other (# 457) of an excised, triangular area

located between converging engraved lines. Under the binocular microscope used for temper examination, traces of what appear to be red pigment appear in the excised or roughened area. Like the preceding specimen, the sherds are probably sections of the body of a bottle.

Specimen # 460. The smoothed exterior surface is black and rests upon a thin brown undercoat which in turn appears on a light grey core and interior. The temper (clay ?) consists of fine (generally less than 1 mm. in size) specks of black material in the grey groundmass. A single line is engraved on the exterior surface. The sherd is probably a portion of the body of a bottle and has a thickness of 5 mm. and a hardness of 3.5.

Specimen # 457. This small sherd with a smooth surface is a uniform grey color on outer and inner surfaces as well as in the core. The temper appears to be a fine grit (less than 1 mm. in size) with a few specks suggestive of bone. The curvature of the sherd suggests that it may be from the edge of a flattened basal area with a thickness of 6 mm. and a hardness of 3.5.

Specimen # 320. The specimen consists of four glued sherds with a curvature suggestive of the body of a bottle. The inner and outer surfaces are a light grey with a black core, the outer surface also bearing a dark fire bloom. The temper is a fine abundant shell with an occasional flake reaching 4 mm. in size but nearly all below 1 mm. in size. The surface is smoothed, but not polished, and undecorated. The form of the vessel, the fine temper, and the hardness (3.5) suggest the probability of it being a Caddoan vessel rather than an example of Woodward Plain. Two additional body sherds from the same location cannot be fitted on the restored vessel section and a third body sherd from this location (#320)

joins a sherd from the same vessel with the specimen number 140.

Specimen # 564. A strongly curved body sherd having a smooth, black exterior surface, a dark brown core and grey interior surface. The temper appears to consist of crushed sherds which are seen as black specks in the brown groundmass. When the sherd is broken, the tempering particles also break--a portion being retained by each fresh surface. Although they only range up to about 2 mm. in size, when examined under the microscope small particles of a different color are seen in the tempering particles. Surface hardness is 3.0 to 3.5. Wall thickness varies between 4-5 mm.

Specimen # 82. This specimen, from the same location as one of the small polished and engraved sherds previously discussed has smooth, grey-brown surfaces on exterior and interior with a grey core. The temper consists of very fine particles of clay with occasional rounded, black particles (clay ?) no harder than the paste of the sherd. The very compact texture and speckled appearance of surface and cross section of this sherd differentiates it from sherds of characteristic Woodward Plain paste.

Specimen # 454. Consists of two joined sherds from the same location, clearly from a globular body. The temper is a sparse, fine shell and the texture is compact, hardness being 3.5. Aside from texture, the sherd is marked by a polished surface bearing fine striations or polishing marks 1-2 mm. in width. Wall thickness ranges between 5-6 mm. The surfaces and core are a tan color with small, grey fire blooms.

Specimen # 551. This final sherd is perhaps less deviant from Woodward Plain in general appearance but does have slightly polished dark grey surfaces with a lighter core. The paste is very compact and the temper, consisting of fine particles of shell less than 1 mm. in size, is generally inconspicuous. Wall thickness is 4 mm. and hardness 3.5.

Other than the larger undecorated sherds and vessel section discussed, the largest of the small polished sherds with an engraved decoration has a maximum length of 28 mm. which is inadequate for typological identification which, for this material, is so largely dependent upon decoration and vessel form. Variations in paste and color suggest that at least nine vessels are represented by the sherds. At present, we are unable to place them precisely within the Caddoan tradition. The provenience of the sherds is given below.

#	Square	Level	#	Square	Level
82	0:5	top 2.5'	320	1:4	8
223	0:6	7	140	1:3	4
457	0:4	9	564	1:6	13
460	0:4	11	454	2:4	11
457	0:4	9	551	1:4	12

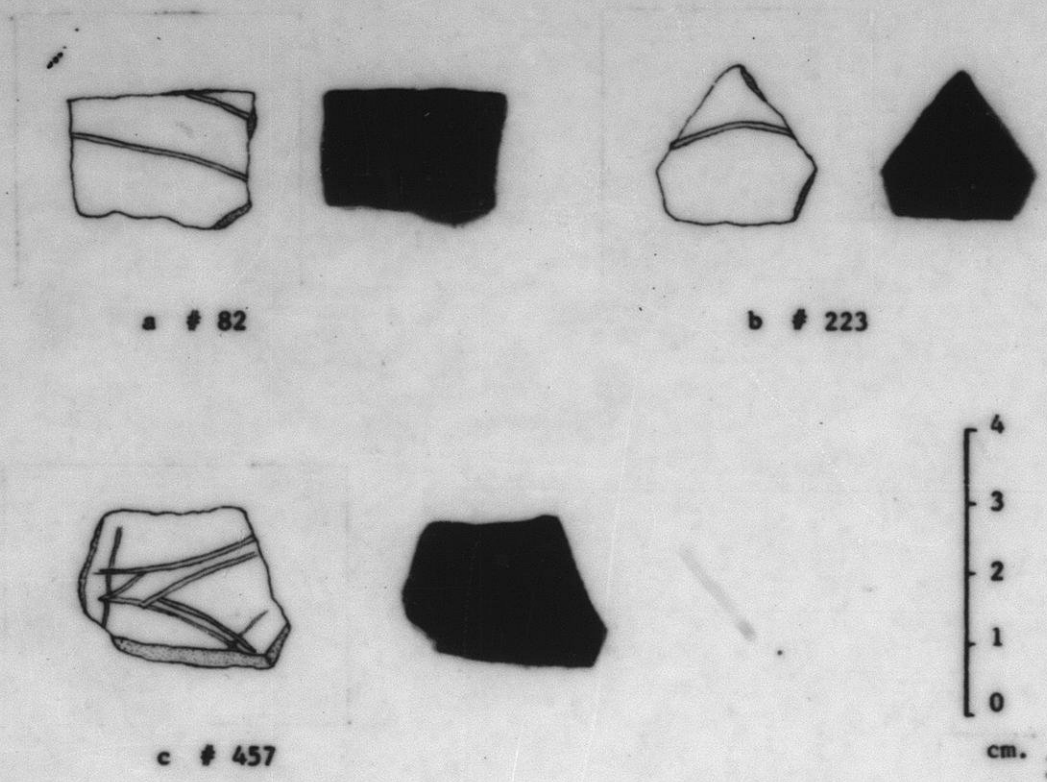


Figure 113. Caddoan sherds.

NEOSHO FOCUS POTTERY

Two pottery types, Woodward Plain and Neosho Punctate, have been previously described and assigned to the Neosho Focus. The undecorated variety, Woodward Plain, was described by Robert L. Hall (1951: 19-21) in connection with his analysis of the ceramic levels of the two Smith Site bluff shelters (D1-55 and D1-42). The second type, Neosho Punctate, has been used in archaeological literature (Baerreis, 1951: Plate III; Bell and Baerreis, 1951: Plate 13,) but a formal type description was not prepared until 1952 when one was presented to a conference on Caddoan Ceramics held at the University of Oklahoma. These two type descriptions have been used as a point of departure in the analysis of the shell tempered ceramics at D1-47.

The analysis, however, has proceeded with an awareness of several problems that arise from the distribution of shell tempered pottery in eastern Oklahoma. It is clear that shell tempered pottery is characteristic of the Fulton Aspect in the region and that it is possible, though not yet adequately demonstrated by site analysis, that shell tempered pottery is also to be found on the earlier Gibson Aspect horizon. Since the type name Woodward Plain has been proposed, it has been applied to shell tempered pottery from several sites in this region. In all instances it is not clear that the assignment of the name implies that essentially identical ceramic complexes are present in the sites under consideration (i.e., identical to the extent that there is no question but that ceramic complexes with direct historic relationships are under consideration) or whether the name Woodward Plain is simply being applied to a generally similar shell tempered fabric. In the latter instance, the use of the name Woodward Plain would have no more significance than the retention of the

rubric, shell tempered pottery. This would, we feel, be a misuse of the concept of pottery type as we have visualized it. We should like to restrict the use of the term Woodward Plain to a precise complex of ceramic traits and only apply it in those instances where a similar complex of traits is present. The use of shell temper and firing under oxidizing conditions are not adequate sorting criteria for assignment to this ceramic complex. Such traits are too widespread and can easily be found in unrelated ceramic complexes. It is obvious, therefore, that attributes of vessel shape, vessel size, and appendages must be used with considerable precision to determine whether two ceramic complexes are related or not. Up to the present time such comparisons would have been virtually impossible since only the sample described for the Smith Sites by Hall has been available. This situation, however, we hope to remedy by the series of sites now being analyzed.

Although we have urged caution in extending the name Woodward Plain to the general series of shell tempered pottery to be found in sites in Eastern Oklahoma, we also recognize that it may be found proper to do so. The extension of the name to the widely distributed pottery in the eastern part of the state, however, would then imply that such pottery is derived from a common source and is indicative of cultural relationships within the area. Such a conclusion, if it is reached, will be an important step toward an understanding of the prehistory of the region.

Woodward Plain

Since the type description for Woodward Plain as prepared by Robert L. Hall forms a point of departure for our analysis, we have reproduced a modified version of his description below. The modifications made consist of the deletion of s small series of decorated sherds which we would place in the category Neosho Punctate.

TYPE MATERIAL: 463 sherds including rim sherds of an estimated original series of 29 vessels and basal portions of an estimated 13 vessels.

PASTE:

Method of manufacture. Coiling is to be inferred from the directionalizing of fractures, the appearance of the fracture edges, and the orientation of individual flakes of temper when viewed in a vertical fracture.

Tempering. Particles of crushed clam shell up to 2 mm. in diameter with an occasional inclusion of 3 mm. diameter make up a possible third of the bulk of some vessels but usually fall considerably short of this proportion. No exact physical determination of percentage of aplastic to plastic was attempted. Leaching was minimal, accounting for the pocking of a few sherds.

Hardness. Ranging above 3.0 (Mohs scale). A compact, smoothed surface easily abrades both silver coins and copper pennies (hardness 3.0).

Color. Surface, light buff ranging to orange-brown or dark grey with firing clouds. A sherd may have a slaty core with inner and outer vessel surfaces reddish or may be uniformly reddish or dark.

SURFACE FINISH:

Modifications. Interior and exterior smoothed but never polished.

Tempering is typically visible on both surfaces.

FORM:

Rim. Unthickened, sometimes tapering slightly. Rim curvature as seen in vertical section suggests three categories of rim form; a) incurving, b) flaring, c) recurved.

Lip. Both flattened and rounded.

Body. Both shallow bowls and deeper-bodied, globular vessels are found, the latter accounting for all of the class "C" (recurved) rims and many of class "A" (incurving).

Base. All sherd sections identifiable as bases were flat. One vessel may have had a round bottom, though this can only be inferred from the projected curvature of the shoulder area.

Thickness. 4 mm. to 15 mm. for vessel walls, varying with over-all vessel size between 6 and 10 mm. in the shoulder region, with the greatest thickness confined to the areas of juncture of vessel base and wall. One base has a thickness of 20 mm.

Vessel diameters. 21 to 45 cm. for four olla forms, measurements taken in the shoulder regions; 22 to 31 cm. for three bowl forms, measurements taken at shoulder or rim, whichever was widest.

Appendages. Limited to strap handles, tabs rising from the rim, and conical nodes applied to vessel wall. Four handles were found, three from D1SmII (D1-42) and one from D1SmI (D1-55), each representing a different vessel. Handles when present were probably to be found only two to a vessel, sometimes but not always riveted, and set high on the rim footing on the lip. (Hall, 1951: 19-21)

Woodward Plain from D1-47

We have discussed the distribution of Woodward Plain at D1-47 in terms of a series of vessel shapes. First to be treated are the bowls which are subdivided into the following shape categories:

Category A. The walls of the bowl are convex sided and are close to vertical near the orifice or slant inward to create a decrease in maximum diameter as one approaches the orifice.

Category B. The maximum diameter is clearly at the orifice with a marked contraction in diameter beginning immediately below it. This category may be further subdivided into a form (B1) with straight-sided walls and (B2) with convex-sided walls.

Category C. Unlike categories A and B which represent a simple bowl form, Category C has a composite profile consisting of a short vertical rim above the contracting body.

A separate category has also been established for a series of small bowls. Categories A through C in all probability have a flat base since this is the only form represented in the shell tempered ceramics from the site. Such bases as are present, however, are not appropriate for the small bowl category which may well have a rounded basal section.

Woodward Plain - Bowl, Category A

Five rim sherds are placed in this category. One is a composite sherd formed by matching rim sherd #'s 41 and 86, together with a body sherd numbered # 41. The remainder are single sherds and of the total of five sherds or vessel sections thus produced, all seem to represent different vessels. One rim, # 202, because of the presence of vertical lip tabs is treated as a distinct variety of Category A.

Category A Rim Sherds

#	Square	Level	Thickness (lip)	Lip Form	Diameter Orifice
457	0:4	9	5 mm.	round	14 cm.
139	1:5	4	5 mm.	flat	46 (?) cm.
202	2:6	6	5 mm.	round	20 cm.
456	2:5	7	6 mm.	flat	--
41	0:1	3	6 mm.	flat	22 cm.
86	0:2	top 2.5' (sherd attaches to # 41)			

The diameter of the bowl when computed for sherd # 139 is 46 cm., the curvature being remarkably slight. Since the portion of the rim preserved is only 65 mm. in length, it is, of course, possible that the curvature was not uniform throughout the entire diameter of the orifice.

Specimen # 202 represents a variant of the bowl form in that the lip bears two triangular lip tabs (13 mm. at the base and 4 mm. high) placed vertically on the lip. They are spaced (center to center) 22 mm. apart. Since the rim fragment has room for only the two lip tabs it is not possible to determine whether these are continuous for the entire rim or not.

No specific discussion of temper, hardness or texture is presented for the various vessel categories unless these differ markedly from the general description of the type.

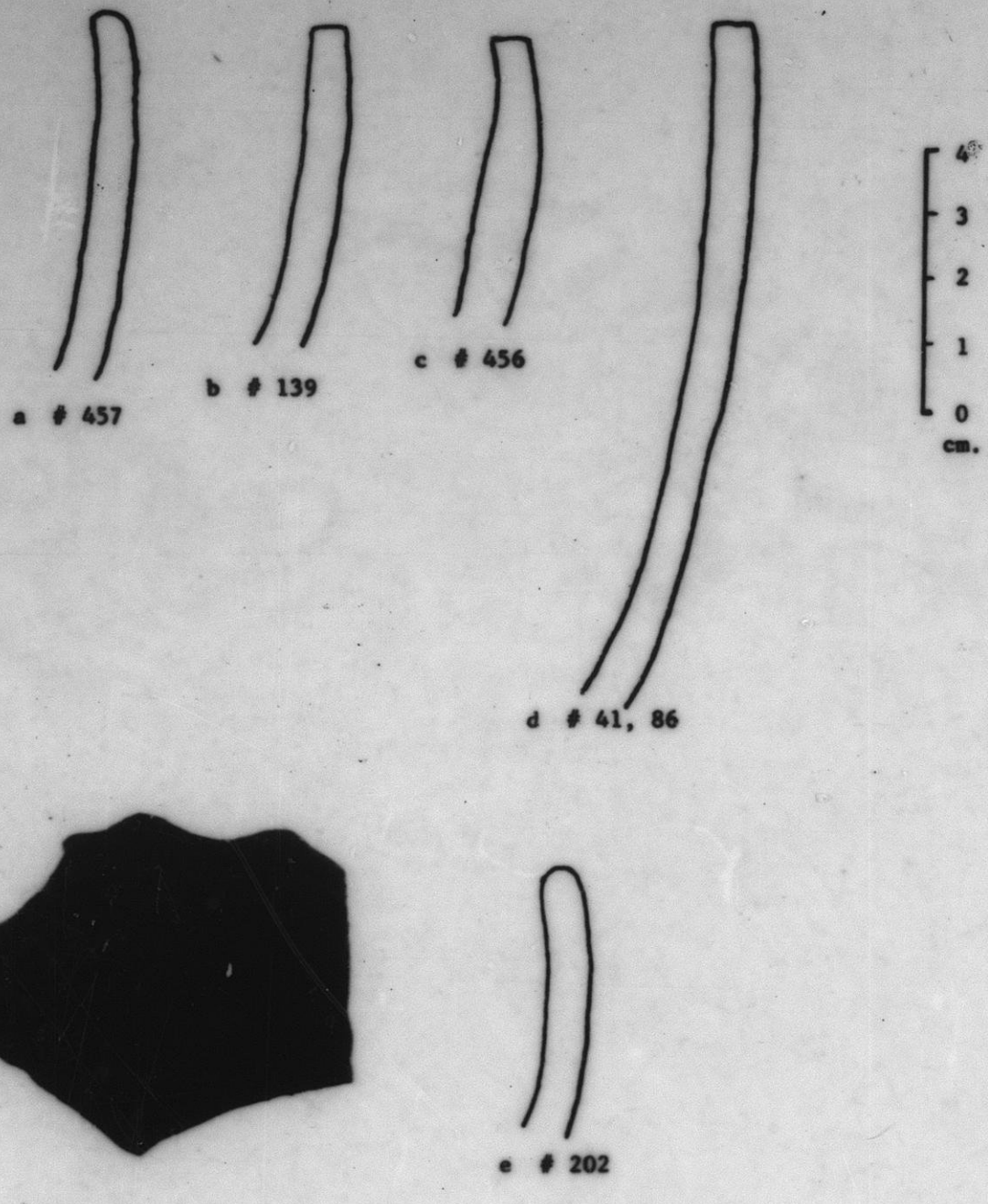


Figure 114. Category A bowls, Woodward Plain.

Woodward Plain - Bowl, Category B

A much larger series of rims fit in Category B which is essentially characterized as a vessel with a much sharper contraction in vessel wall toward the base, the contraction beginning immediately below the orifice. Two subdivisions are made on the basis of form into those having nearly straight walls (B1) and those with markedly convex walls (B2). The attributes of straight or convex walls are determined by placing a straight-edge upon the vessel wall, not simply by inspection. Where the amount of curvature does not exceed 1-2 mm. in a 5 cm. length, the rim is placed in the straight category since visually it has that appearance.

Category B rims also includes a small group of sherds with a roughened or brushed surface. The striations, in the rim area, are generally vertical and range from relatively coarse to fine. One of the rims with fine striations (# 331) has these superimposed in such a fashion that they suggest or simulate a fabric impression. The detail, however, is not sufficiently clear to permit a firm identification. Rims with coarser striations on the exterior also tend to have horizontal smoothing marks or striations on the interior.

The dimensions, location and other attributes of the Category B sherds are given on the following table.

Category B Rim Sherds

#	Square	Level	Thickness (lip)	Diameter Orifice	Lip Form	Rim Form	Surface
147	0:2	top 2.5'	5 mm.	20 cm.	round	B1	smooth
196	2:2	6	4 mm.	---	round	B1	smooth
557	1:6	12	4 mm.	22 cm.	round	B1	smooth
318	2:3	7	8 mm.	36 cm.	flat	B1	smooth
39	0:3	6	4 mm.	---	round	B1	brushed
331	2:4	9	4 mm.	---	round	B1	brushed
20	0:7	top 2.5'	5 mm.	20 cm.	round	B1	brushed
A22-1	2:1	11	5 mm.	30 cm.	flat	B1	smooth
137	0:4	top 2.5'	6 mm.	---	round	B2	brushed
556	2:3	14	5 mm.	---	flat	B2	smooth
399	0:4	10	6 mm.	20 cm.	round	B2	smooth
12	1:4	4	7 mm.	15 cm.	round	B2	smooth
372	2:1	10	7 mm.	---	round	B2	smooth
543	2:2	13	6 mm.	15 cm.	round	B2	smooth
75	Top 2.5'	0 row	6 mm.	22 cm.	round	B2	smooth
397	0:7	11	(joins # 75)				
213	2:4	6	(5 mm.)	20 cm.	horizontal tabs on lip; B2		
84	2:4	6	(8 mm.)	---	horizontal tabs on lip; B2		

Specimen # 12 represents sections of a vessel presently consisting of two large rim sherds, each formed by joining two individual rim sherds and one having in addition three body sherds attached to it. The form, paste, and texture suggest that specimens # 372 and 543 may be of this same vessel despite their markedly different location.

Specimens # 213 and 84 comprise a distinct variant in that they

have a series of lip tabs projecting nearly horizontally from a slightly flattened lip. In specimen # 213 two contiguous tabs, 16 mm. in width, are present on the section of rim available. It cannot be determined whether these continue around the entire rim or are placed in groups. In specimen # 84, only a single similar tab is found on a short rim section. Presumably multiple tabs were originally present.

Attention should be paid to the rim profile of specimen A22-1 which is classified as a B1 rim. The top 8 mm. of the rim are straight sided but below this a marked curvature is present. Two vessel forms may be present in this bowl category -- one with straight sides continuing to a flat base and a second having a combination of straight and convex sides.

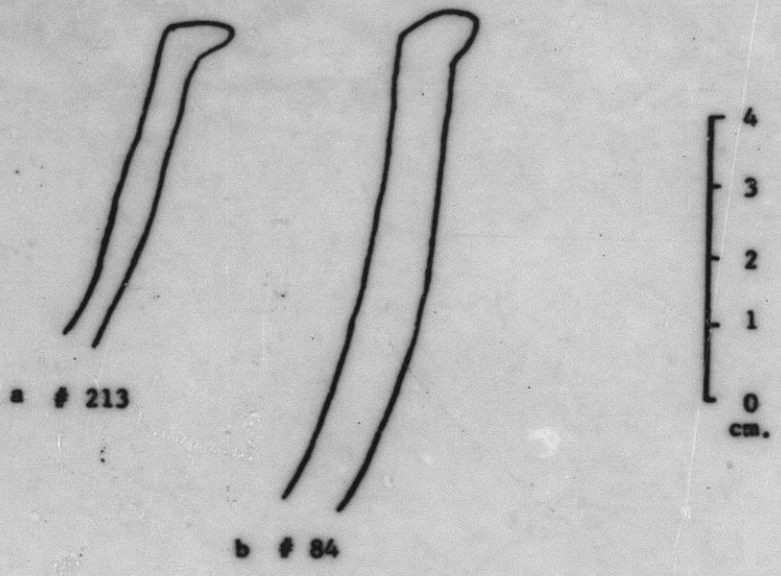


Figure 115. Rim profiles of Category B2 bowls with horizontal lip tabs.

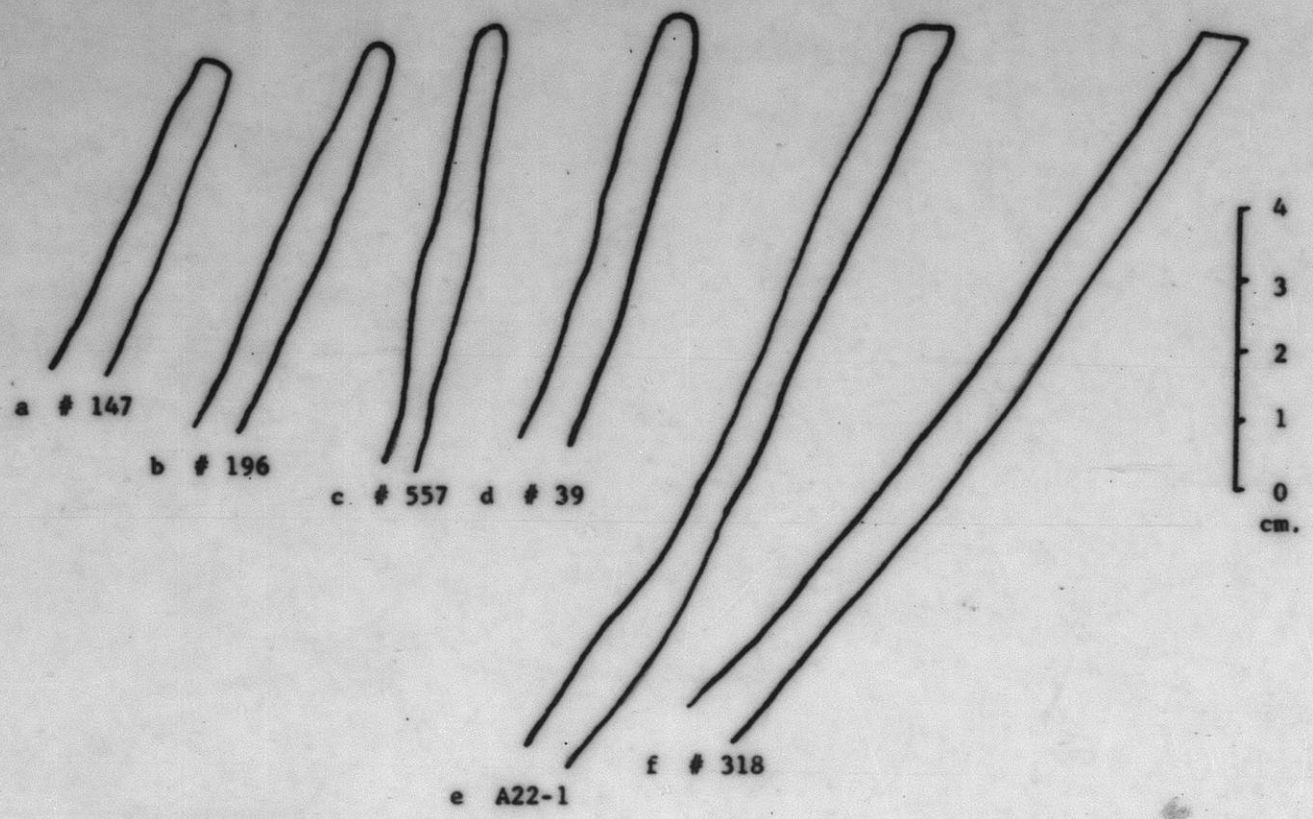
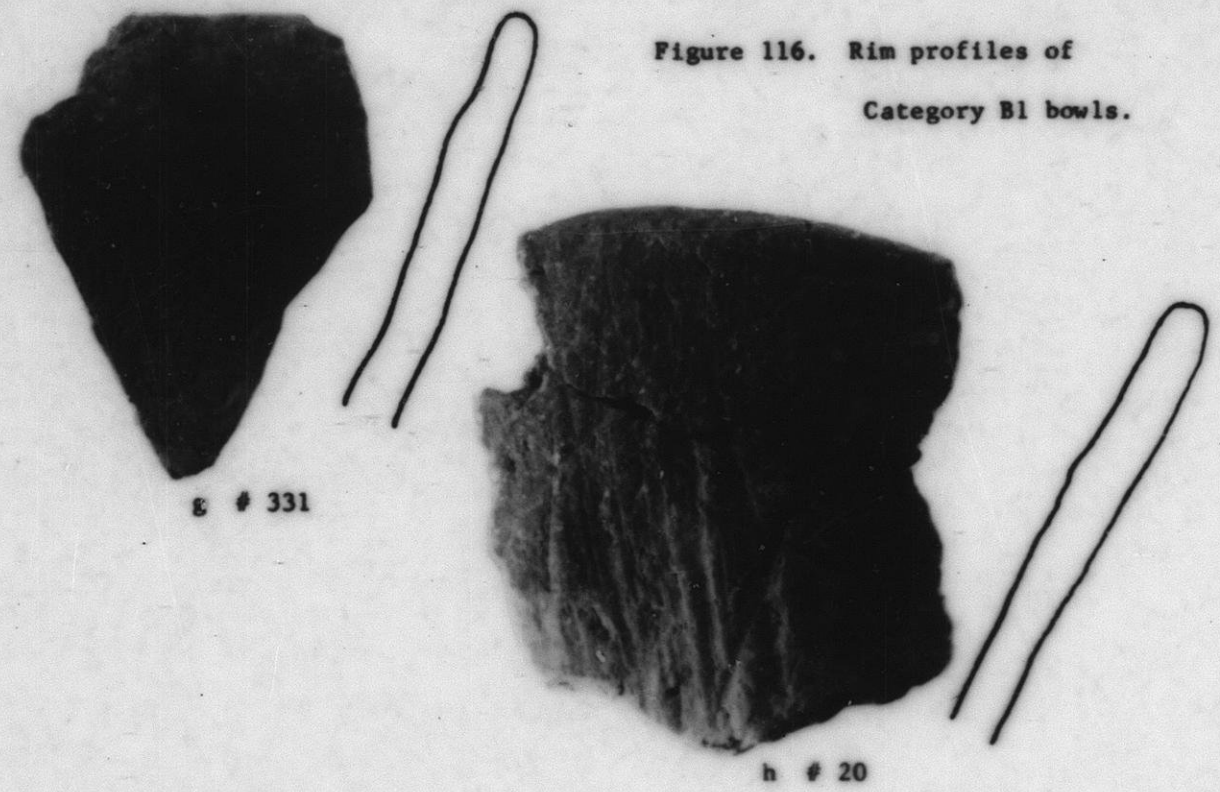


Figure 116. Rim profiles of Category B1 bowls.



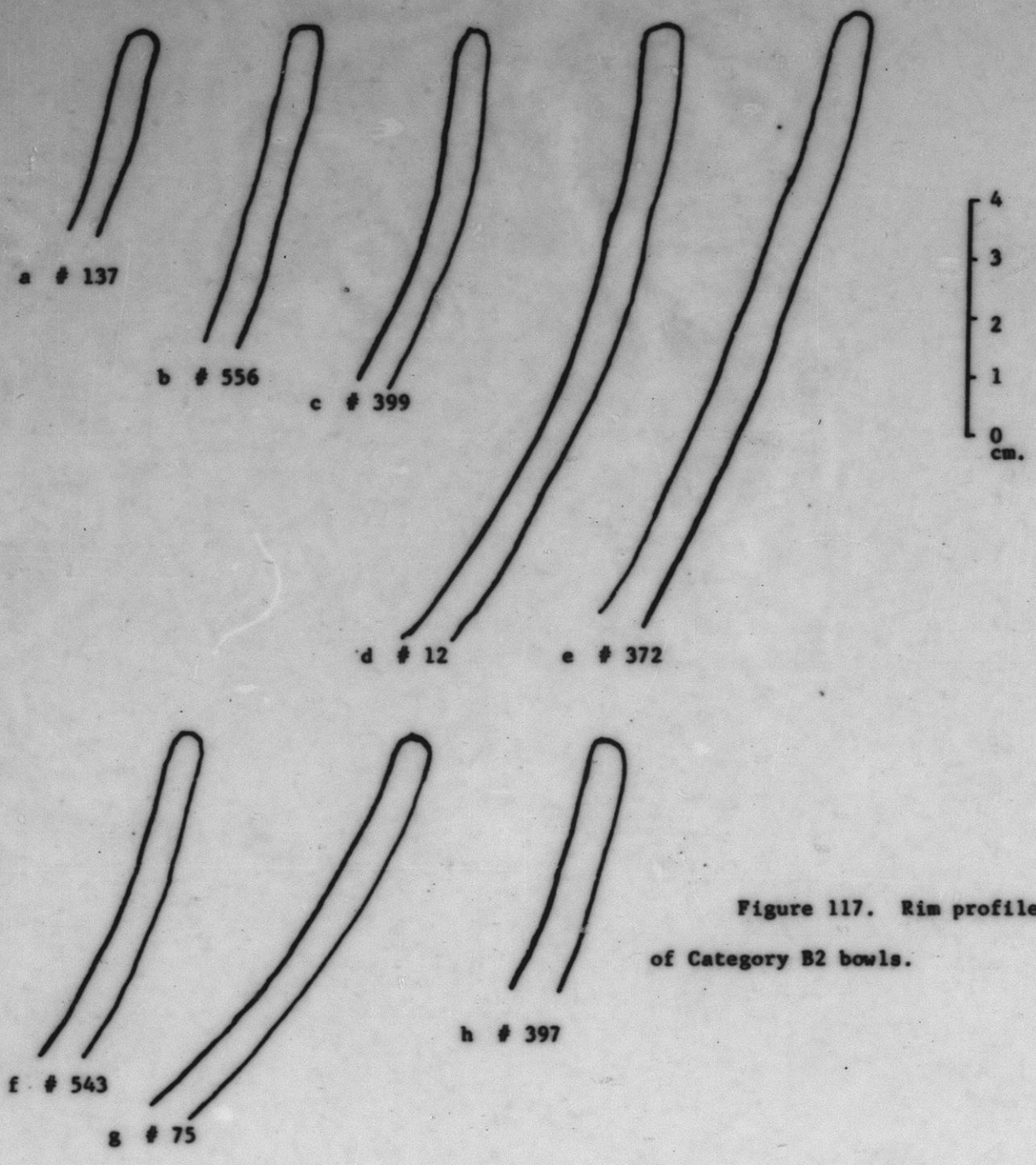


Figure 117. Rim profiles of Category B2 bowls.

Woodward Plain - Bowl, Category C

A single rim sherd (# 565 found in square 1:4 at level 13) is placed in Category C. The form appears to be a composite one in that there is a roughly vertical rim 38 mm. in height, below which the bowl contracts sharply to the base. The lip is rounded and has a thickness of 4 mm. It is unfortunate that the rim is a rather small one which does not permit vessel reconstruction with great precision.

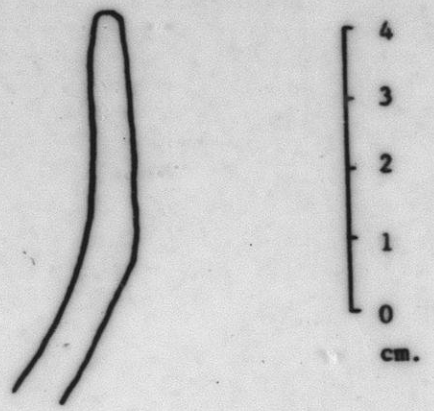


Figure 118. Rim profile of Category C bowl, Woodward Plain.

Woodward Plain - Small Bowls

We have placed a series of rim sherds derived from small vessels in a separate bowl category. In their form attributes they are similar to the Category A rim having convex sided walls that are nearly vertical or slant inward. However, no flat bases of a size appropriate for these small vessels were located so that it is possible that they might have a rounded basal section.

#	Square	Level	Thickness (lip)	Diameter Orifice	Lip Form
556	2:3	14	3 mm.	___	flat
697	test pit		2 mm.	6 cm.	round
459	0:6	10	3 mm.	___	flat (polished)
543	2:2	13	5 mm.	6 cm.	round
202	2:6	6	5 mm.	6 cm.	round
314	2:7	7	3 mm.	7 cm.	round
202	2:6	6	(joins rim # 314)		
318	2:3	7	(joins rims # 314 and 202)		

Of the above specimens, # 459 with a smooth, slightly polished black surface, is somewhat deviant from the general characteristics of Woodward Plain. It is, however, tempered with a fine shell though somewhat more compact than normal because of the small size of the temper. If it were not evident from the number of other sherds derived from small vessels, it would be tempting to place this sherd in a Caddoan category.

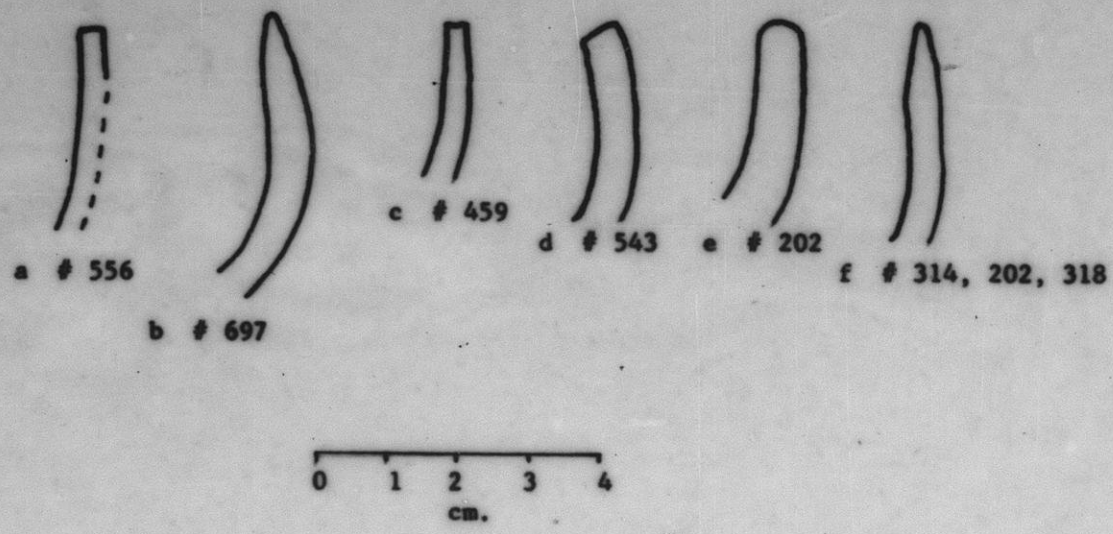


Figure 119. Woodward Plain, small bowls.

Unclassified Bowl Rims, Woodward Plain

A series of rim sherds, sufficiently large to determine that they are derived from bowls, but with an inadequate portion of the lip present to permit precise orientation of the sherd are placed in this category. Provenience, lip form and thickness are given in the table below.

#	Square	Level	Lip Form	Thickness (lip)
140	1:3	4	flat	5 mm.
336	2:2	11	flat	5 mm.
139	1:5	4	flat	5 mm.
150	0:2	6	round	5 mm.
323	2:5	8	round	5 mm.

Woodward Plain, Jar Forms

We have subdivided the jars into a series of lettered form categories comparable to the procedure followed with the bowls. The form categories take into consideration both the height, curvature, and distinctiveness of the rim as well as the definition of the shoulder area below the rim. The characteristic jar form of Woodward Plain appears to have a proportionately broad orifice which is but slightly smaller than the maximum diameter of the vessel. The rim itself is joined to the shoulder by a gentle curvature and in no instance was there a sharp line of juncture between the rim and shoulder area. Jars are rarely equipped with vertical lip tabs, as found on bowls, and occasionally have strap handles.

Woodward Plain, Jar Category A

In Jar Category A the rim is either vertical or inslanting merging gradually with a gently rounded shoulder area. It will be noted from the rim profiles (Figure 119) that the shoulder area is not pronounced and proportionate to the maximum diameter of the vessel; the orifice diameter is substantial. A single sherd (# 450) was provided with a strap handle (19 mm. wide and 36 mm. high) which is riveted at the base and welded to the lip. Provenience, lip form and thickness of the Category A Jars are given in the table below.

#	Square	Level	Lip Form	Thickness (lip)	Diameter Orifice
373	2:1	9	flat	4 mm.	18 cm.
449	0:7	9	flat	6 mm.	--
450	0:4	9	round	4 mm.	16 cm.
142	1:3	3	flat	4 mm.	32 cm.
142	1:3	3	flat	8 mm.	--
85 (2)	0:6	top 2.5'	round	6 mm.	26 cm.
84	2:4	6	flat	5 mm.	12 cm.
84	2:4	6	flat	6 mm.	--
39	0:3	6	flat	6 mm.	--
232	1:4	6	flat	4 mm.	24 cm.
221	0:5	7	flat	6 mm.	18 cm.
211	1:4	5	round	7 mm.	--
147	0:2	top 2.5'	flat	6 mm.	20 cm.
401	0:7	10	flat	5 mm.	--
551	1:4	12	flat	6 mm.	20 cm.

#	Square	Level	Lip Form	Thickness (lip)	Diameter Orifice
460	0:4	11	round	4 mm.	18 cm.
85	0:6	top 2.5'	flat	5 mm.	16 cm.
12	1:4	4	round	5 mm.	16 cm.

In the above tabulation of sherds, two rim sherds are joined to form one of the rims listed under # 85. A second rim with this number is probably not from the same vessel. While other sherds in the category perhaps are derived from the same vessel, this cannot be determined with certainty in view of the limited range in rim form.

It will be noted that orifice diameter ranges between 12 and 32 cm. The mean diameter is 19.7 cm. Where the height of the rim can be estimated it ranges between 18 and 31 mm., averaging 27.8 mm.

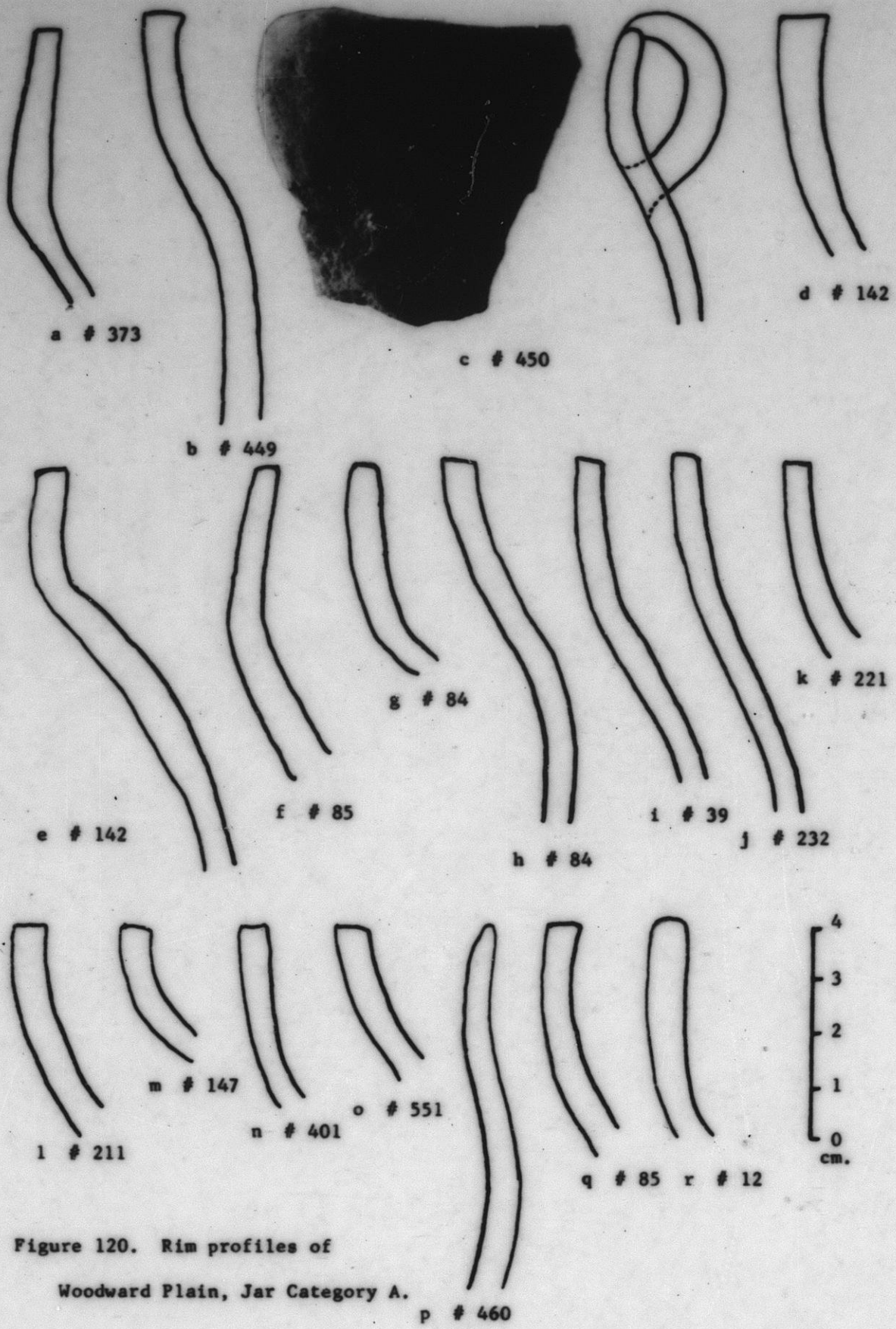


Figure 120. Rim profiles of Woodward Plain, Jar Category A.

Woodward Plain, Jar Category B

We may contrast this jar category with the preceding one by stressing the presence of a short rim, either vertical or slightly flared. In contrasting the height of the rim area, Category B ranges from 12 and 14 mm. where it is distinctly demarcated, in contrast to 18-31 mm in Category A. The B form also includes rims that are generally inslanting though these latter also turn vertically immediately at the orifice as can be seen from the rim profiles (Figure 121). Category B rims are tabulated below.

#	Square	Level	Lip Form	Thickness (lip)	Diameter Orifice
697	test pit		flat	4 mm.	20 cm.
203	1:4	6	flat	5 mm.	24 cm.
196	2:2	6	round	4 mm.	20 cm.
197	2:2	7	(joins # 196)		
448	0:4	8	round	5 mm.	20 cm.
450	0:4	9	(joins # 448)		
8	1:6	6	round	6 mm.	22 cm.
560	1:4	15	(joins # 8)		
325	1:6	7	round	6 mm.	--
195	1:5	7	round	4 mm.	--

Specimen # 325 is equipped with two vertical rim tabs which are triangular in outline (19 mm. at base, 9 mm. in height) which may continue around the circumference of the vessel. Specimen # 697 appears to have been originally equipped with a handle but presently only the riveted section at the base remains. Aside from the rim sherds listed as actually joining in the table above, it cannot be determined whether additional sherds are derived from the same vessel.

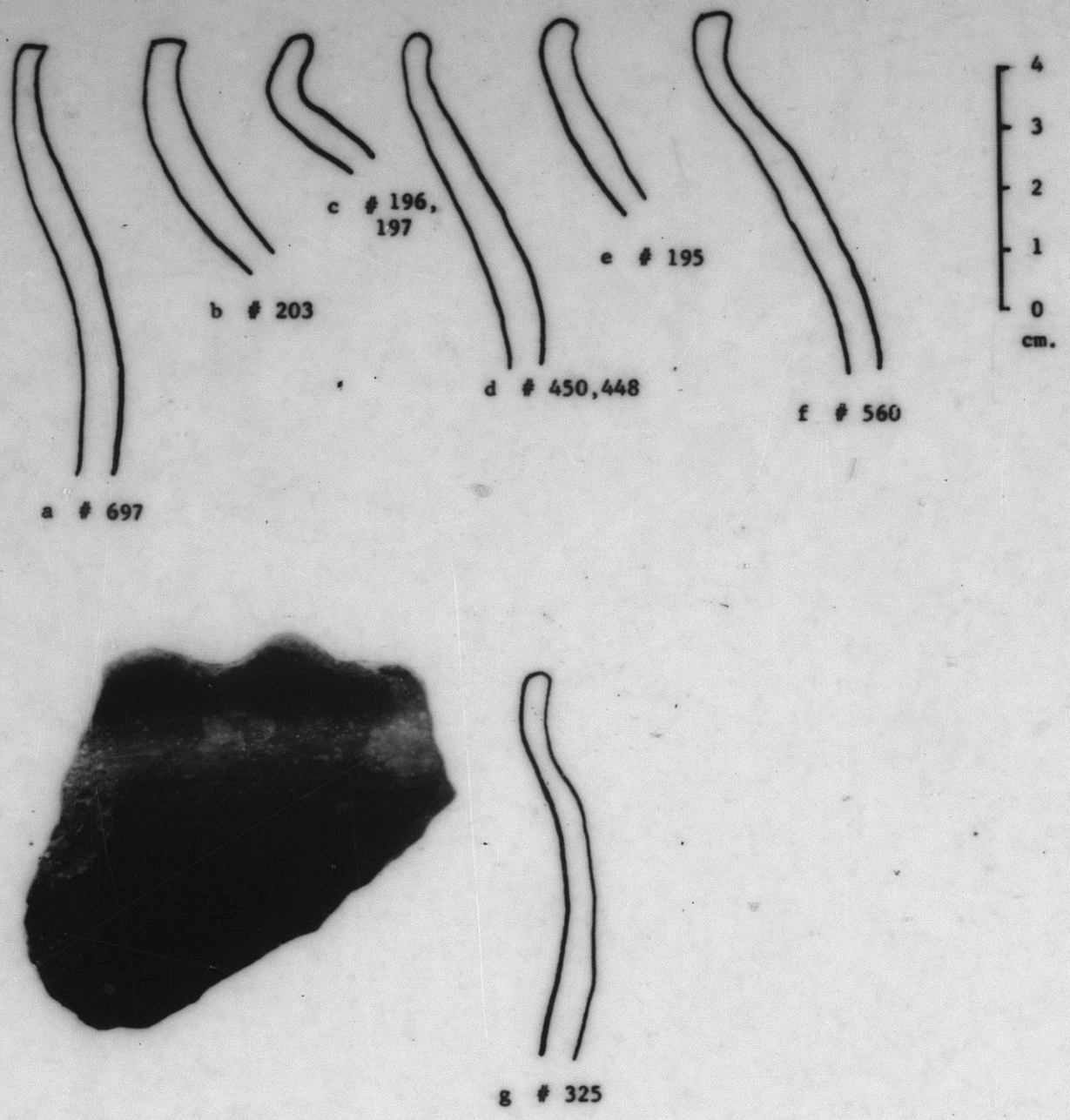


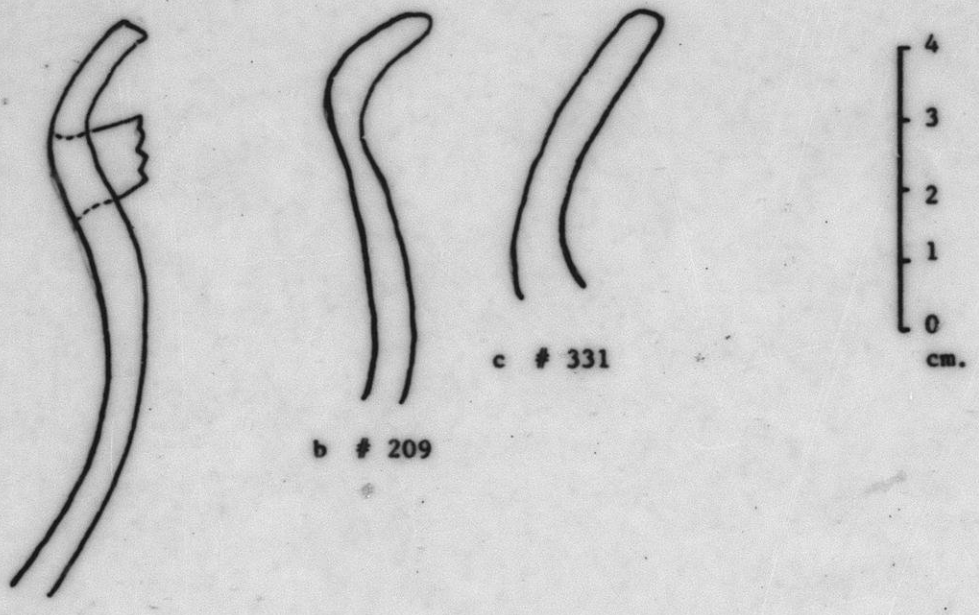
Figure 121. Rim profiles, Woodward Plain, Jar Category B.

Woodward Plain, Jar Category C

While Jar Category B includes sherds possessing a moderate amount of flare, it is specifically characterized by a rim that is of very slight height. Jar Category C is designed to accomodate the flaring rim of somewhat greater height. Like Categories A and B, the shoulder does not extend greatly beyond the orifice diameter and the angle formed by the shoulder area with a horizontal plane is greater than 45 degrees. Only two rims are placed in the category with certainty. One (# 144) was originally equipped with a strap handle, 25 mm. in width, only the base now remaining.

Rim # 331 probably falls within this category since the rim is high and flaring. Since the shoulder area is missing, it is possible that the sherd may belong in Category D.

#	Square	Level	Lip Form	Thickness (lip)	Diameter Orifice
144	1:4	4	flat	5 mm.	16 cm.
209	1:5	5	round	3 mm.	20 cm.
331	2:4	9	round	4 mm.	20 cm.



a # 441

b # 209

c # 331

Figure 122. Rim Profiles, Woodward Plain, Jar C.

Woodward Plain, Jar Category D

Like the preceding category, D possesses a flaring rim of substantial height but in addition has a well demarcated shoulder area which appears to form less than a 45 degree angle with a horizontal plane. The vessel form represented seems to fall outside the normal range of the jars of Woodward Plain. Two rims are present in the category (# 450 from square 0:4, level 9 and # 84 from square 2:4, level 6) but both are clearly from the same vessel. The lip is flat and 5 mm. in width but the wall thickness rapidly expands to 10 mm. at the juncture of rim and shoulder.

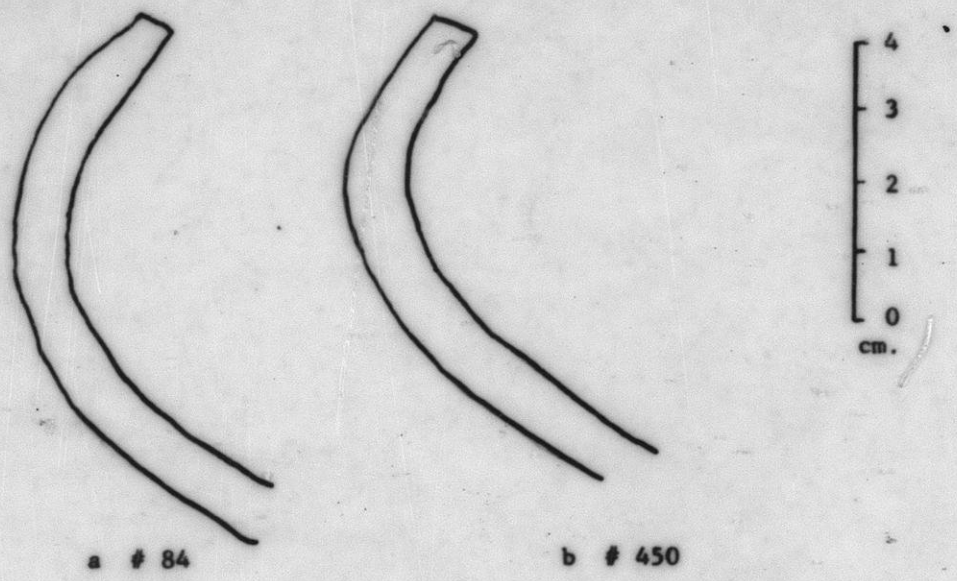


Figure 123. Rim profiles, Woodward Plain, Jar D.

Woodward Plain, Miniature Jar

A small jar, # 324, was found in square 1:6 at level 8. It is crudely made from a lump of clay and has the paste and surface finish of Woodward Plain. The form may approximate that of jar Category B but with a sharply demarcated shoulder area. While the base is broken, the lower section being missing, it was clearly flat. The small jar is 54 mm. in height at present, and has a maximum diameter of 60 mm.

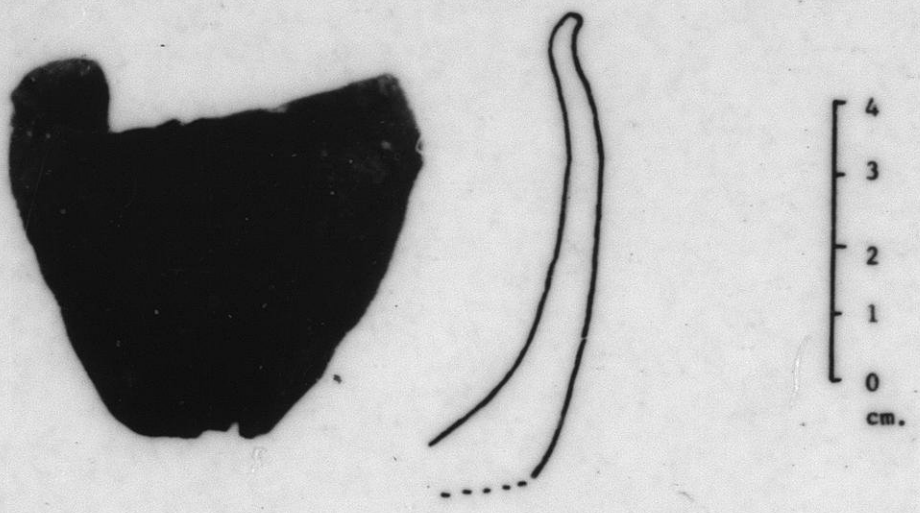


Figure 124. Miniature Jar, Woodward Plain.

Woodward Plain, Unclassified Jar Sherds

In addition to the jar sherds previously listed, there is a small group too small in size to permit accurate alignment. These sherds are tabulated below. One other feature which may be noted for the general jar category is that three rims have strap handles.

#	Square	Level	Lip Form
39	0:3	6	round
42	1:5	6	round
217	1:2	6	round
314	2:7	7	?
372	2:1	10	flat
445	1:7	8	flat

Woodward Plain, Unclassified Rims

We have refrained from classifying as jars or bowls the following rim sherds which, in general, are too small to permit precise orientation.

#	Square	Level	#	Square	Level
4 (2)	1:3	3	326	2:3	9
6	1:7	5	328	1:5	8
39	0:3	2	336	2:2	11
44	1:5	3	373	2:1	9
87	0:1	top 2.5'	396	0:5	11
140 (2)	1:3	4	401 (2)	0:7	10
143	1:2	2	450 (2)	0:4	9
147	0:2	top 2.5'	543	2:2	13
151	1:6	5	548	2:5	10
196 (2)	2:2	6	549	1:6	10
203	1:4	6	557	1:6	12
206	1:6	6	637	0:5	14
209	1:5	5			
211	1:4	5			
214	1:3	6			
316	2:4	7			

A total of 33 rims are tabulated on the list above. The number of distinct rims is reduced to 30 by sherd mending and in addition two sherds are so similar in color, paste and texture that they doubtless derive from the same vessel. Making use of the reduced number, we find the following attributes in the group. 19 of the rims have rounded lips, the remainder being flattened. Two rim sherds (# 211 and # 549) bear vertical, triangular lip tabs. No distinctive features can be noted on the remaining sherds.

Neosho Punctate

In the earlier description of the Neosho Punctate type, previously cited, the type was essentially characterized as representing the decorative variant of Woodward Plain. In paste and surface finish characteristics, therefore, no essential differences were noted. However, it should be stated that in both Woodward Plain and Neosho Punctate at D1-47, sparse amounts of grit are occasionally found in conjunction with the shell temper. In describing the characteristics of the Neosho Punctate sherds and restored vessels at D1-47, an attempt will be made to place them in the same vessel categories so that the similarities in form between the two pottery types will be more sharply revealed. Comparison is restricted, however, by the size of the sample since only twenty-nine rims and thirty-three body sherds of this type were present at D1-47, the frequency being substantially lower than that for Woodward Plain as judged by the number of rim sherds.

Neosho Punctate, Bowls

All of the sherds and vessel sections from bowls at D1-47 have markedly convex sides and would be comparable to the Category A bowl of Woodward Plain. Bowl categories B and C are not present in this Neosho Punctate sample and it may be of considerable importance in the understanding of the growth and development of this pottery type if these varieties are consistently absent at other components.

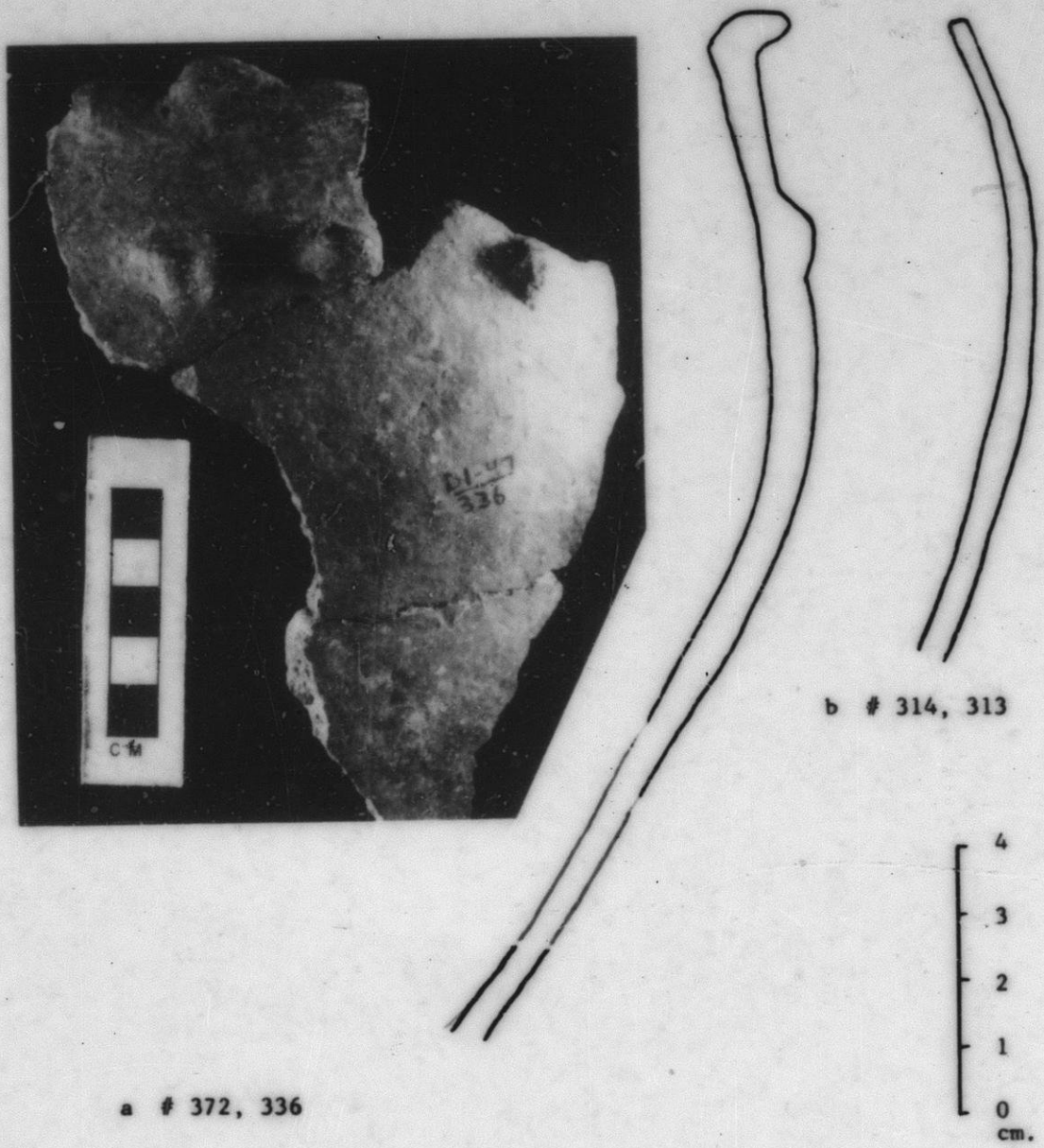
A substantial number of the bowl sherds appear to represent a single vessel. This vessel is characterized by a markedly convex wall which at a point about 55 mm. below the lip begins a more straight contraction to the base. The vessel is decorated by diagonal notches on the lip (2-3 mm. in width), by a series of rounded nodes (12 mm. in diameter) spaced as a continuous band about 35 mm. apart and placed 40 mm. below the lip, and by groups of paired, rounded triangular lip tabs (26 mm. at base, 7 mm. in height) placed in a nearly horizontal position on the rim. The lip tabs are comparable to some described in the Woodward Plain series and may indicate that these too were clustered in a similar fashion. The paste is compact with shell temper and a hardness of 3.5. The surface color is reddish with blackened fire mottling in areas. The wall thickness is a uniform 5 mm. and the diameter of the vessel at the orifice is 24 cm. The following sherds, or mended vessel sections, are assigned to this vessel:

#	Square	Level	
372	2:1	10	(rim)
336	2:2	11	(body sherd; attaches to 372 above)
372	2:1	10	(body sherd; attaches to 336 above)

#	Square	Level	
635	2:8	6	(two rim sherds and one body sherd)
325	1:6	7	(rim sherd)
317	2:6	7	(3 body sherds; attaches to 325 above)
141	1:6	4	(1 body sherd; attaches to 325 above)
452	2:1	13	(1 rim sherd)
196	2:2	6	(1 rim sherd)

One additional rim sherd (# 202 from square 2:6, level 6) has a similar rim curvature to the vessel described above and also bears diagonal notches on the lip. The notches, however, are somewhat bolder (4 mm. in width) and more deeply placed on the lip. It is assumed it represents a different vessel.

Only one additional vessel section can be placed in the bowl category. This section is formed by a rim (# 314) found in square 2:7, level 7 and one (# 313) found in square 1:1, level 6, together with an additional body sherd from this same location. Surface color varies from a dark red to a bright orange and grey suggesting that portions were refired. The wall of the bowl has a uniform convex curvature and the rim slants inward slightly. Wall thickness is 5 mm. at the lip and increases gradually to 6 mm. The diameter of the orifice is computed as 24 cm. The decoration is confined to a series of punctate impressions on the lip, placed parallel to the wall curvature. The instrument by which the punctate impressions were executed is hollow (reed or bone ?) leaving a node in the center of the jabbed imprint.



a # 372, 336

b # 314, 313

Figure 125. Neosho Punctate bowls.

Neosho Punctate, Jars

Both categories of jars, A and B, as described for Woodward Plain, are present in the Neosho Punctate series. The rims, grouped so far as possible according to vessels, are described below.

Neosho Punctate, Jar A

632, 631, 563, 205, 40 from 1:7, level 6; 1:7, level 9; 1:8, level 6; 1:8, level 5; 1:7, level 3, (two rim sherds and five body sherds) constitute a jar with a rim which is vertical. The orifice diameter is 14 cm. The decoration consists of fine (3 mm. wide) punctates which are across the lip and opposed diagonal bands of parallel incised lines placed on the rim and upper shoulder. A strap handle, somewhat approaching a loop handle in its thickness (width 14 mm.; thickness 8 mm.) and with a rather rectangular longitudinal section is attached at the lip and rivited into the rim.

5 (1:7, level 6) has a carelessly executed decoration similarly composed of diagonally opposed bands of parallel incised lines. The lip, however, is flattened and undecorated.

316 (2:4, level 7) has fine (3 mm. wide, 8 mm. long) elliptical punctates placed on the lip, parallel to the vessel wall, and in an undulating band on the rim. The band on the rim consists of three parallel rows of punctates with a fourth row bordering these and placed and a right angle to them.

209 (1:5, level 5) has broad (4 mm. wide) wedge-shaped punctate impressions on the lip, parallel to the vessel wall, and a diagonal band of broad incised lines paralleled by punctate impressions on the rim. The rim, as in the preceding example, contracts inward.

219 (1:3, level 5) is a small sherd but evidently similar in form

to the preceding examples. The lip bears diagonal notches and a punctate decoration is present on the lower portion of the rim though not enough is present to determine the pattern.

207 (2:5, level 6), a final sherd of similar form, bears only a decoration of diagonal punctate impressions on the lip.

The group of Jar A rims are similar in paste and surface finish characteristics to Woodward Plain. Wall thickness at the lip ranges between 5 and 6 mm., with a similar wall thickness maintained in other areas. Sherds of this group are illustrated by Figures 126 and 127.

Neosho Punctate, Jar B

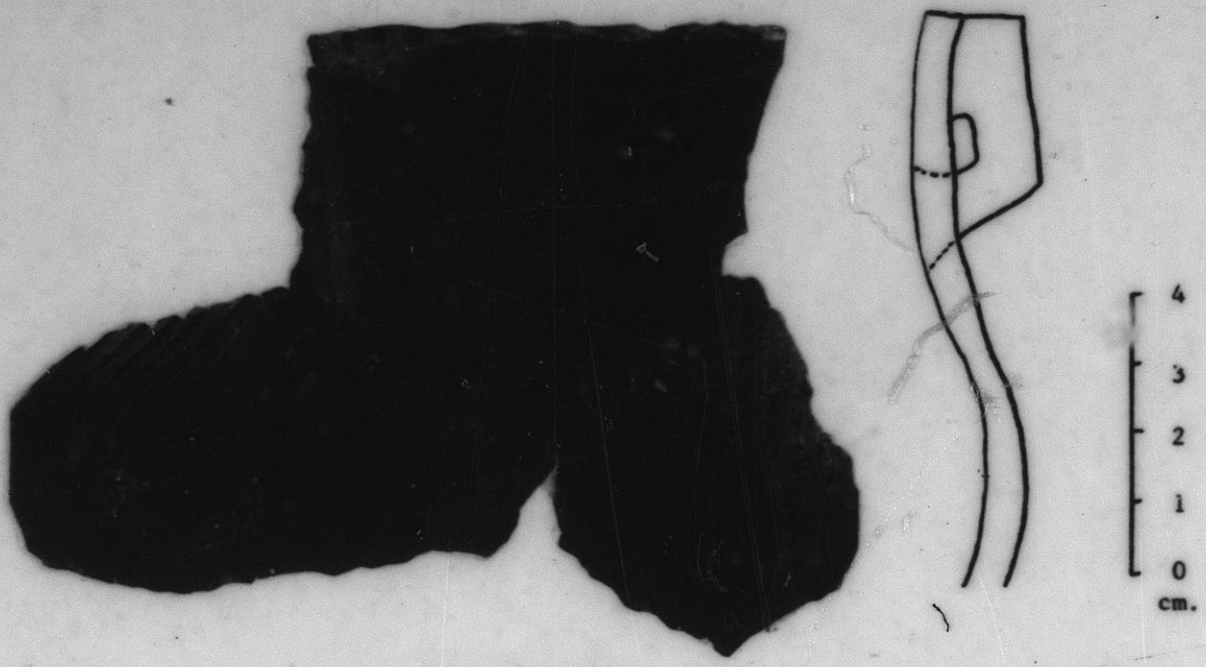
152 (1:7, level 5) has as a decoration only diagonal notches across the lip.

317 (2:6, level 7) bears an angular decoration of broad (3 mm.) incised lines bordered by irregular punctates on the rim with similar punctate impressions on the inner portion of the lip.

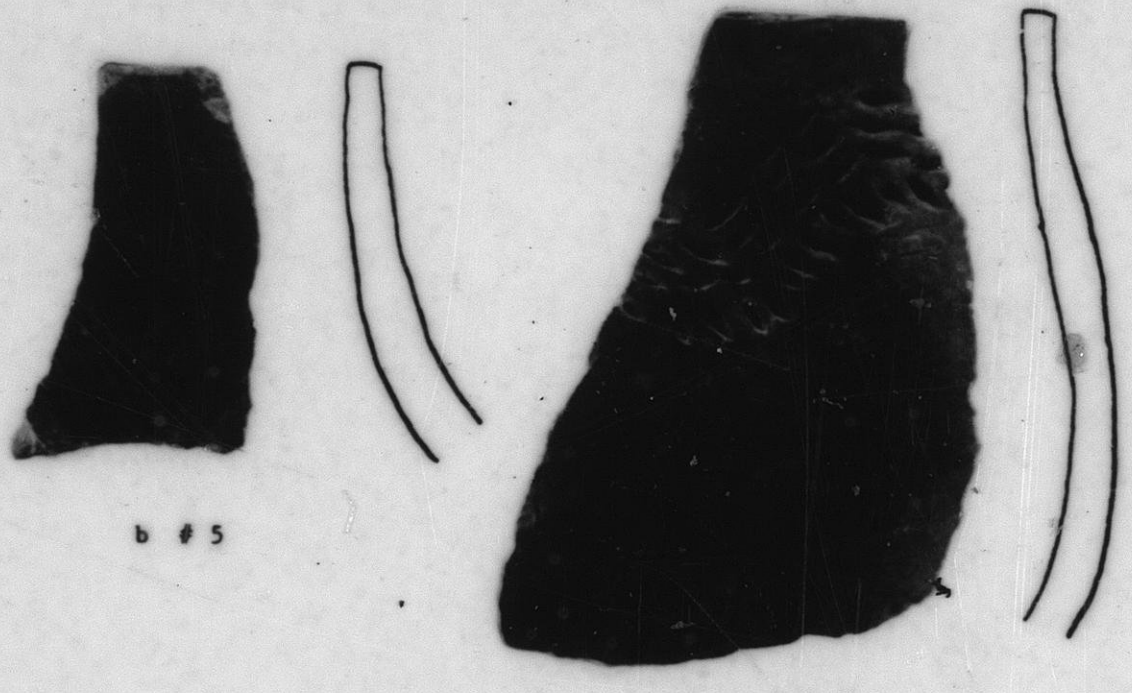
257 (2:6, level 7) bears punctate impressions on the lip, parallel to the vessel wall, and horizontal bands of similar punctate impressions placed on the rim 12 mm. below the lip.

196 (2:2, level 6) has a decoration confined to diagonal notches across the lip. Diameter at orifice is estimated as 18 cm.

As in the preceding group, paste and surface finish characteristics as well as vessel shape are similar to Woodward Plain pottery. Wall thickness is uniformly 5 mm. Sherds of Jar B form are illustrated in Figure 128.



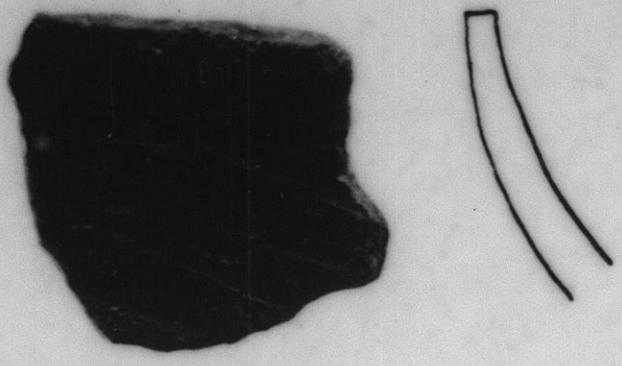
a # 632, 631



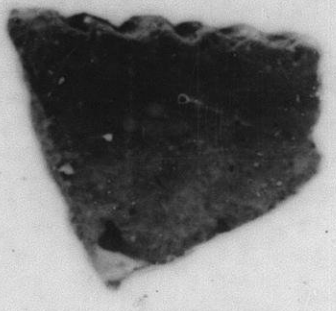
b # 5

c # 316

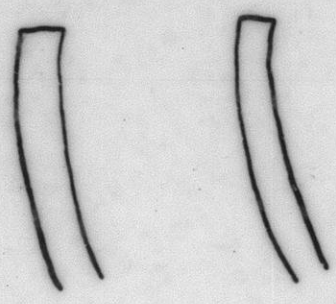
Figure 126. Neosho Punctate, Jar Category A.



a # 209



b # 219



c # 207

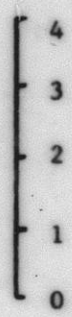


Figure 127. Neosho Punctate, Jar Category A.

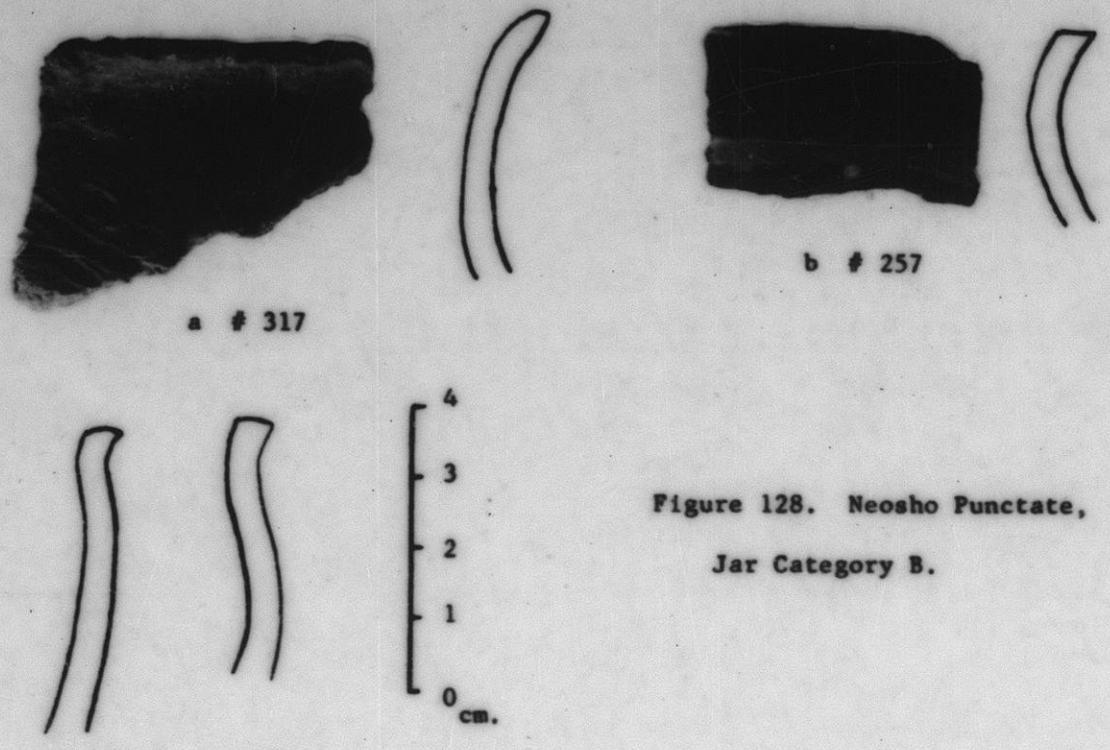


Figure 128. Neosho Punctate, Jar Category B.

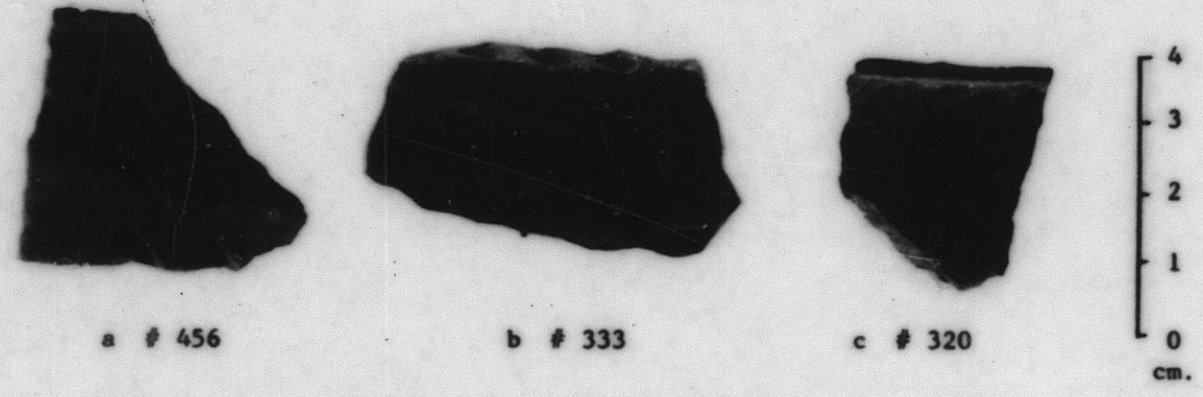


Figure 129. Neosho Punctate, unclassified form.

Additional Neosho Punctate Rims (Figure 129)

The following rim sherds, bearing decorations similar in character to other Neosho Punctate sherds, are too small to permit proper alignment to determine vessel form.

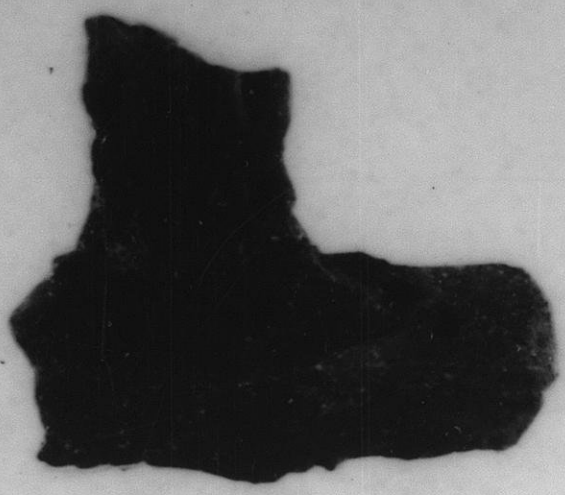
#	Square	Level	Decoration
333	2:5	7	diagonal punctate impressions on lip
333	2:5	7	longitudinal punctate impressions on lip
320	1:4	8	incised lines on rim; flat, undecorated lip
456	2:5	7	incised lines and parallel punctates on rim; flat undecorated lip.
397	0:7	11	longitudinal punctate impressions on lip
694	1:8	2	same as # 397, perhaps same vessel.
314	2:7	7	longitudinal punctate impressions on lip
314	2:7	7	opposed bands of fine incised lines on rim

Neosho Punctate Body Sherds

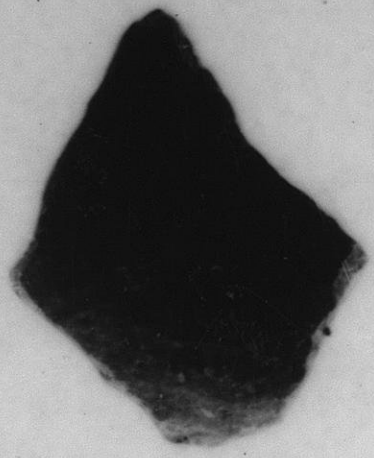
Because of the presence of a decoration, some body sherds of the type Neosho Punctate can be isolated although in other characteristics they would be similar to those of Woodward Plain. The group is tabulated below with comments on decoration given.

#	Square	Level	Decoration
10	1:5	4	fine incised lines
19	1:6	3	incised lines bordered by punctate area
44	1:5	3	broadly spaced, parallel incised lines
44	1:5	3	nearly obscured incised lines.
141	1:6	4	double row of punctates bordering incised lines
202	2:6	6	two applied nodes
202	2:6	6	zone of parallel incised lines bordered by line
202	2:6	6	broadly spaced incised lines

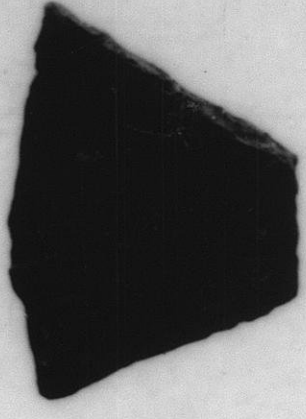
#	Square	Level	Decoration
202	2:6	6	parallel incised lines at right angle to incised line
202	2:6	6	parallel incised lines
204	2:6	5	incised lines
205	1:7	6	portion of applied node
208	1:5	6	zone of parallel punctates
209	1:5	5	parallel incised lines
210	2:7	6	incised line bordered by punctates
210	2:7	6	incised lines alternating with punctates
219	1:3	5	punctate impression
314 (2)	2:7	7	incised lines alternating with punctates (probably same vessel as # 210)
316	2:4	7	parallel incised lines
317	2:6	7	punctate impressions
318	2:3	7	punctate impressions (joins # 219)
320	1:4	8	2 parallel rows of diagonal punctate impressions
320	1:4	8	opposed diagonal tines
321	2:3	8	faint incised lines
326	2:3	9	strap handle, 27 mm. wide, attached by riveting technique and bearing wedge-shaped punctate impressions
333	2:5	7	incised line
445	0:5	8	fine incised lines
560	1:4	15	incised lines
561	1:4	14	parallel incised lines (probably same vessel as # 316)
564	1:6	13	parallel incised lines
631	1:8	5	fine incised lines
636 (2)	2:8	7	incised lines



a # 326



b # 141

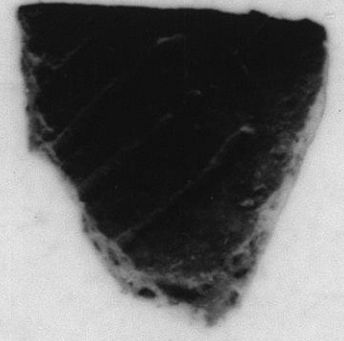


c # 561

d # 208

e # 19

f # 210



c # 316

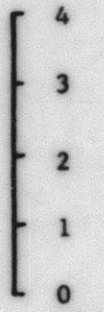


Figure 130. Neosho Punctate body sherds.

Unclassified Pottery

A group of six sherds bear deep bold lines engraved on the surface in a rough diamond shaped pattern. In paste and surface finish characteristics they resemble the Woodward Plain-Neosho Punctate types. On two sherds similar engraving appears on the interior surface as well as the exterior, suggesting that it might have been accomplished after the breakage of the vessel. Four sherds (# 206; square 1:6 at level 6) fit together while two sherds of location # 205 (square 1:7, level 6) fit a sherd # 204 (square 2:6, level 5).

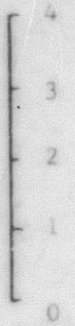
One rim sherd with an inward slanting rim (Jar category A) with thick walls (9 mm.) and a round lip has very fine engraved or incised lines on the surface. While the paste is similar to Woodward Plain-Neosho Punctate, the pattern of decoration is aberrant for the type Neosho Punctate. The specimen, # 637, is from square 0:5 at level 14.

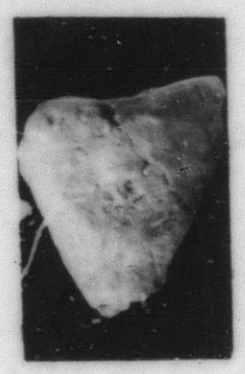
A small sherd, # 223, could either be derived from a miniature jar or perhaps from a pipe bowl. The original diameter would perhaps be close to 45 mm., and the nearly vertical walls have a thickness of 7 mm. The surface is irregular though roughly smoothed. Essentially the sherd lacks temper and has been fired to a reddish brown color. The specimen is from square 0:6 at level 7. Another sherd, # 310, seemingly from a rounded basal area is essentially of the same texture and surface finish. This specimen is from square 1:4, level 7.

Exterior a # 206 Interior

b # 205, 204

c strap handle





d # 223

Figure 131. Unclassified sherds.

Shell Tempered Basal Sherds

Nineteen sherds are parts of bases or bases and sections of walls. All are flat and circular in outline. The diameter of the thirteen measurable bases ranges between 6 and 12 cm., with an average of 8.6 cm. Base thickness for 11 sherds ranges between 5 and 14 mm. with an average of 8.3mm.

One basal sherd (#'s 314, 311, 196, 373) is deviant in shape, temper and thickness. While shell tempered, the temper is fine and sparse. The base proper is concave rather than flat as in other instances. The surface is slightly polished and the thickness of both walls and base is 5 mm.

Fifteen sherds are sections of the walls of vessels immediately adjacent to the base with a small section of the flat base present. These, together with the preceding group, would provide us with a total of 34 flat bases (eliminating all instances in which sherds match and fit together). This number is quite small when the total number of distinct vessels as recognized by rim sherds is computed--a number which probably is in excess of one hundred. Either many portions of flat bases were not recognized or some of the vessels of Woodward Plain and Neosho Punctate have globular bodies with a continuous curvature through the basal area.

Shell Tempered Body Sherds

782 sherds belong to vessels of Woodward Plain or Neosho Punctate types. Of this group 418 have shell temper which ranges in size from fine to medium and is present in sparse to moderate amounts. The remaining sherds have slight amounts of grit present. Since in most instances the grit could only be seen in fresh breaks or under high magnification, much of it may represent an accidental inclusion in the clay. Some, however, appears to have been deliberately added in conjunction with the shell temper. Grit

is present in conjunction with shell in the rim sherds of both Woodward Plain and Neosho Punctate. An analysis of the vertical distribution of the two varieties of temper, however, showed no significant difference. Twenty-eight of the body sherds have a brushed surface similar to that noted on rim sherds of Woodward Plain bowls.

Wall thickness was measured on a total of 522 of the body sherds. Sherds with only one surface present were excluded from this series. The following tables indicate the frequency, range, and mean thickness of sherds with a brushed surface, and those with a smooth surface.

Brushed Surface, Shell Tempered Sherds

x mm.	f	fx	
4	5	20	
5	7	35	
6	8	48	mean 5.86
7	3	21	
8	5	40	

Smooth Surface, Shell Tempered Sherds

x mm.	f	fx	
4	45	180	
5	75	375	
6	198	1188	
7	89	623	
8	68	544	
9	11	99	
10	5	50	mean 6.26
11	2	22	
12	1	12	

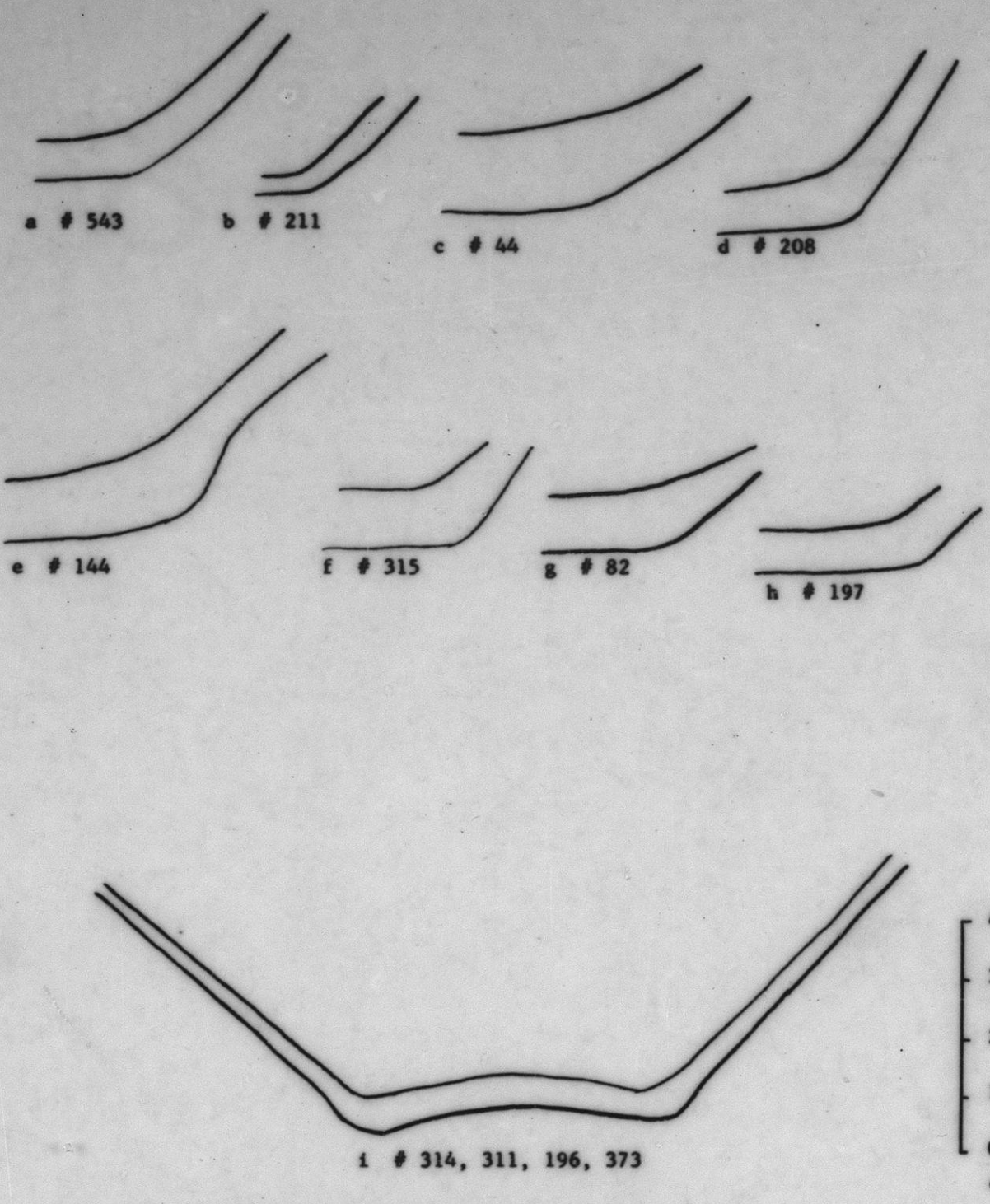


Figure 132. Profiles of basal sherds.

The combined series of sherds ranges in thickness from 4 to 12 mm. with a mean thickness of 6.24 mm.

Handles

Two undecorated strap handles are also present among the sherds from D1-47. One, # 210 from square 2:7, level 6, is 13 mm. wide and 7 mm. thick. The other from an unknown location is 21 mm. wide and 13 mm. thick. It still retains the clay plug by which it was riveted into the wall of the vessel.

III. THE NEOSHO FOCUS CERAMIC COMPLEX

A question raised initially in connection with the shell tempered pottery types was the degree of similarity between the ceramics of D1-47 and Woodward Plain as defined at the type site by R. L. Hall and also the nature of the relationships between Woodward Plain and its variant, Neosho Punctate. The relationship of Woodward Plain to other shell tempered pottery of the region is also an unexplored facet. It was previously suggested that comparisons of shell tempered pottery would necessarily stress the attributes of form in view of the lack of distinctiveness of paste and surface finish in this broad body of material.

In undertaking the consideration of the first question, that of the similarity of the Smith sites and the D1-47 ceramics, we have used the Woodward Plain type material from the Smith sites (D1-42 and D1-55), originally described by R. L. Hall, which has been available for analysis in conjunction with the study of the D1-47 sherds. We have grouped both series of sherds into the same vessel form categories previously discussed. The decorated pottery from D1-42 and D1-55 has been classified as Neosho Punctate rather than as Woodward Plain as in Hall's type description. The results of this classification are given in the following table. For this table, the sherd count is reduced to a vessel count since this is the manner in which sherds from D1-42 and D1-55 were tabulated.

	Woodward Plain		Neosho Punctate	
	D1-47	D1-42, 55	D1-47	D1-42, 55
Bowl, Category A	5	5	3	1
Bowl, Category B1.	8	2	0	2
Bowl, Category B2.	9	3	0	0
Bowl, Category C	1	0	0	0
Small Bowls.	5	2	0	0
Unclassified Bowl Rims . .	5	2	0	0
Jar, Category A.	18	11	6	1
Jar, Category B.	7	7	4	0
Jar, Category C.	3	2	0	0
Jar, Category D.	1	0	0	0
Miniature Jar.	1	0	0	0
Unclassified Jar Rims. . .	6	3	0	0
Unclassified Rims.	30	0	8	0

Two major conclusions may be drawn from the above table. First, it would appear that the form categories of Woodward Plain at D1-47 are essentially the same as those upon which the original type description was based. Two additional vessel shape categories (Bowl C and Jar D) present at D1-47 are represented by a single rim in each category and may simply reflect the larger sample size rather than a real difference between samples. The second conclusion is that despite the more restricted range of vessel forms in Neosho Punctate, in comparison to Woodward Plain, it is highly significant that no new vessel shape categories appeared. The restriction in range of vessel form for Neosho Punctate could again be due to the smaller sample size or alternatively because Neosho Punctate was derived from one stage in the development of Woodward Plain (assuming that all vessel forms do not survive the life of the pottery type). The data from D1-47, however, are

not adequate to determine the existence of any time difference on the basis of vertical distribution for vessel form categories. Neither do there appear to be significant changes in the relative proportions of Woodward Plain to Neosho Punctate in the vertical levels. We therefore find no evidence to disprove the suggestion that Neosho Punctate is the decorative variant of Woodward Plain and cannot, on the basis of information from D1-47, make any suggestions as to the relative time range of the two types.

Since we have stressed the importance of vessel shape as the diagnostic feature of the ceramic complexes, we have attempted a series of vessel reconstructions from the larger rim sherds combined with the series of flat bases. The latter give not only the characteristic dimensions of the base, but also the angle at which the vessel wall meets the flat basal area. Those for which this reconstruction can be made with reasonable assurance are given in Figures 132, through 136 which follow. The hatching on the rim profile to the right indicates the extent to which an actual rim was present for that particular vessel. A comparison of the vessel shapes would appear to indicate a basic similarity to the shell tempered pottery of the Searcy component (Bell and Baerreis, 1951: Plate 12), and also that to the Morris site (Bell and Fraser, 1952: 230). The range of vessel shape and distinctiveness of the decorated types of the Fort Coffee Focus (Orr, 1946: Figures 33-34), however, are clearly deviant from the ceramic complex of Woodward Plain and the associated Neosho Punctate type. We have no reason to doubt the identification of Woodward Plain at the Brackett Site, Ck-43 (Bareis , 1955) and the Smullins site, Ck-44 (Hall, 1954) but the available data on form categories do not permit precise comparison. The presence of a water bottle in the vessel categories of the Brackett site should be noted as deviating from our interpretation of characteristic vessel forms. Woodward Plain as

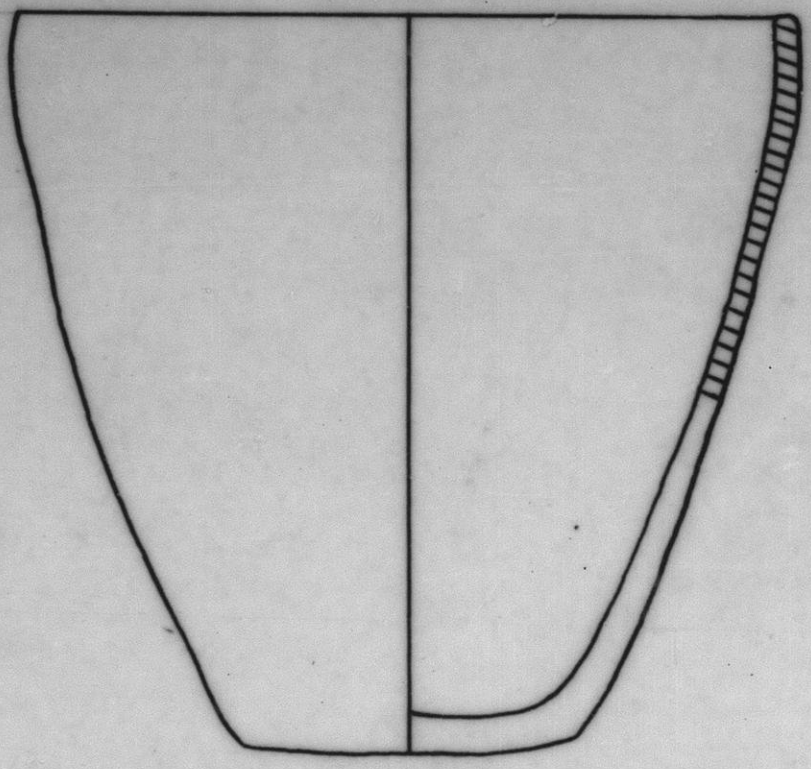
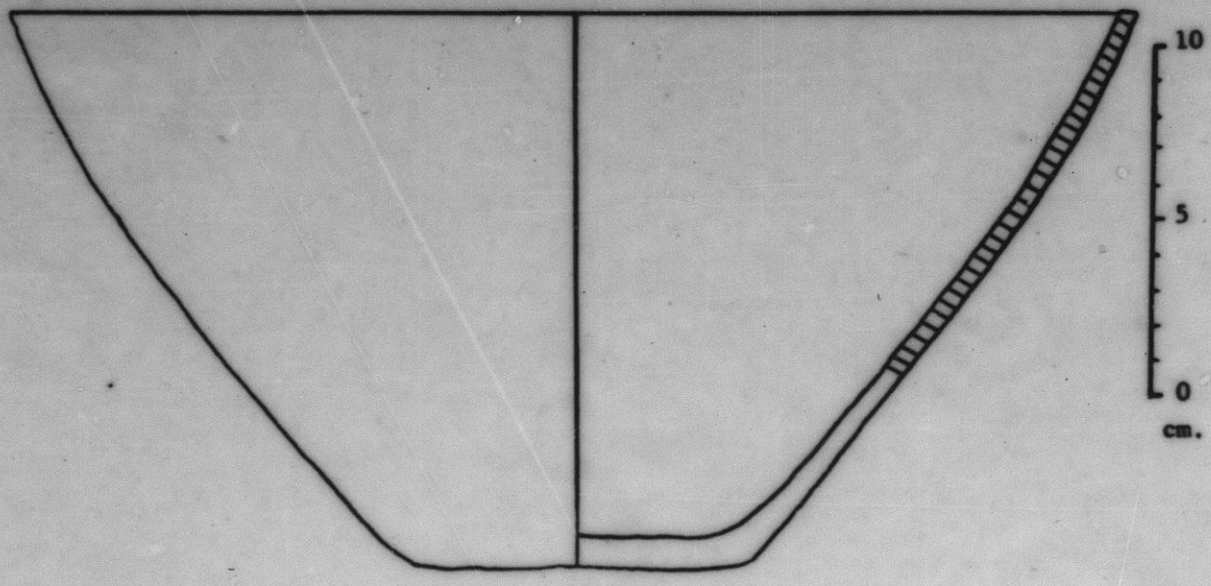
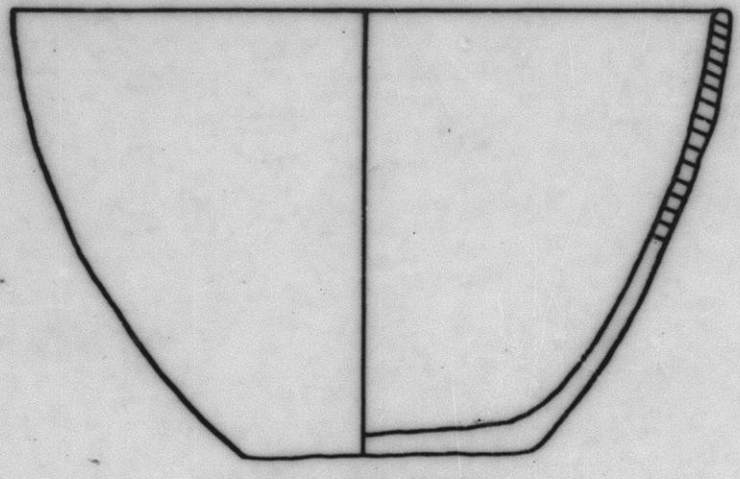


Figure 133.

Bowl Category A. Reconstructed from rim sherd # 41, 86.

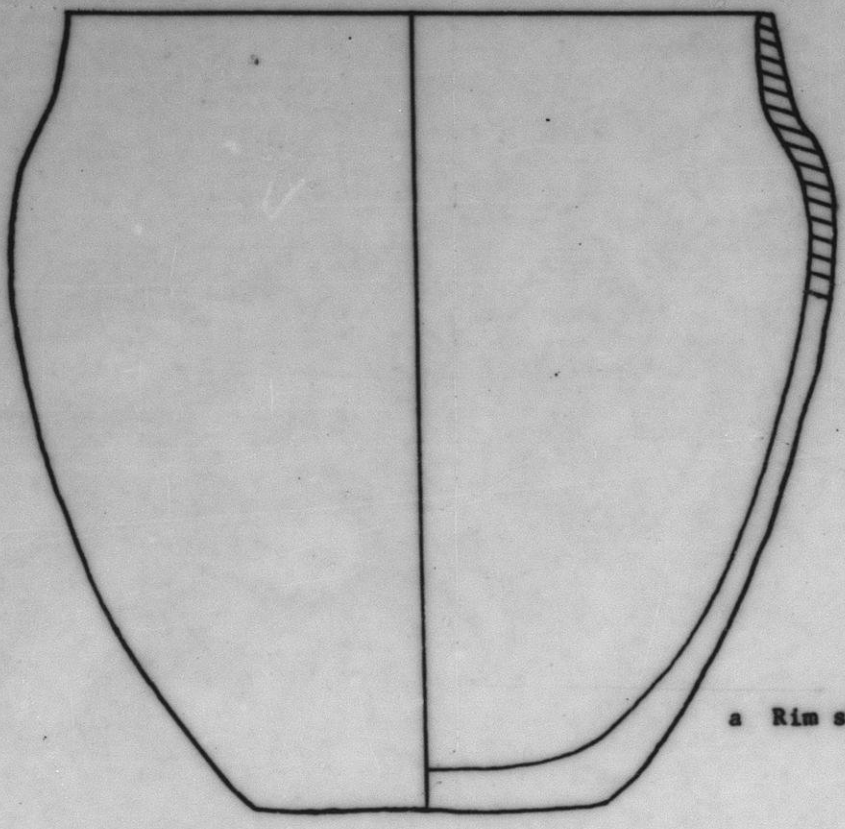


a Rim sherd # 318



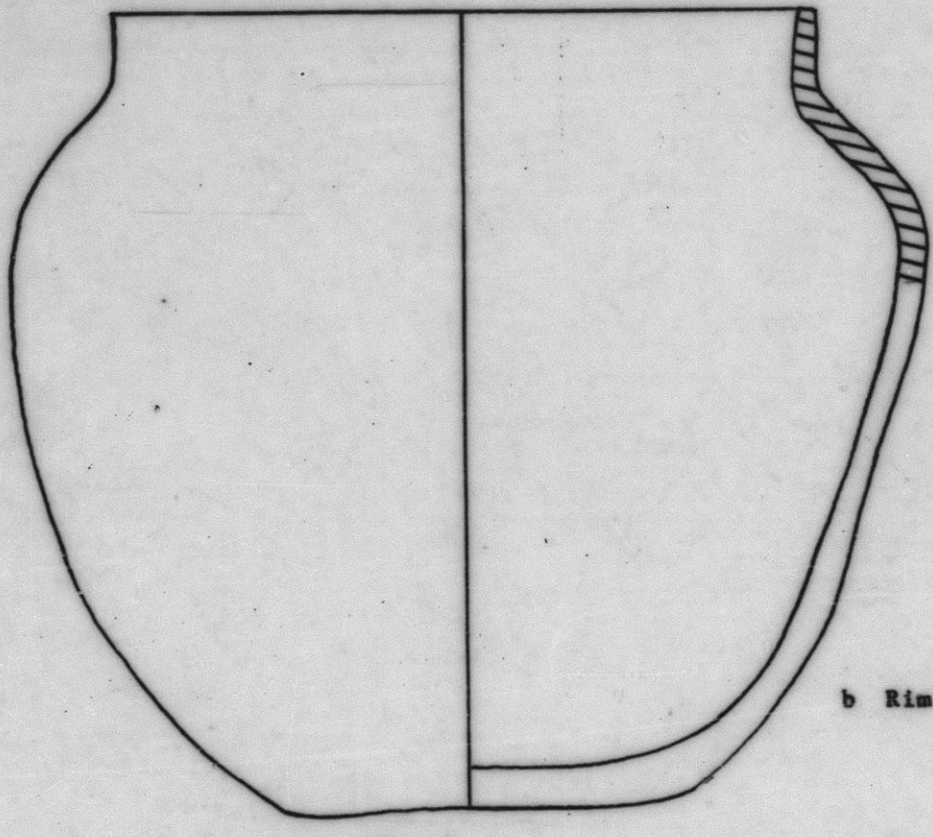
b Rim sherd # 399

Figure 134. Bowl Category B1 (a), B2 (b).



10
5
0
cm.

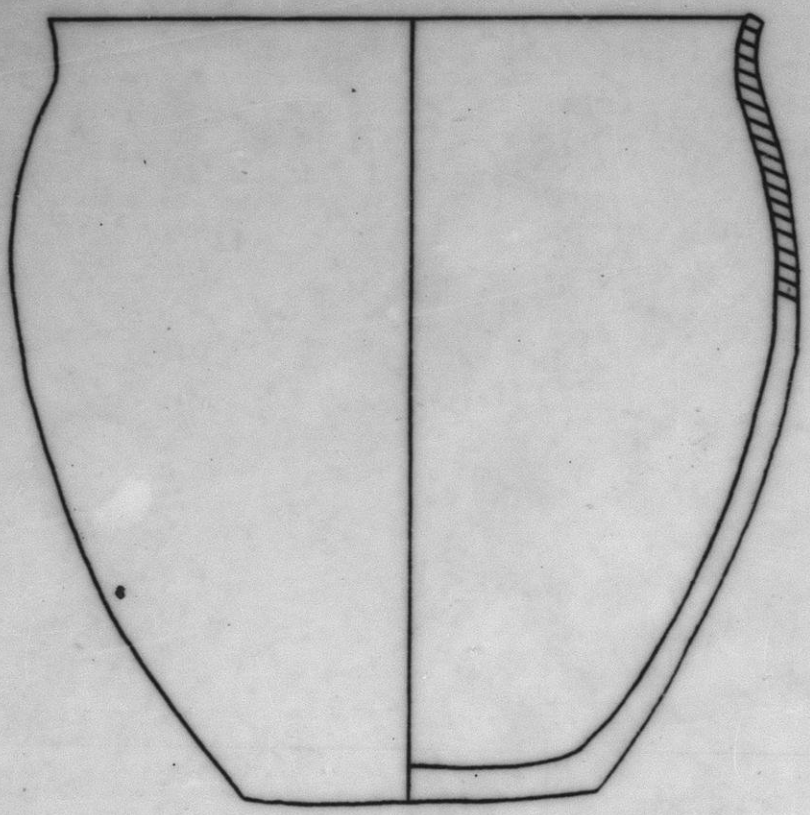
a Rim sherd # 449



Jar Category A

b Rim sherd # 142

Figure 135.



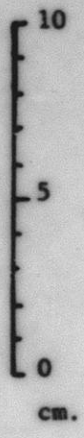


Figure 136.

Jar Category B. Reconstructed from rim sherd # 697.

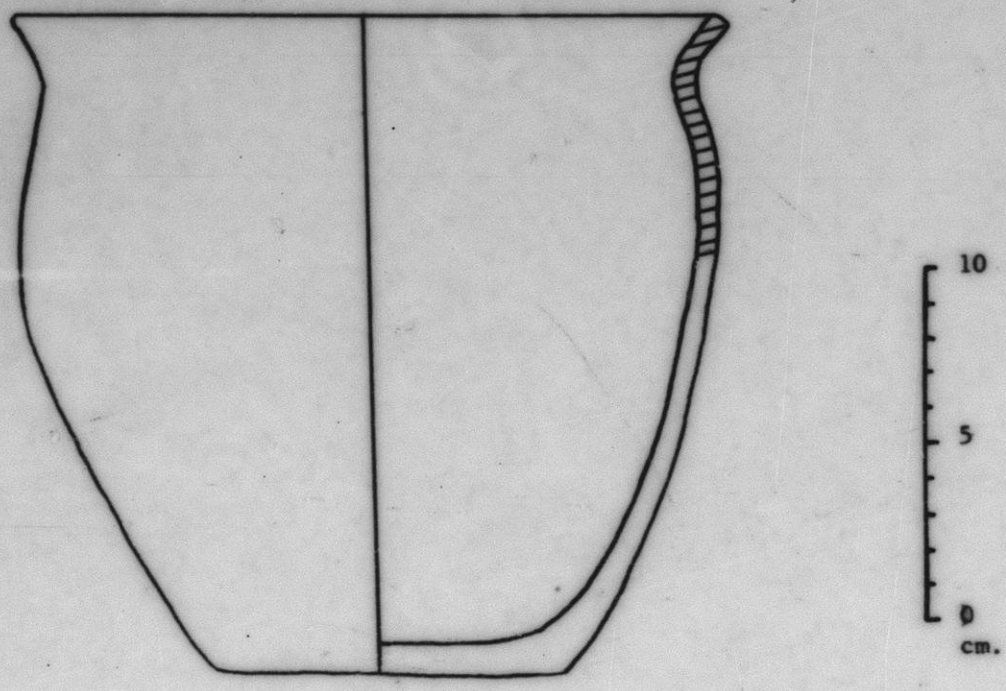


Figure 137.

Jar Category C. Reconstructed from rim sherd # 209.

identified at the Sam Site, Lf-28 (Proctor, 1957), also contains deviant attributes. The one vessel described as having a thickened and inward beveled lip (ibid: 76) suggests a distinctive characteristic of ceramics from McCurtain County, which also are found with a shell tempered paste. The material listed as "Woodward Plain (Decorated)" (ibid) we would exclude from Woodward Plain since we have restricted this type to undecorated pottery. Furthermore, the particular variant of decorated pottery at the Sam Site as illustrated in Plate 20, No. 5 of that report does resemble the one unclassified vessel from Dl-47 for which Woodland influence was suggested. The LeFlore County variant may indicate the derivation of a similarly decorated vessel from an alternative source. It may also be a hybrid product in this area, for a zoned treatment is common in Gibson Aspect ceramics. In any event, the similarities of the shell tempered ceramics at the Sam Site to Woodward Plain would seem to require further consideration. The problem of the relationships of the shell tempered pottery briefly touched upon here clearly requires further analysis of collections before a resolution of the questions raised can be attempted.

The above discussion is primarily concerned with the question of the identification of Woodward Plain at various Oklahoma sites. If vessel form is important in distinguishing between shell tempered wares of different cultural traditions, there should be differences between such sites. As an example of the usefulness of this type of investigation, the shape of the pottery vessels from the Oneota Leary Site (Hill and Wedel, 1936) can be compared with the shape of Neosho Focus vessels. In the original summary article on the Neosho Focus it was pointed out that there were similarities in design between Neosho Punctate and Oneota pottery, perhaps to be accounted for by a migration of peoples into Oklahoma (Bell and Baerreis, 1951: 71).

Leaving this discussion of the origin of the Neosho Focus and a precise comparison of Neosho Punctate and Oneota pottery for a consideration when more Neosho Focus components are analysed, we can compare the form of the shell tempered Neosho Focus pottery with the shell tempered Oneota pottery of the Leary Site. This may indicate the importance of the consideration of vessel form in distinguishing between shell tempered pottery complexes.

In the report on the Leary site the shell tempered rim sherds were grouped into three varieties. The first variety consists of flaring rims, those which flare "50° to 75° from the horizontal," (Hill and Wedel, 1936: 33, Figure 3, a - c) and which comprise 63 percent of the sample. These rims would conform to Form Category D as described here. At D1-47 there is one vessel of this form while at D1-55 and D1-42 there are no vessels of this form. The second rim variety at Leary, comprising 11 percent of the sample, is characterized as a recurved rim, showing a continuous convex curve from neck to lip (Hill and Wedel, 1936: 33, Figure 3, d - e). These rims would either correspond to Form Category B or C, represented by a total of ten vessels at D1-47 and nine vessels at D1-55, D1-42. Four percent of the Leary rim sherds are classified as vertical rims, (ibid, 33, Figure 3, f - g) corresponding to Category A. At D1-47, D1-55, and D1-42 this category makes up the majority of the jars. In addition to these differences, the Leary Site produced no bowl forms and no flat bases. It is also apparent from the rim cross sections illustrated for Leary that the shoulders of the vessels at this site are much broader than those from the Oklahoma sites under discussion.

This comparison does indicate that when vessel form is taken into consideration rather than an attempt to qualify and quantify the characteristics of the shell temper, differences between sites can readily be seen.

A more systematic comparison would, of course, be valuable in determining the precise relationship between pottery samples from various sites.

The Problem of Computation of Pottery Sample Size

It has been mentioned in the text prior to this point that the simple enumeration of the number of pottery sherds present presents some problems. Should this count be taken on the number of sherds returned to the laboratory as the material was sacked in the field, or on the basis of the number of sherds after attempts have been made to fit the sherds together in order to reconstruct vessel shape? Or, as in some reports (e.g., Newell and Krieger, 1949: 75 - 78), on the basis of reconstructed vessel lots, irrespective of whether the sherds actually fit. There are obvious merits to different approaches, but we have been mainly concerned with the question of obtaining comparability of figures so that a comparison of percentages of types between sites would be based upon figures similarly derived. Every effort was made to glue together as many sherds from the site as possible. Such a procedure would not only give a better understanding of the number of vessels present but also provide a means to estimate the extent of disturbance at the site and the pattern of deposition of the strata which could be seen by plotting the matching sherds. However, it is also clear that the number of matching sherds found would depend on the size of the pottery sample to be handled as well as the amount of time expended on the effort to match the sherds. These variables cannot be controlled from site to site so that our tabulated figures are based upon a reduced number of sherds in which the sherd counts are made after every attempt has been made to fit together sherds from the same square and level. Where these match and can be glued together they would count as only a single sherd. It was felt that this matching process could be carried out with each container from a single level as the material was cataloged. In

addition, such matching and gluing would compensate for rough handling of particular containers that could result in additional breakage of sherds and hence an erroneously high sherd count. Additional sherds from different squares and levels were fitted together and glued wherever possible but these are not used to reduce the basic sherd count. The results obtained by the different kinds of sherd counts are given in the following table.

	Original sherd count	Count reduced by matching from same square and level	Count reduced by matching from different squares & levels
Shell tempered body sherds	881	809	763
Shell tempered basal sherds	40	38	34
Shell tempered rim sherds	145	133	125
Caddoan body sherds	18	14	13
Woodland body sherds	26	23	22
Woodland rim sherds	3	2	2

As was noted in the discussion above, it is the count from the second column that was used for comparative purposes and tabulation in the final trait list in this report. In addition, where decoration, paste and surface finish also suggest that we are concerned with a single vessel, this has been used to reduce the count in the trait list.

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It may be questioned whether the relatively small number of Woodland sherds might not similarly reflect cultural contacts between groups rather than an early occupation of the shelter by Woodland peoples. Thus the lowest levels of the shelter could comprise a culture of Archaic type which has acquired some ceramic traits. Archaic peoples did make use of shelters. Two sites, D1-42 and D1-55, located only a few miles from D1-47 contained a preceramic Archaic occupation in the lowest levels (Wittry, 1952). But there are significant differences between the latest Archaic assemblage and that assemblage found in the lowest levels of D1-47, a point to be discussed later in the final summary of the conclusions. However, the possibility of some interaction between a Woodland group and one having shell tempered pottery is suggested by the paste characteristics and the shell tempering of some of the Woodland ceramic material. Other sherds are "classic" Woodland as seen in northeastern Oklahoma. Furthermore these latter sherds appear in the lowest levels of some of the squares suggesting that the earliest occupation is by a people having a small quantity of ceramics in their cultural complex. In levels slightly above those in which the pure Woodland sherds are present, are the Woodland sherds exhibiting paste characteristics like Neosho Focus sherds. This situation suggests that in the later portion of the span of Woodland occupation, contacts with other groups took place and, if correctly perceived, indicates a long survival of the Woodland tradition at the site. Because of the concentration of Woodland ceramics in the lowest levels at the site, as opposed to the distribution of Neosho Focus ceramics, a distinct Woodland zone is postulated as comprising the earliest occupation of the site.

Using the ceramics as a point of departure, we therefore resolve the problem of the interpretation of cultural sequence by the separation of two

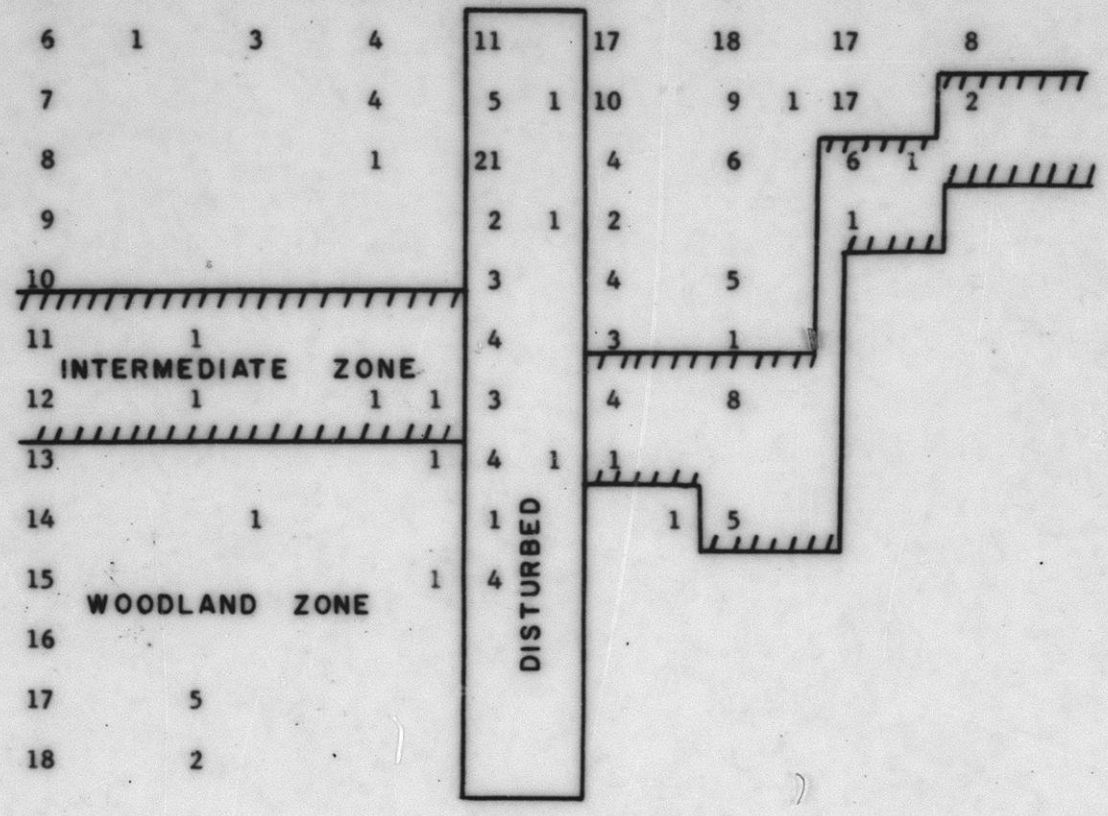
horizons in the shelter: (1) an early zone, characterized by the presence of Woodland ceramics; and (2) a late zone, evidently a component of the Neosho Focus. In plotting the vertical distribution of all sherds by square, we find that there is an overlap between the lowest Neosho Focus sherds and the highest Woodland sherds. Under normal circumstances we might expect to find a time gap between the Woodland occupation and the later Neosho Focus occupation, so we must resolve the question as to whether the overlapping of ceramic traditions is due to mechanical mixing, perhaps the result of excavation precedures, or whether there was an actual contact zone and time overlap between the two distinct cultures mentioned, Woodland and Neosho Focus. It is clear, of course, that the arbitrary nature of the horizontal four inch levels in which the site was excavated might have resulted in a mechanical mixing of two cultural zones if these were deposited in steeply dipping strata. Such mechanical mixing could have resulted from aboriginal activities also. Mechanical admixture is likely to have taken place in the vicinity of burials which were inserted in the deposit or where pits were excavated for other purposes. Such features went unrecognized in the course of the excavations. In addition to these processes the deposit undoubtedly suffered some mechanical admixture simply through the occupants walking on the surface. The weight of a heel on the loosely consolidated deposit could well bury a stone implement several inches below the surface level at which it was originally dropped. Such mechanical admixture would not have important consequences in interpreting a deposit consisting of the remains of a single cultural tradition of short duration. However, where a sequent occupation of two groups is involved, it may give a false impression of continuity and overlapping of types.

In view of the above considerations and the evidence of overlap of ceramic traditions, we have segregated an Intermediate or disturbed zone as well as a Woodland zone and a Neosho Focus zone. From a simple plotting of the two ceramic complexes, we can see the relative distribution of the Neosho Focus and Woodland complex. In this ceramic distribution, presented in tables on the following two pages, the sherd count utilized is that obtained after all matching sherds from the same square and level have been glued together. The basis for the segregation of the zones, also indicated on the same tables, is discussed below. The upper levels of the deposit are regarded as representing the Neosho Focus, based on the distribution of Woodward Plain rim sherds, Neosho Punctate rim and body sherds, and plain shell tempered body sherds which probably represent both of the preceding types. At the bottom of the deposit are found, almost exclusively, the Woodland sherds. These lower levels constitute the Woodland zone.

For the majority of the squares there is little or no overlap between the Woodland and Neosho Focus ceramics. This is true for all squares except 1:4 and 2:2. Leaving these squares for later consideration, the problem is to establish an intermediate zone, defined as a probable zone of mechanical mixture of the two cultural complexes. The line of the intermediate zone was established in those squares where the two ceramic traditions overlapped and was then extended, at the same level, to adjacent squares in which this ceramic overlap did not occur. For the most part this overlap is confined to two levels (eight inches). The deposit in the second row of squares (2:2 through 2:8), adjacent to the rock wall, is thinner than the deposit in the outer row of squares, yet at the same time the artifacts are found at a lower level due to the presence of a sterile zone near the surface. In this row the base of the Neosho Focus horizon is taken to

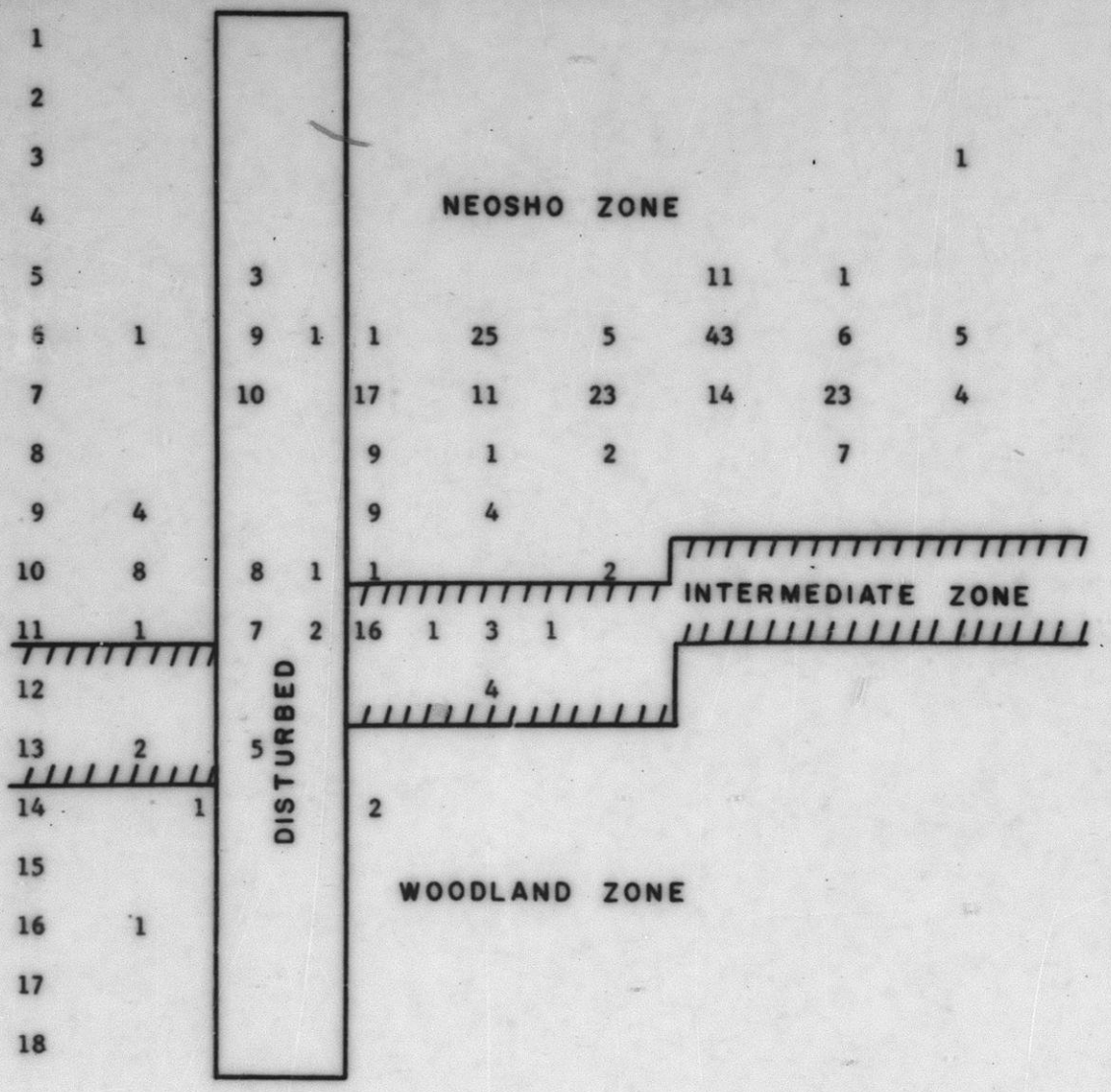
DISTRIBUTION OF NEOSHO FOCUS CERAMICS (N) AND WOODLAND CERAMICS (W) BY INDIVIDUAL SQUARE AND LEVEL:

Square:	1 : 1		1 : 2		1 : 3		1 : 4		1 : 5		1 : 6		1 : 7		1 : 8	
Level	N	W	N	W	N	W	N	W	N	W	N	W	N	W	N	W
1															1	
2			7				1		5		1				2	
3					9		6		14		3		4			
4					11		26		12		5		5			
5	3				15		9		18		17		4		9	
6	1		3		4		11		17		18		17		8	
7					4		5	1	10		9	1	17		2	
8					1		21		4		6		6	1		
9							2	1	2				1			
10							3		4		5					
11		1					4		3		1					
12		1			1	1	3		4		8					
13						1	4	1	1							
14			1				1			1	5					
15						1	4									
16																
17		5														
18		2														



DISTRIBUTION OF NEOSHO FOCUS CERAMICS (N) AND WOODLAND CERAMICS (W) BY INDIVIDUAL SQUARE AND LEVEL:

Square:	2 : 1		2 : 2		2 : 3		2 : 4		2 : 5		2 : 6		2 : 7		2 : 8	
Level	N	W	N	W	N	W	N	W	N	W	N	W	N	W	N	W
1															1	
2																
3																
4																
5			3								11		1			
6	1		9	1	1		25		5		43		6		5	
7			10		17		11		23		14		23		4	
8					9		1		2				7			
9	4				9		4									
10	8		8	1	1				2							
11	1		7	2	16	1	3	1								
12							4									
13	2		5													
14		1			2											
15																
16	1															
17																
18																



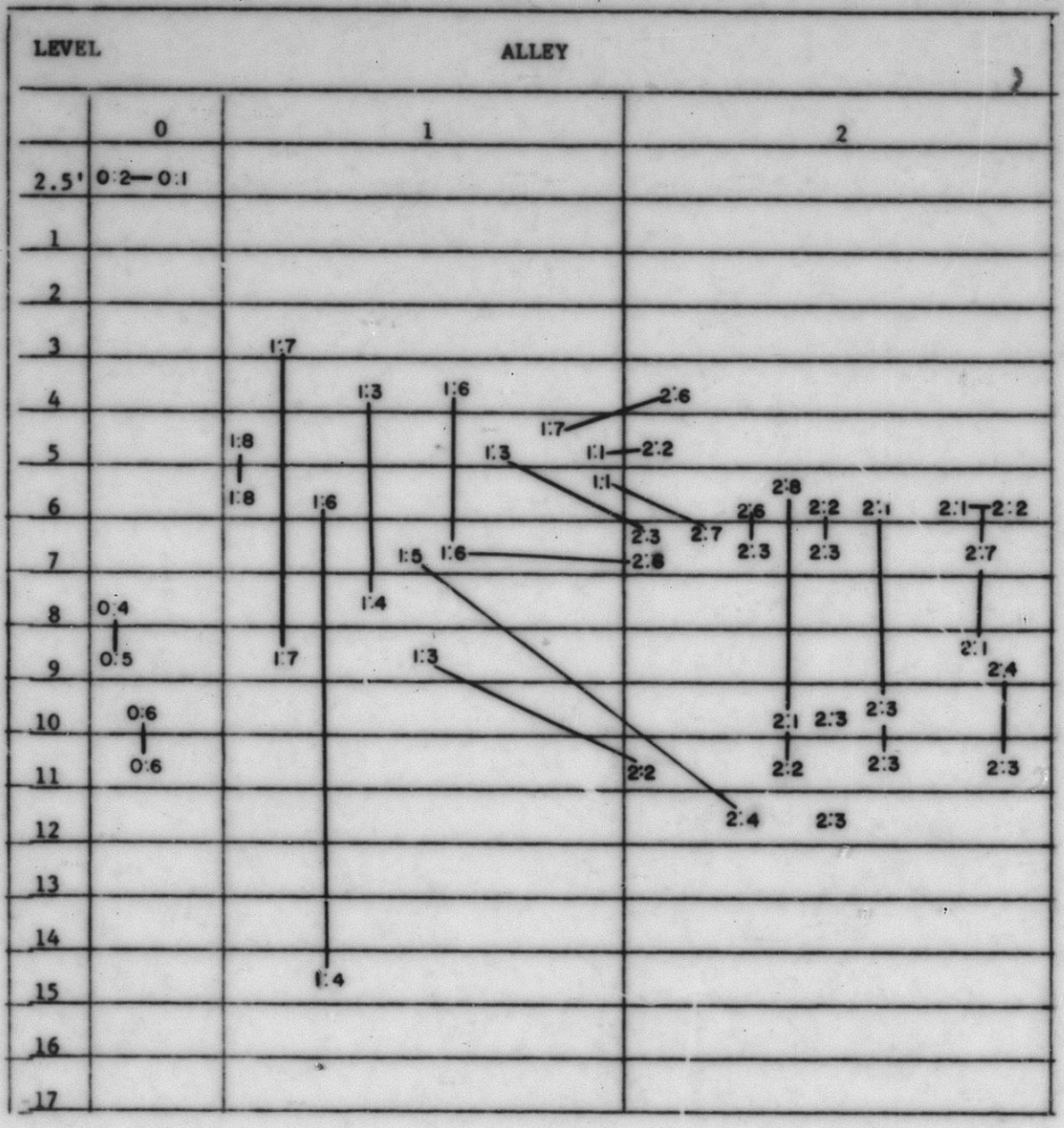
include the following levels: square 2:1, level 11; 2:3 through 2:5, level 10; and, 2:6 through 2:8, level 9. The intermediate zone slants upward in the latter squares to follow the contours of the sterile base of the shelter. In the second row from the shelter wall (squares 1:1 through 1:8) cultural materials begin at a higher level and consequently the zone of overlap also begins at a slightly higher level than in the first row. The intermediate zone begins in square 1:1 through 1:3 at level 11, while in squares 1:5 and 1:6 it is shifted downward to level 12. In the latter square, 1:6, the intermediate zone is increased in thickness to a total of twelve inches. The presence of Neosho Focus sherds at a lower level in square 1:6 than in adjacent squares would appear to indicate some disturbance, but it is felt that the slight amount of contamination indicated by the ceramic distribution was not sufficiently extensive to warrant the exclusion of the group of Neosho Focus artifacts from the analysis. In squares 1:7 and 1:8 the intermediate zone comprises levels 8 and 9. Here again the level of the zone is raised to conform to the contours of the shelter base.

Considerable overlap in the two ceramic complexes is present in square 2:2 where Woodland sherds are found in the same levels with those of the Neosho Focus between level 6 and level 11. The explanation in this instance is clear. This is the square in which the large group burial, Burial 1, was located. The insertion of the burial has clearly disturbed the stratigraphy in the square. All of square 2:2 is therefore excluded from the stratigraphic analysis and placed in a disturbed category. It may well be that the disturbance caused by the insertion of this burial is also responsible for the presence of two Neosho Focus sherds in level 14 of square 2:3 and one Neosho Focus sherd at level 14 in square 1:2. These squares were not excluded from the stratigraphic analysis since it was felt that the amount of

contamination from this source could not have been extensive. While ideally it would perhaps be best to exclude such squares, the size of the site and consequently the size of the sample does not permit this.

A second area of extensive overlap is to be seen in square 1:4 where Woodland and Neosho Focus sherds appear together in levels 7, 9, and 13, and where Neosho Focus sherds continue down to level 15, eight inches below the lowest Woodland sherd. Examination of the diagram on the following page, a representation of the sherds from different locations which are from the same vessel and which have been glued together, aids in the explanation of this situation. Here it can be seen that most of these matching sherds come from adjacent squares, either from the same or sequent levels, or from the same square but from sequent levels. These and the sherds which are as much as three levels apart, up to 12", probably do not indicate disturbance in the shelter. But there are also those sherds which are four to seven levels apart vertically, and they do indicate disturbance of some sort. However, nearly all these sherds are found in the Neosho Focus zone or in this zone and the Intermediate zone. They thus do not indicate that there was much mixture between the Woodland and Neosho Focus zone, the zones we are using to isolate culture complexes. However, there is one instance where the matching sherds do indicate disturbance between the two major zones at the site. This is seen in the sherd from square 1:6, level 6, which matches one from square 1:4, level 15. These matching sherds plus the unusual overlap of Woodland and Neosho Focus ceramics in this square confirm the presence of disturbance. If a pit were dug from level 6 downward, that is, when level 6 represented the surface of the deposit, it could account for Woodland sherds appearing at level 7 and Neosho Focus sherds appearing as deep as level 15.

DISTRIBUTION OF MATCHING SHERDS



We cannot control the possibility that some material from the pit was spread out on the ground surface at that time period and thus divorced from its normal context. In order to eliminate as much mixing as possible, the cultural deposit in square 1:4 from level 6 down is regarded as disturbed and so tabulated.

Using the zones as shown on pages 276 and 277, and as explained in the above paragraphs, we have tabulated the artifact frequencies for our cultural zones. To the inventory of the Neosho Focus we have also added the artifacts found in the top 2.5' of the outer row of squares (0:1 through 0:8). Since the cultural deposits of this outer sector clearly dipped steeply as the deposits accumulated, it was felt the deeper levels in this sector were probably culturally mixed.

Site Inventory by Assigned Cultural Zones

	Neosho Focus	Inter-mediate	Wood-land	Disturbed/ Unassigned
Large projectile points:				
Gary A	3	0	0	3
Gary B	0	1	0	4
Langtry A.	4	0	2	1
Langtry B.	0	1	2	0
Cooper A	6	0	3	4
Cooper B	3	3	5	1
Barbed points.	1	0	0	1
Snyders.	0	0	2	0
Snyders-like	2	0	1	1
Fairland A	1	0	0	1
Fairland B	3	2	1	0
Cupp	0	1	0	1
Smith.	0	0	0	1
Unclass. - contracting stem.	4	0	0	4
Unclass. - notched points.	6	0	2	2
Unclass.	9	1	1	7
Subtotal - lg. points.	42	9	19	31
Blade fragments, lg. points.	23	7	2	11
Point with graver-like tip	0	0	1	0
Bunt	0	0	1	0
Unfinished large points.	2	0	0	0

Site Inventory by Assigned Cultural Zones (continued)

	Neosho Focus	Inter-mediate	Wood-land	Disturbed/ Unassigned
Small projectile points:				
Simple triangular	7	1	0	0
Lanceolate triangular . . .	7	1	0	1
Small lanceolate.	1	1	0	2
Unclassified.	13	0	0	2
Small serrated.	0	0	0	1
Subtotal: small points. . .	28	3	0	6
Chipped stone knives:				
Large ovate-acuminate . . .	0	1	2	0
Large ovate to elliptical .	0	4	1	0
Medium ovate-acuminate. . .	1	2	0	3
With distinct base.	1	1	4	1
Unclassified fragments. . .	3	2	3	4
Stemmed knife, serrated . .	1	0	0	0
Core knives:				
Ovate-acuminate	1	4	1	0
With distinct base.	1	2	1	1
Fragments	4	4	4	6
Core tools.	2	4	2	6
Eccentric flint	1	0	0	0
Harahey knife	1	0	0	0
Beveled knife fragments . .	0	0	0	2
Scrapers:				
End scraper, Type A-1 . . .	0	1	0	0
End scraper, Type B-2 . . .	1	0	0	0

Site Inventory by Assigned Cultural Zones (continued)

	Neosho Focus	Inter-mediate	Wood-land	Disturbed/ Unassigned
End scraper, Type B-4	1	1	0	2
End scraper, Type C-3	0	0	0	1
End Scraper, Type F	1	0	0	0
Stemmed scrapers.	4	0	1	1
Side scrapers	3	0	0	0
Utilized flakes	7	5	1	8
Unmodified flakes	18	4	3	89
Chipped stone drills:				
Variant D	0	1	0	0
Variant F	0	1	1	3
Unclassified chipped stone. . implements.	2	1	0	0
Ground stone implements:				
Grinding basins	1	1	0	1
Nutting stones.	5	0	0	2
Mano - two grinding faces . .	9	0	0	3
Mano - one grinding face . .	0	0	1	0
Mano blank.	1	0	0	0
Misc. grinding stones	2	1	0	0
Hammerstones	1	0	1	0
Shaft smoothers	4	1	0	2
Grooved abraders.	1	0	0	2
Abrader	0	0	0	1
Hematite.	1	0	0	1
Boatstone	1	0	0	0
Boat-shaped stone	1	0	0	0

Site Inventory by Assigned Cultural Zones (continued)

	Neosho Focus	Inter-mediate	Wood-land	Disturbed/ Unassigned
Bone implements:				
Ulna awls	3	0	0	0
Rib-edge awl	0	0	0	1
Cannon-bone awls	2	0	2	1
Flat split awls	2	0	0	0
Splinter awls	2	0	0	0
Minute awls	0	0	1	0
Rod-like awls	2	1	0	1
Awl fragments	1	0	0	2
Deer cannon-bone beamer	4	0	0	3
Neural spine beamer	1	0	0	0
Worked deer manible	0	0	1	0
Bison scapula implement	1	0	0	0
Turtle carapace bowl	5	2	1	4
Antler flakers	12	5	2	9
Thinned antler tips	2	0	0	1
Worked antler shafts	3	0	0	0
Deer ulna flakers	9	1	1	1
Worked deer ulnas	1	0	0	1
Narrow antler bracelets	2	0	0	0
Longitudinally perf. deer phalange	0	0	1	0
Laterally perf. deer phalange	1	1	0	1
Antler drifts	2	1	0	0
Long bone shaft straighteners	2	0	0	1

Site Inventory by Assigned Cultural Zones (continued)

	Neosho Focus	Inter-mediate	Wood-land	Disturbed/ Unassigned
Bone tube	0	0	1	0
Patella "paint brush" ?	0	0	0	1
Perforated deer scapula	1	0	0	0
Notched bones	2	0	0	0
Racoon penis bone	0	0	0	1
Antler sections	0	0	0	2
"Other worked bone"	8	0	0	2
Shell scrapers	9	1	0	4
Perforated mussel shell	0	0	0	1
Plaited basketry	x	0	0	0
Ceramics:				
Woodland (Cooper Zoned Stamped)-partial vessel	0	0	0	1
Rim sherds	0	0	0	1
Body sherds	0	0	0	3
(Cowskin Dentate Stamped - rim)	0	1	0	0
Woodland body sherds	2	1	12	4
Unclassified vessel (Woodland influence ?; scattered sherds)	2	3	0	0
Caddoan pottery	3	2	0	7
Woodward Plain (rim sherds):				
Bowl, Category A	4	0	0	1
Bowl, Category B1	5	1	0	2
Bowl, Category B2	6	0	1	2
Bowl, Category C	0	0	0	1
Small bowls	4	0	1	3
Unclassified bowl rims	3	0	0	2

Site Inventory by Assigned Cultural Zones (continued)

	Neosho Focus	Inter-mediate	Wood-land	Disturbed/ Unassigned
Jar, Category A	9	0	0	9
Jar, Category B	3	0	0	7
Jar, Category D	1	0	0	1
Miniature Jar, ...	1	0	0	0
Unclassified jar rims.	5	0	0	1
Unclassified rims.	17	1	0	10
Neosho Punctate:				
Bowl Category A				
Possible vessel	3	1	0	1
Rims	3	0	0	0
Jar, Category A.				
Partial vessel	2	0	0	0
Rims	5	0	0	0
Jar, Category B.	3	0	0	1
Unclassified rims.	6	0	0	2
Body sherds (decorated). . . .	27	0	0	6
Unclassified (shell-tempered).	1	0	0	3
Flat basal sherds	25	1	0	8
Body sherds (undecorated). . .	525	49	2	153

The preceding list does not exhaust the possible traits which might have been tabulated and assigned to cultural zones. It is, obviously, a list of artifact types. The descriptions presented in the initial portion of this report also provide us with specific identifications of animal species and bone element so that we may contrast the use of animal bones for industrial purposes in the Neosho Focus and Woodland horizon. The bone refuse which will provide additional information is currently being studied by Professor William C. Reeder of the University of Wisconsin's Department of Zoology. We are indebted to him, to Mr. Frank Iwen and to Mr. Dewey Buck for identification of the bones used for tools.

	Neosho Focus	Woodland
Deer:		
Ulna	14	1
Cannon-bone	10	2
Tibia	1	0
Radius	1	0
Phalange	1	1
Scapula	1	0
Mandible	0	1
Antler	19	2
Bison:		
Thoracic vertebra	1	0
Scapula	1	0
Racoon (ulna)	1	0
Turtle (carapace)	5	1
Bird	0	2

Differences in the use of particular species are to be seen, as well as individual bone elements within the species. The sample, however, is small and further confirmation of these suggested differences is needed.

The description and classification of the use of deer phalanges (see p. 186), raised a question in our minds as to whether the roughly perforated phalanges were indeed artifacts. They have been so considered in Plains archaeological reports, usually in reference to bison phalanges, and the single report which raised the question as to the perforation being produced simply to extract marrow concluded that "it seems unlikely that the holes were made only to extract marrow (Hill & Kivett, 1940: 163)." A tabulation of all deer phalanges at the site revealed that many were burned and some split longitudinally and others transversely. The distribution was as follows:

	Neosho Focus	Inter-mediate	Wood-land	Disturbed/ Unassigned
Whole phalanges (unmodified) . .	32	3	1	14
Whole phalanges (burned)	3	0	0	6
Split longitudinally (unburned).	14	1	1	9
Split longitudinally (burned). .	0	0	0	1
Split transversely (unburned). .	9	3	2	8
Split transversely (burned). . .	1	0	1	0
Totals	59	7	5	17

Phalanges were clearly rarely used for the preparation of artifacts. They were, however, frequently split and since more cracked ones are found in unburned specimens this is not an accidental trait associated with tossing them into the fire. Since they are frequently broken, it may well be that the punching of rough holes in them could be associated with the attempt to break them, perhaps to obtain marrow.

The crux of our cultural analysis rests upon the preceding tabulated site inventory, in which the individual culture traits are assigned to specific complexes--Neosho Focus and Woodland respectively. A primary contribution of our study is this detailed description and assignment of traits to the two culture complexes. While the Neosho Focus has been previously described (Bell and Baerreis, 1951: 71-75), this description was necessarily a very general and tentative one in view of the absence of detailed studies of the sites at which the complex had been found. We are now in a position to be specific about its inventory, at least as represented in one component. A definitive statement as to the nature of the complex must, of course, be based upon a comparison of several components. Such a study is now being made by one of us (J. E. Freeman) and will shortly by available. Since a series of sites will provide a far sounder base for a consideration of the problems of the origin and relationships of the Neosho Focus, a discussion of this important question will also be deferred for the succeeding reports. The earlier Woodland component obviously presents but a small body of material as compared to that available at the main Hopewellian sites located at the mouth of Honey Creek (D1-33 and D1-49) upon which the presently available summary of this culture complex was made (Bell and Baerreis, 1951: 27-33) and with which the Woodland material from D1-47 is clearly affiliated. "Woodland" in the context of this report has reference to the local Hopewellian complex in Delaware County, Oklahoma. D1-47 has important information to add to that summary description of this culture also. Open sites such as D1-49 and D1-33 have extremely limited series of bone implements, in all probability due to soil conditions. Thus the Woodland component in the bluff shelter adds important data to our knowledge of the inventory of this culture complex which had not previously

been known.

In thus discussing the Woodland component at D1-47, we have by-passed a consideration of our collateral reasons for not regarding these lower levels of the shelter as essentially an Archaic occupation which through contact with Woodland peoples acquired a few pottery vessels in trade. In an earlier study (Baerreis, 1951) three sequent phases in the Archaic materials were defined. More recent evidence on this horizon is summarized in a later paper (Baerreis, 1959). If, as has been mentioned earlier in this report, there are suggestions of contact between the Woodland group and a second cultural complex manufacturing shell tempered pottery, we must clearly be concerned with a late manifestation of the Archaic. Several traits are characteristic of the late Archaic phase (Period C; see table VII, Baerreis, 1951: 63-64). One of the traits found in abundance in this late phase is a group of small projectile points, designated Type G. They do not occur in the lower levels of D1-47 attributed to the Woodland horizon. While other traits are also absent (e.g., the double bitted chipped stone axe), the small points are probably the primary bit of evidence since their absence could not be attributed to sample size.

The sheer enumeration of the traits of the two cultural complexes is not the main area of cultural interpretation to which we wish to devote major attention in this final interpretive section. The individual traits can be seen in the site inventory. We have devoted considerable space to a careful enumeration and description of all of the items recovered and preserved in the shelter. The question may well arise in the mind of the reader whether or not such a lengthy account of all of this material was worth the time and the space. We believe that it was, not simply for the purpose of creating a list of traits and identifying cultural complexes,

but in the more important objective of the archaeologist, the understanding of the nature and functional character of the sites and in the reconstruction of the life of the people who lived at the site.

We have taken particular pains to attempt to isolate two cultural samples, Neosho Focus and Woodland, so that we might use these samples to study the relative proportions of various functional categories of tools. For this purpose we can largely ignore the precise typological categories, as these types were extablished to aid in determining cultural relationships. Now we wish to turn our attention to the proportions of tools of different uses.

A convenient starting point is to be found in the projectile points, a numerically important element shared by both the Neosho Focus and the Woodland culture. For the Neosho Focus sample there is a total of 44 large projectile points of all kinds, the Woodland culture having by contrast a total of 21. To the Neosho Focus group, however, must also be added a total of 28 small projectile points. While this trait is confined to the Neosho Focus, the large and small projectile points must be grouped since both presumably reflect the extent or importance of hunting activities of the people. Thus the Neosho Focus has a total of 72 projectile points as opposed to 21 for the Woodland group. This provides us with a ratio of 1:3.4 against which we may evaluate the frequency of some of our other traits. If other functional categories have a generally similar ratio in the two cultural groups, we may assume they have an equally important functional role in both cultures since this difference in relative frequency would take into account the differences in the size of the sample for the two groups.

An interesting comparison may be immediately made with another item on the site inventory, the blade fragments. These fragments, consisting of

the tip or a section of the blade of large projectile points would perhaps appear to be of little utility in cultural analysis. Yet their distribution is such that 23 fragments were found in the Neosho Focus sample while only two were found in the Woodland sample, giving a comparable ratio of 1:11.5 which markedly deviates from the ratio of points in the two complexes. The contrast would be even more striking if it had been based on the proportion of large projectile points in the two culture complexes from which the fragments were derived. Such a difference must reflect differences in the character and pattern of occupation of the shelter by the two cultural groups. We have concluded that it is related to the functional activities which the two groups carried out at the site, an interpretation based on the proportional differences in the total assemblage of artifact materials from the two cultural complexes.

We may parenthetically remark that while direct comparison can be made between two components that take account of differences in sample size by comparing the ratios of the distinct tool categories, such a procedure obviously permits only the comparison of two components at one time. Where a larger number of components are to be compared, particularly in an attempt to see what the general economic pattern of a given cultural unit is, use might be made of an index number with the projectile points serving as a base. Such a procedure was suggested in connection with the analysis of the Archaic materials of this area (Baerreis, 1951: 94-95). Such a procedure should be of aid in evaluating and interpreting a series of components from the same group and in making comparison with other groups.

The Neosho Focus occupation at this site, as well as others currently being studied, would appear to reflect the varied and rounded activities of the group over the entire seasonal cycle. Not only is there evidence for

hunting activities (as seen in the total of 72 projectile points as well as in abundant bone refuse) but we also find scrapers (skin dressing); grinding basins, nutting stones and manos (flour production presumably both from agricultural activities and seed gathering); shaft smoothers, bone shaft straighteners, and grooved abraders (shaft preparation and bone implement manufacture); bone awls (basketry ? and sewing activities); bone beamers (skin dressing); antler and ulna flakers (stone implement manufacturing); antler drifts (skin preparation ?), etc. A substantial number of these categories are lacking in the Woodland sample and it would not seem that the absence of such a large number could be attributed to the smaller sample size. There are, for example, no grinding basins, nutting stones, or manos with two grinding faces in the Woodland zone. All of these implements are present in substantial numbers in the large Hopewellian villages. We would, therefore, interpret their absence as indicating that these activities (agriculture, seed gathering and flour preparation) were not carried out at D1-47. The presence of 12 scrapers in the Neosho Focus zone and 1 scraper in the Woodland zone similarly supports this striking difference in the two components, though again, scrapers are extremely common in the large Hopewellian villages on Honey Creek.

The contrast between the two components can be readily supported by considering additional traits and is presented in tabular form below. We may explain this difference by viewing, as indicated above, the Neosho Focus zone as representing debris from a primary settlement of these people. It would, considering the size of the site, represent the occupation by a family group and presumably the settlement pattern of the Neosho Focus consists of dispersed groups of families living for nearly the entire year as isolated groups. Since only a portion of the known industrial activities of the

Woodland (Hopewellian) peoples are present at D1-47, we suggest that this component is simply a hunting camp, occupied seasonally by the people. Thus the difference in proportion of blade fragments, previously considered, could well be due to the fact that the Hopewellian peoples did not return to the shelter each day (as did the Neosho Focus people) for tool manufacture and repair, discarding at the camp their broken tools. By considering this component as a hunting camp, we may also suggest that the relatively low number of potsherds here indicates that the pottery was not manufactured at the site, but rather was brought in from elsewhere.

Economic Activities in the Neosho Focus and Woodland Components, as Reflected by Artifact Frequency

	Neosho Focus	Woodland
Hunting:		
Projectile points	72	21
Seed preparation and utilization:		
Grinding basins	1	0
Manos and other grinding stones	11	1
Nutting stones	5	0
Skin dressing:		
Chipped stone scrapers	10	1
Beveled knives (?)	1	0
Bone beamer	5	0
Antler drifts	2	0
Sewing and/or basketry manufacturing:		
Bone awls	12	3
Tool fabrication:		
Antler flaking tools	17	2
Ulna flaking tools	9	1
Hammerstones	1	1
Shaft smoothers (sandstone)	4	0
Bone shaft straighteners	2	0
Grooved abraders	1	0
Food containers and cooking utensils:		
Pottery rim sherds	82	2
Pottery body sherds	583	14
Cutting tools:		
Chipped stone knives	6	10
Core knives	6	6
Core tools	2	2

The table indicating economic activities of the two components presented on the previous page obviously provides but a rough grouping of functional categories. Many tools may have multiple uses and the uses of some are uncertain. Shell scrapers, for example, might be listed, but what was being scraped? The shell scrapers are confined to the upper zones and are thus associated with Neosho Focus pottery, the only pottery manufactured at the site. This association plus the contour of the working edge of the scraper suggest that they may have been used in pottery manufacture, perhaps to smooth and shape vessels. Obviously, Hopewellian peoples made pottery, but in the light of our interpretation, not at this site. It is clear that the area of functional interpretation of tools is one to which more attention must be directed if we are to gain an understanding of how people lived in the past.

We have interpreted our comparative list as indicating that seed preparation and utilization, skin dressing, and tool fabrication was important to the Neosho Focus component but not in the Woodland component. Sewing activity was of nearly equal importance in the two components. Even if this is simply a Hopewellian hunting camp, the repair of skin moccasins was probably an activity that must have been carried on constantly. We may also note that cutting tools are more important in the Woodland component than in the Neosho Focus component. If the site was primarily a Hopewellian hunting camp, butchering and preparation of meat which would subsequently be carried to the main villages might be one of the most important activities carried on here.

In conclusion, it is perhaps well to reiterate that our comparisons of economic activities are not comparisons of the Neosho Focus culture and the Woodland culture but, rather, simply of two components. If we have correctly identified the Woodland component as simply a hunting station, we feel we have added a new dimension to the understanding of the pattern of land use of this people.

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APPENDIX 1. CHARRED PLANT MATERIAL FROM SITE D1-47 DELAWARE COUNTY, OKLAHOMA

JOHN T. CURTIS

In the course of the excavation of the bluff shelter, D1-47, described in the preceding pages, charred plant material was recovered at nine locations and preserved for laboratory identification. The nine locations refer to a specific square and four inch level, the excavation unit by which the deposit was removed. Although multiple fragments from a given plant species may be present at each of these individual square and level, they are tabulated as a single instance since they may well represent breakage of a single specimen. Material from a different square and level, however, is tabulated as a separate instance of the use of that particular plant species.

The individual charred specimens preserved were as follows:

135 - from square 1:6, level 5. C. 30 charred wood fragments, the largest being 43 x 40 x 25 mm. Red cedar.

342 - from square 2:3, level 11. 2 small pieces of charred wood, the larger being 29 x 23 x 10 mm. Black oak.

343 - from square 1:3, level 9. 2 small fragments of charred wood, the largest being 33 x 25 x 15 mm. Red cedar ?

348 - from square 2:1, level 9. 2 fragments of charred wood, the larger being 41 x 24 x 18 mm. Red cedar.

569 - from square 1:4, level 15. C. 24 small fragments of charred plant material, the largest being 26 x 12 x 11 mm. Includes acorns, and Iris tuber.

571 - from square 2:3, level 13. 5 fragments of charred wood, the largest being 60 x 39 x 25 mm. Hackberry.

572 - from square 1:4, level 13. C. 8 fragments of charred plant material, the largest being 41 x 25 x 21 mm. Hackberry and hickory nut.

573 - from square 1:4, level 13. Numerous small charcoal fragments (largely below 1 cm. in maximum size but with a few up to 20 mm. in maximum length) and ash. Large fragments are chestnut wood (Castanea ozarkansis ?)

640 - from square 2:3, level 8. Group of c. 400 charred acorns found in area two feet in diameter.

B1-1 - from square 4:2, level 13. Fragments of plaited mat associated with Burial 1. Fiber in plaited mat is Arundinaria. Loose fibers associated with mat, however, are non-identified bast fibers, as from basswood or other dicotyledon.

In the analysis of the cultural remains from the bluff shelter, it has been suggested that the shelter was occupied by two successive groups, Woodland and Neosho Focus. The earlier Woodland occupation is separated from the later Neosho Focus occupation by an Intermediate zone which is presumably culturally mixed. Some squares and levels are regarded as disturbed and hence cannot be assigned to any of the three zones. Taking the plant remains and assigning them to these same cultural zones so that the use of the plant material may be attributed to a specific group of people, results in the following table.

	Wood-land	Inter-mediate	Neosho Focus	Unclassified
Red cedar (Juniperus sp.)	-	-	3	-
Chestnut (Castanea ozarkansis ?).	-	-	-	1
Hackberry (Celtis occidentalis) .	1	-	-	1
Hickory nut (Carya sp.)	-	-	-	1
Black oak (Quercus velutina). . .	-	1	-	-
Acorns (Quercus sp.).	-	-	1	-
Iris tuber (Iris sp.)	-	-	-	1
Cane (Arundinaria macrosperma). .	-	-	1	-
Basswood (?) (Tilia sp.).	-	-	1	-

The data shows no significant change in vegetational composition during this time interval. Furthermore, on the basis of an obviously insufficient sample, there appears to be no significant difference from the vegetation found in the region at the time of European settlement. Except for red cedar, most of the species are those to be expected along the river and major streams.

APPENDIX 2. SKELETAL MATERIAL FROM D1-47

AARON ELKINS

D1-47 contains two burials. Burial No. 1 consists of at least seven, and possibly nine individuals, with nine the likely number. Burial No. 2 may consist of two individuals, but more probably of one. These remains are summarized in Table 1.

TABLE 1. SKELETONS FROM D1-47

BURIAL NO.	SEX	AGE	REMAINS
Burial No. 1			
B1-(1)	Male	About 30	Broken skull, postcranial fragments.
B1-(2)	Female	About 25	Relatively complete postcranial skeleton.
B1-(3)	Female	About 23	Broken skull with good face, teeth, postcranial fragments.
B1-(4)	Female	About 20	Relatively complete skull, teeth, fairly good postcranial material.
B1-(5)	Male	21-30	Half of calvareum, complete face, teeth, postcranial fragments.
B1-(6)	Unknown	7-9	Skull, teeth, postcranial material.
B1-(6)a	Male (?)	About 18 Months	Cranial fragments.
Burial No. 2			
B2	Unknown	About 1 year	Cranial, postcranial fragments.

One sack, labeled only B1- could not be classified. This included a patella, a fibula, a sternum, and vertebrae.

PROCEDURES

SEPARATION OF INDIVIDUALS

When received by the writer, this material was in about fifteen sacks, and labeled with the above numbers, except for B1-(6)a, which was not listed. Examination of the bones makes it apparent that there had been several errors in the previous separation of individual skeletons. (Field notes show that Burial No. 1 was compressed into a five by four foot space, and that Burial No. 2 was less than a foot distant, such conditions, of course, maximizing the likelihood of error in the field.) The sacks labeled B1-(2) actually contained the postcranial remains of a woman about 25 years old, and the cranium of a child from 7-9 years old. This cranium is believed to belong to B1-(6) on the following bases: likeness of texture of the cranium and the B1-(6) remains; complementation of bones and teeth (the cranium has some maxillary teeth); exclusion of all other possibilities, through age. Also believed to belong to B1-(6), on the same bases, are four partially formed teeth contained in a sack labeled only B1. All this material, then, is regarded as belonging to one individual, and is called B1-(6) throughout this paper. Another difficulty arose with the sacks that had been labeled B1-(6), since they contained parts of three individuals: 1) the child discussed immediately above; 2) the fragmentary skull and teeth of an infant; 3) three adult teeth. The number, B1-(6) was kept for the child, B1-(6)a was assigned to the infant, and the three teeth are presumed to belong to one of the other individuals. The final difficulty concerns the sacks labeled B2. One of these sacks contained an infant skeleton, the other, a pair (?) of adult femora. These femora have been assigned to B1-(2) for the following reasons: 1) the field notes have Burial No. 2 listed only as an infant; 2) the femora could not possibly belong to any skeleton other than B1-(2), and resemble that skeleton in color, texture, size, and coloring,

as well as fitting quite well into the B1-(2) acetabulae; 3) B1-(2)'s post-cranial skeleton is well-preserved, yet lacks any sign of femora; 4) substitution of B2 for B1-(2) seems a not too unlikely error in labeling. Throughout this paper, then, these femora are regarded as belonging to B1-(2).

DETERMINATION OF AGE AND SEX

Wherever possible, aging was accomplished by the use of the McKern and Stewart (1957) formulae based on the pubic symphysis. These formulae, though specifically derived from "young American males" seem by far the best method extant. In D1-47, the results of these formulae were in excellent agreement with long bone symphses, fair agreement with cranial suture closure, and were usually two to five years younger than results from the older Todd method of pubic symphyseal aging.

Sexes were determined through use of the standard criteria.

DETERMINATION OF STATURE

The formulae for Whites in Trotter and Gleser (1952) were utilized for determination of stature. Although once again not intended specifically for American Indians, this method appears to be the best available.

DESCRIPTION OF MATERIAL

GENERAL CONDITION

The remains of D1-47 are in moderately poor condition. All skeletons were extensively broken, and most were fragmentary. Even after reconstruction, none can be said to be in "good" condition. Only five long bone lengths could be measured, allowing stature estimates on three individuals.

DESCRIPTION OF INDIVIDUAL SKELETONS

B1-(1). Male, about 30 years old (pubic age 29.18). The right lambdoid suture, being open, is somewhat less advanced in age than is the pubic symphysis. The squamous sutures, as might be expected, are open.

The teeth are not notably worn for a member of a primitive population. The crown of the upper right first premolar is half-destroyed by

a cavity, and a periapical abscess is present in the alveolus of this tooth. A deep abscess affects the alveolus of the lower right second molar, and opens into the mandibular canal of this side, at the mental foramen. Both abscesses show evidences of still being in progress at time of death. The lower right second molar was either lost prior to death, or greatly loosened by the abscess, and lost post-mortem. The acetabular area of the left innominate bone of this skeleton is extensively remodeled. No trace remains of the normally deeply concave lunate surface of the acetabulum, but only a bumpy, fairly smooth, pin-holed area, slightly raised, along the superior border of the acetabular fossa. The acetabular fossa itself is thinned and very rough. Anything approaching normal acetabulofemoral articulation must have been impossible. There is also great antero-posterior narrowing of this region. A diameter taken from the notch below the anterior inferior iliac spine to the greater sciatic notch measures only 33 mm. (as compared to 49 mm. in the normal right innominate). The ishiopubic ramus and the superior pubic ramus are abnormally thinned. The sciatic notch is affected in such a way as to appear normal, but typically female. The pubis and posterior part of the iliac wing are normal (the anterior half of the ilium and the proximal part of the left femur are missing). The right innominate is completely normal.

B1-(2). Female, about 24 years old (pubic age 24.14). The skull is not present. No pathologies have been observed. The stature of this individual, as estimated from the femora, is 157 cm.

B1-(3). Female, about 23 years old (pubic age 22.49). All visible cranial sutures are open. The teeth which are present are generally quite worn. Upper right molars 1, 2, and 3 show, in that order, a marked cline from quite worn (almost to pulp chamber), to moderately worn, to barely worn (enamel complete). The six lower left distalmost teeth (possibly not the third molar)

have been lost ante mortem, as has the lower right second premolar. The alveolus of this premolar is abscessed, the lesion extending into the apical portion of the alveolus of the first molar. A periapical abscess exists at the site of the upper right first molar, and penetrates the inferior surface of the maxillary sinus, as well as the external surface of the maxilla. Five carious teeth can be observed: The upper right first molar has a small occlusal cavity (possibly the result of attrition), the upper right second and third molars show cavities in their adjacent surfaces, in the region of the neck, and distal cavities are apparent in the lower right first molar, and upper left second molar. Some osteoporosis in the area around bregma is the only non-dental pathology noted.

B1-(4). Female, 19-20 years old (pubic age 19.04). All cranial sutures are open. All teeth are fully erupted, the third molars recently (as shown by lack of wear). None of the teeth have been lost ante mortem, and no abscesses are present, but both upper first molars show occlusal caries, the lower left first molar has an advanced distal cavity from occlusal surface to neck, and the lower left third molar has a small buccal cavity (possibly, this may be an unusually cavernous, but non-pathological buccal fissure). The lower molars, particularly the third molars, are lingually inclined so that their occlusal surfaces face the nasal aperture. The upper third molars are inclined buccally, but to a lesser degree. Osteoporosis is present along the sagittal suture, and around the central halves of the lambdoid and coronal sutures. The basilar portion of the occipital bone possesses a pair of well-formed bilateral precondylar tubercles. Stature, calculated from the right femur, is 156 cm.

B1-(5). Male, age 21-30. All of the cranial sutures on the left are open, and the sagittal suture is open or slightly closed (the right half of the

cranium is not present). This individual shows the most extensive pathology of the group, both in teeth and bones. Except for the incisors, all of the upper teeth have been lost ante mortem, as has the lower left third molar (this last may never have erupted). Abscesses are numerous. A large one, involving the upper left canine and first premolar alveoli, extends to within 7 mm. of the pyriform aperture. The same alveoli on the right side of the maxilla are afflicted with a less extensive, but still large abscess. Old abscesses in the region of the upper first and third molars on the left can be seen, and it seems probable that the entire palate, posterior to the incisors, was abscessed, although absorption of the alveolar margin has progressed to a degree making this difficult to ascertain. In the mandible, a periapical abscess occurs in the alveolus of the carious right first molar. The external surface of the bone of the molar region of the left side of the mandible is extremely porous, the mental foramen is much enlarged, and the left lower first molar is extremely carious, these three facts suggesting an already present abscess which is not visible from the exterior. The left lower first premolar has a small occlusal cavity, and the proximal two-thirds of the crown of the first molar on this side is destroyed by caries. The lower right first premolar has a distal cavity. Wear on the lower molars is considerably more advanced on the left (occlusal enamel is completely worn off) than on the right (occlusal fissures are still visible), inferring that the efficacy of the right upper teeth was lost some time before that of the left. The left innominate bone is osteoporotic, and there is an especially large growth of spongy bone at the inferior, posterior corner of the left acetabulum. The area anterior to this is not present, nor is the acetabular area of the right innominate. The caudal two segments of the sacrum are missing, but the rest is extremely osteoporotic, the cortical bone being

completely destroyed along the anterior wall of the sacral canal. Other areas of less severe cortical destruction are numerous, particularly on the pelvic surface. This bone seems unusually broad, but this may not be pathological. A small exostotic area exists on the proximal part of the medial lip of the linea aspera of the left femur (the bone is broken here, and the area may be more extensive). The medial, proximal end of the shaft of the right fibula is considerably thickened transversely, increasing the transverse diameter of the upper 20 mm. of the shaft to a size equalling the transverse diameter of the head, which is normal. The anteromedial crest of this bone shows, about 55 mm. from the bone's distal end, a group of small exostoses covering about 10 mm. Unfortunately, this bone, too, is broken at the exostotic area, and the pathology may extend further distalward. The left fibula has a group of similar exostoses in the same area. This bone is whole, and the exostoses can be seen to extend to the articular facet for the talus, a distance of about 40 mm. Another group of exostoses, similar to those already mentioned, is present on the right tibia, along the lower part of the interosseous crest, and along its distal bifurcation, and in the groove between the bifurcating arms. The left tibia has the same manifestation at the same place, but the part of the bone at which the bifurcation of the crest takes place is missing. Along the interosseous crests of both tibiae, there are what seem to be slight, smooth overgrowths of bone, appearing as longitudinal spicules. It should be noted that only one scapular fragment is present (the infraspinous portion of the left), and this shows the characteristics usually associated with senility. No other bones appear to be senile in nature, with the possible exception of the bones in the postorbital portion of the left temporal fossa. These bones are "crinkled" in appearance, and may be somewhat thinned. Slight osteoporosis is present at

bregma and lambda. The stature of this individual, as calculated from the right humerus, is 162 cm.

B1-(6). Child, 7-9 years old, sex undetermined. The sutures in the left mastoid region are open endocranially, but appear to be in a stage of near-obliteration in their ectocranial aspects. These sutures are the posterior squamous, parietomastoid, and superior mastooccipital sutures. All other sutures are completely open. The left and right upper second deciduous molars have small cavities in the occluso-distal borders of their crowns, and the upper right first deciduous molar is affected by a more extensive cavity in the bucco-mesial corner of its crown.

B1-(6)a. Infant, about 18 months old, classified as a questionable male because of a pronounced bilaterality of the chin.

B-2. Infant, about 1 year old, sex undetermined.

SUMMARY

The small number and fragmentary nature of the population makes generalization difficult and tenuous. The following statements are meant to apply only to the eight individuals herein discussed, and any extension to the actual population of D1-47 must be in the nature of surmise.

HEALTH

The life expectancy of this group is rather low. One-third of the eight individuals are children or infants, and the rest are 30 or under. The outstanding pathology is dental caries, with its associated alveolar defects. Of the seven skeletons with observable jaws, all but the two infants have at least two carious teeth. Of the four observable adults, only the youngest, a 20 year old female, shows no indication of abscesses or teeth lost ante mortem, while the three others have at least two abscesses, and have lost at least two teeth prior to death.

Of non-dental pathologies, cranial osteoporosis is the most common, mildly manifesting itself in B1-(3), B1-(4), and B1-(5). Both males are affected with extensive and severe remodeling of the acetabular area of the innominate bone, and one of these has numerous wart-like exostoses on the long bones of the lower limb. A tendency towards premature suture closure may be present in B1-(6). Bilateral precondylar tubercles, more an anomaly than a pathology, appear in B1-(4), and complete the list of abnormalities.

GENERAL DESCRIPTION

The measurements in Tables 2 and 3 show these people to be small and slight, with females equalling or surpassing males in the majority of measurements, both cranial and postcranial. Stature has been estimated at 162 cm. for one male, and 156 cm. and 157 cm. for two females. No long bone has more than a moderate degree of muscular rugosity, and most are extremely gracile. Male bones are only slightly more rugged than the female. The presence of a well-developed gluteal tuberosity on every observable femur is interesting, since all other femoral muscle-markings are generally very slight. The sexual criteria of the cranium (mastoid processes, supra-orbital and occipital toruses, etc.) are only slightly more developed in the males than in the females, being generally moderate (in a slight-moderate-medium-large scale) in the former, slight in the latter. The masseteric borders of the malars are an exception to this, being quite rugged in the males, and slight or absent in the females. The nasal bones, preserved in one child, one female, and one adult, are medium in pronunciation, and of concavo-convex form, the convexity being slight.

Artificial cranial deformation, so often reported in this area, is not present in this group.

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Table 2. Cranial Measurements and Indices

	Measurements																					Indices			
	Glabello-occip. lgth.	Maximum width	Basion-bregma height	Minimum frontal diam.	Max. bizygomatic diam.	Basion-nasion length	Basion-prosthion length	Auricular height	Nasion-prosthion height	Nasal height	Nasal breadth	Orbital height, Left	Orbital height, Right	Orbital breadth, Left	Orbital breadth, Right	Biorbital breadth	Max. horizontal circum.	Frontal subtense	Condylosyphyseal length	Bigonial width	Bicondylar width	Min. breadth asc. ramus	Cranial index	Upper facial index	Nasal index	Orbital index
ADULT MALES																									
B1-(1)											23								97	86	111	31				
B1-(5)	175			90					65	50	22	36	36	40	40		520	22	104	89	117	33			44.0	90.0
Males, N	1	0	0	1	0	0	0	0	1	1	2	1	1	1	1	0	1	1	2	2	2	2	0	0	1	1
ADULT FEMALES																									
B1-(3)					127				68	48	22	35		42										53.5	45.8	83.3
B1-(4)	177	132	130	95	133	108	110	113	71	50	24	36	36	42	43	101	500		102	94	121	34	74.6	53.4	48.0	84.7
Females, N	1	1	1	1	2	1	1	1	2	2	2	2	1	2	1	1	1	0	1	1	1	1	1	1	1	1
CHILDREN																									
B1-(6) (7-9 yrs.)	164	128		87	99						17	33	34	37	37	84	456	23					78.1			90.5
Total	3	2	1	3	3	1	1	1	3	3	5	4	3	4	3	2	3	2	3	3	3	3	2	2	3	4

*Taken in mid-sagittal plane

Doubtful measurements are underscored

TABLE 3. POSTCRANIAL MEASUREMENTS

	FEMUR												TIBIA						HUMERUS									
	Max. length		Max. diam. head		Subtrochanteric diam.				Midshaft diam.				Max. length		Midshaft diam.				Max. length		Max. diam. head		Midshaft diam.				Epi-cond. diam.	
					A-P		Trans.		A-P		Trans.				A-P		Trans.						Major*		Minor*			
	R	L	R	L	R	L	R	L	R	L	R	L	R	L	R	L	R	L	R	L	R	L	R	L	R	L	R	L
ADULT MALES																												
B1-(1)					20		29		22		23										35						51	
B1-(5)									28	24	25	21			28	28	18	19	299		39		20		18			
ADULT FEMALES																												
B1-(2)	417	420	41	41	22	23	30	30	26	25	25	25		359	29	29	19								18		52	
B1-(3)					20		28		25	25	23	23			26		19											
B1-(4)	411		41		22		30		23		24																	

Doubtful measurements are underscored

* As defined in Hrdlicka, 1947, p. 168

TABLE 4. DISCRETE TRAITS

	Tympanic Plate								Superior sagittal sinus	Parietal foramina		Supra-orbital foramina		Supra-orbital notches		Mylo-hyoid arches		Enamel extensions on molar teeth
	Dehiscences		Marginal foramina		Transverse slits		Auditory exostoses											
	R	L	R	L	R	L	R	L		R	L	R	L	R	L	R	L	
ADULT MALES																		
Bl-(1)	A	A	A	A	P	P							P			A	A	10/10
Bl-(5)		A		A		A		A			A	A	A	P	P	P	P	5/5
ADULT FEMALES																		
Bl-(3)	P	P	A	A	A	A	A	A					A		P			7/8
Bl-(4)	A	A	A	A	P	P	A	A		A	A	A	A	P	P	A	A	12/12
CHILDREN																		
Bl-(6) (7-9 yrs.)	P	P	A	A	A	A	A	A	R	P	A	P	A	A	P	A		1/2
NUMBER OF OBSERVATIONS	4	5	4	5	4	5	3	4	1	2	3	3	5	3	4	4	3	
NUMBER PRESENT	2	2	0	0	2	2	0	0		1	0	1	1	2	4	1	1	

Blank space = observation impossible.
P = present, A = absent.
R, L = right, left.
(Superior sagittal sinus) R = sinus turns to right at cruciate eminence.
(Enamel extensions) 10/10 = out of ten observable molars, all ten have extensions, etc.