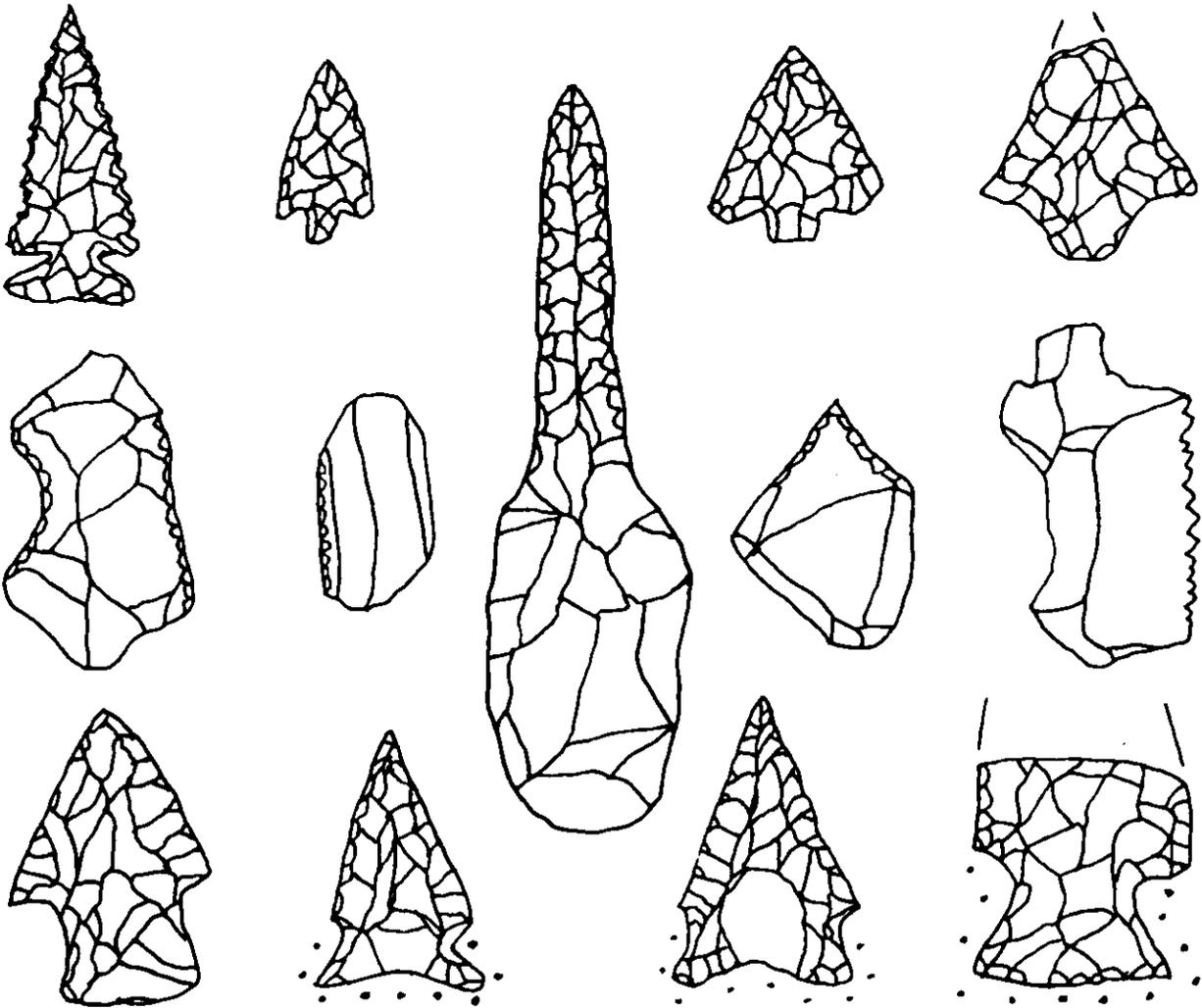




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Artifacts from Sites 41HR794, 41HR795, and 41HR796

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Prehistoric Sites 41HR792, 41HR793, and 41HR794, Harris Co., Texas

Leland W. Patterson and Jimmy R. Kirk

Introduction

This paper summarizes artifacts found on the surfaces of sites 41HR792, 41HR793, and 41HR794 in Harris County, Texas. These sites were discovered and reported for state records of the Texas Archeological Research Laboratory by Jim Kirk. All of these sites are located along a creek in northern Harris County. Most sites of inland Southeast Texas are located near a stream or lake.

These are all multicomponent sites with various time periods represented by artifact types. The sites are campsites used by nomadic hunter-gatherers. The artifact types from these sites are typical of types found in Southeast Texas. Surface collections are an important part of the archeological data base of this region.

SITE 41HR792

41HR792 Projectile Points

Projectile points found at site 41HR792 are summarized in Table 1 and illustrated in Figures 1 and 2. An Early Side-Notched point, a San Patrice point, and a San Patrice preform represent the Late Paleo-Indian period (8000-5000 B.C.). No projectile point types were found that would represent the next time periods, Early Archaic (5000-3000 B.C.) and Middle Archaic (3000-1500 B.C.). Three Gary dart points and a Kent point manufacturing failure possibly represent the Late Archaic (1500 B.C.-A.D. 100) and Early Ceramic (A.D. 100-600) periods, although some Gary and Kent points also occur in the Middle Archaic and Late Prehistoric (A.D. 600-1500) periods (Patterson 1995: Table 3). Gary and Kent points are most numerous in the Late Archaic and Early Ceramic periods. These point types tend to be larger in the Archaic period than in the later Early Ceramic and Late Prehistoric periods (Patterson 1980). A Scallorn arrow point and an arrow point fragment are from the Late Prehistoric period. Three dart point preforms and an unclassified dart point fragment were also found. One of the preforms (Figure 2B) is made of Georgetown type chert from the Edwards Plateau. One Gary point is made of fine-grain quartzite, and all other points are made of local types of chert that can be found in the Brazos and Colorado River valleys. A unifacial arrow point (Figure 2K) could be from the Late Archaic, Early Ceramic, or Late Prehistoric time period (Patterson 1992).

41HR792 Ceramics

Ceramics found at this site include 39 Goose Creek Plain and 11 O'Neal Plain, variety Conway sherds. O'Neal Plain has coarse sand temper. O'Neal Plain occurs only in the Early Ceramic period in Aten's (1983: Figure 14.1) ceramic type sequence for the Galveston Bay area. Goose Creek Plain pottery is not time-diagnostic for a single time period.

41HR792 Chronological Summary

Site 41HR792 has a long occupation sequence from the Late Paleo-Indian period through the Late Prehistoric Period. However, there appears to be a gap in the occupation sequence in the

Early and Middle Archaic periods. It is not certain whether this temporal gap is actual or simply due to incomplete data from the surface collection. It is more common for sites in this region with long occupation sequences to have all time periods in the sequence represented.

41HR792 General Lithics

Stone tools found at this site are shown in Figures 2 and 3. A large bifacial drill (Figure 2A) may be from the Archaic period (Turner and Hester 1993:270). Unifacial tools include a combination scraper/notched tool, 4 scrapers, 2 denticulates, and 3 graters.

Some unmodified flakes have edge wear patterns from cutting and scraping (Tringham et al. 1974). There are 2 flakes with cutting edge wear, 2 flakes with scraping edge wear, and a prismatic blade (Figure 3D) with scraping edge wear.

There are several indications that lithic manufacturing was being done here, including dart point preforms, lithic flakes, 2 quartzite hammerstones, 10 thick chert pieces, 5 petrified wood pieces, a biface fragment, a chert cobble fragment, and 3 miscellaneous chert cores (Figure 3E,F,G). The unfinished Kent point (Figure 1I) and a large preform (Figure 1J) have bifacial thinning failures (thick areas).

There are 72 chert flakes and 1 fine-grain quartzite flake in this collection. Size distribution for the chert flakes is given in Table 2. For flakes of sizes over 15 mm square, there are 3.7% primary flakes (covered with cortex), 25.9% secondary flakes (partially covered with cortex), and 70.4% interior flakes (no remaining cortex). The high percentage of flakes without remaining cortex indicates that primary reduction of chert cobbles was done at lithic sources rather than at this site. Lithic materials were brought to this site as flake blanks for dart point manufacture, and as small cores for other manufacturing use. Primary reduction of chert cobbles at the source reduces weight and volume for transport to remote campsites. Heat treatment of chert was done, as indicated by waxy luster or reddish coloration on many specimens.

SITE 41HR793

41HR793 Projectile Points

Projectile points from this site are summarized in Table 3 and illustrated in Figure 4. A San Patrice point is from the Late Paleo-Indian period. There are no point types from the next time periods, Early and Middle Archaic. Four Gary and 2 Kent dart points possibly span the Late Archaic, Early Ceramic, and perhaps the Late Prehistoric periods. The Late Prehistoric period is represented by an Alba arrow point, a Catahoula arrow point, and an arrow point preform. Four dart point preform fragments were found, with two illustrated in Figure 4H,L. All projectile point specimens are made of chert.

41HR793 Ceramics

There were 84 Goose Creek Plain sherds found, with one specimen being a rim sherd. Ten O'Neal Plain, variety Conway sherds were found, with one specimen having a drilled lace hole for vessel repair. As noted above for site 41HR792, O'Neal Plain pottery is from the Early Ceramic period, and Goose Creek Plain pottery is not diagnostic for a single time period.

41HR793 Chronological Summary

Site 41HR793 has evidence of occupations in the Late Paleo-Indian, Late Archaic, Early Ceramic, and Late Prehistoric periods. No artifact types were found that would indicate occupations in the Early and Middle Archaic periods. As with site 41HR792, there may be a temporal gap in the occupation sequence, or the data may be too incomplete to show the entire occupation sequence.

41HR793 General Lithics

Unifacial stone tools found at this site are illustrated in Figure 5, including 4 scrapers and 2 gravers. Six quartzite hammerstone fragments were found. A total of 274 chert flakes were found. Size distribution of chert flakes is given in Table 4. For flakes larger than 15 mm square, there are 5.1% primary flakes, 29.7% secondary flakes, and 65.2% interior flakes. The high percentage of interior flakes (with no remaining cortex) indicates that primary reduction of chert cobbles was done at lithic sources. No chert cores were found. It appears that most lithic raw materials were brought to this site in the form of flake blanks. Heat treatment of chert is indicated by waxy luster or reddish coloration on many specimens.

Other Items from 41HR793

A small piece of shell with a drilled hole (Figure 5G) may be a bead or a fragment of a shell pendant. Six large pieces of caliche from this site may represent heating elements for use in an earth oven.

SITE 41HR794

41HR794 Projectile Points

Projectile points from site 41HR794 are summarized in Table 5 and illustrated in Figure 6. The collection includes an unfinished Kent point, a Yarbrough point, a Palmillas point, and a dart point preform. The unfinished Kent point is made of petrified wood, and other specimens are of chert. All of these dart point types were used in both the Late Archaic and Early Ceramic periods (Patterson 1995: Table 3). These two time periods are possibly represented at this site.

41HR794 Ceramics

Thirteen Goose Creek Plain sherds were found at this site, including a notched rim sherd (Figure 6H). Because no arrow points were found to represent the Late Prehistoric period, it is judged that this pottery is from the Early Ceramic period.

41HR794 General Lithics

Lithic tools from this site include 2 scrapers and a very large bifacial drill, illustrated in Figure 6. The length of the drill is 100 mm. Chert to make this drill came from the Colorado River, because closer sources of chert do not have cobbles large enough to make a biface this long. Very large bifacial drills are not common in Southeast Texas. The lithic assemblage from this site includes a modest-size collection of 48 chert flakes. Three quartzite hammerstones and eight sandstone abraders were also found. The sandstone abraders are all well used.

Summary

This paper has presented details of surface collections from three prehistoric sites in northern Harris County. The artifact types from these sites are typical of types found at sites in Southeast Texas. All of these sites have multicomponent occupations, which is common in Southeast Texas (Patterson 1995:245). The reuse of sites may indicate scheduling in seasonal subsistence rounds (Patterson 1995:245). The published archeological data base for Southeast Texas continues to grow.

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Table 1. 41HR792 Projectile Points

type	dimensions, mm			Figure
	L	W	T	
Early Side-Notched		28.1	7.7	1A
San Patrice	33.7	23.0	5.4	1B
San Patrice preform	42.2	23.7	5.9	1C
Scallorn	39.6	16.4	3.2	1D
Gary		24.7	6.3	1E
Gary		28.2	6.2	1F
Gary		21.1	7.2	1G
preform	33.8	18.5	10.0	1H
Kent failure	57.3	23.3	10.8	1I
preform	104.0	32.7	13.9	1J
arrow point frag.			3.6	
dart point frag.		15.7	6.2	
preform fragment		37.1	7.6	2B
unifacial arrow pt.	19.1	17.1	2.6	2K

Table 2. 41HR792 Flake Size Distribution

size, mm square	no.	%
under 15	18	25.0
15-20	26	36.1
20-25	9	12.5
25-30	11	15.3
30-35	6	8.3
40-50	2	2.8
	<u>72</u>	<u>100.0</u>

Table 3. 41HR793 Projectile Points

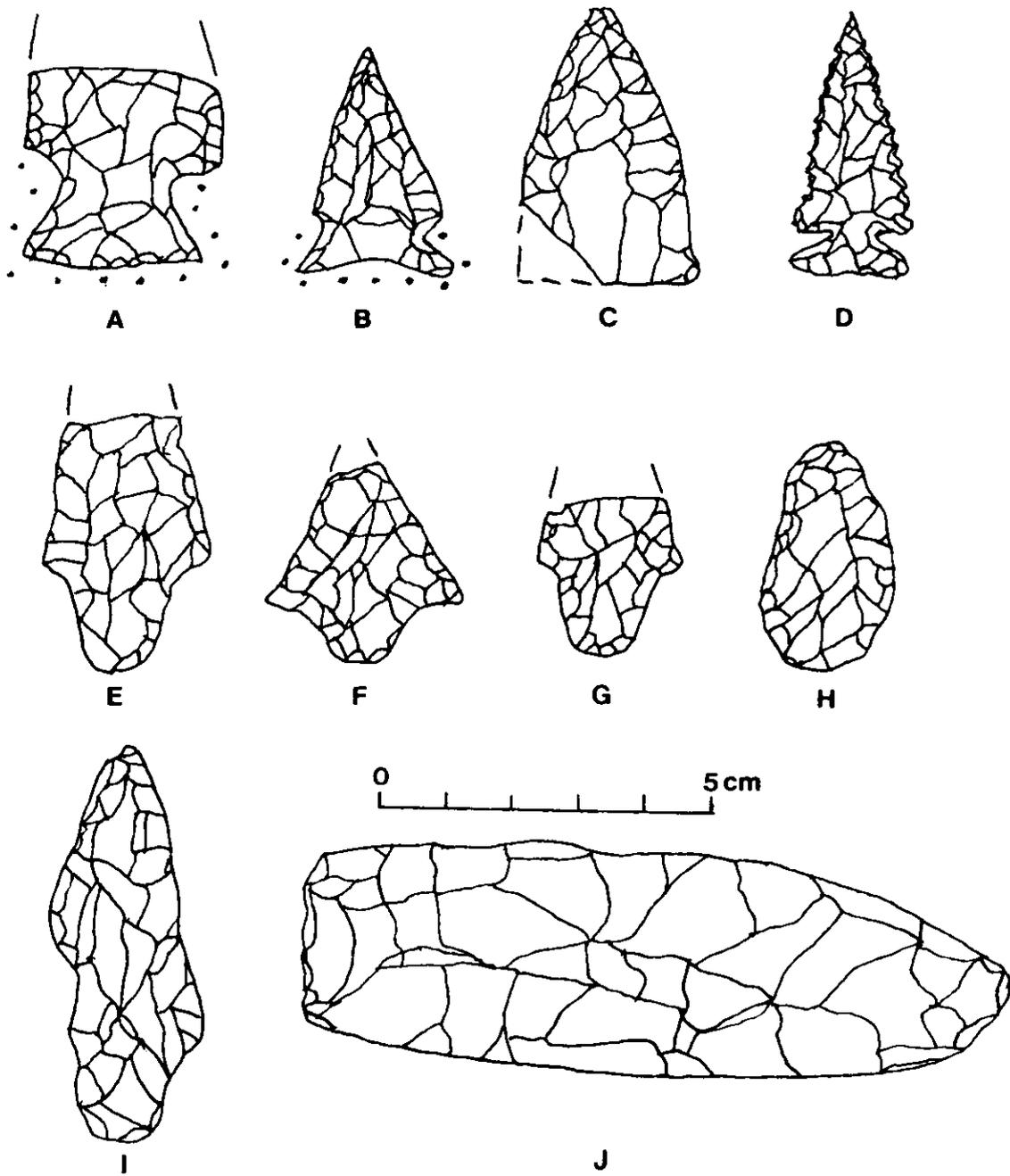
type	dimensions, mm			Figure
	L	W	T	
San Patrice	38.0	24.8	5.8	4A
Gary	44.6	26.3	5.7	4B
Gary	34.9	20.7	8.1	4D
Gary	40.1	20.0	7.1	4E
Gary	33.4	19.1	6.9	4C
Kent	39.1	22.3	7.4	4F
Kent	36.5	20.6	6.1	4G
Catahoula	25.0	22.8	2.8	4K
Alba	23.0	12.7	2.6	4I
arrow pt. preform		17.5	4.2	4J
preform fragment				4H
preform fragment				4L

Table 4. 41HR793 Flake Size Distribution

size, mm square	no.	%
under 15	136	49.6
15-20	92	33.6
20-25	27	9.9
25-30	11	4.0
30-35	6	2.2
50-60	2	0.7
	<u>274</u>	<u>100.0</u>

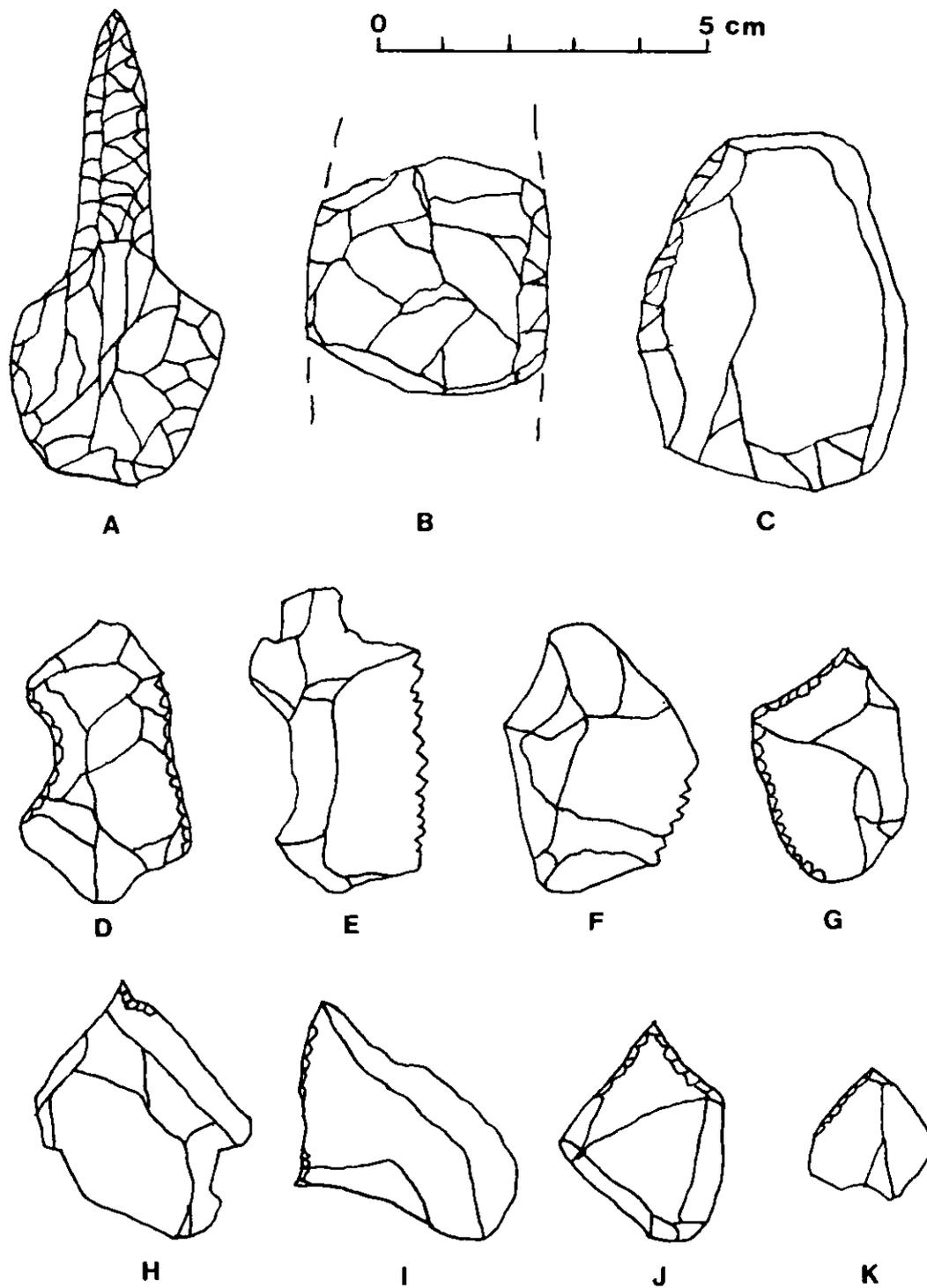
Table 5. 41HR794 Projectile Points

type	dimensions, mm			Figure
	L	W	T	
unfinished Kent		27.6	6.6	6A
Yarbrough	37.9	26.8	9.2	6B
Palmillas			7.9	6C
preform		22.4	9.1	6E



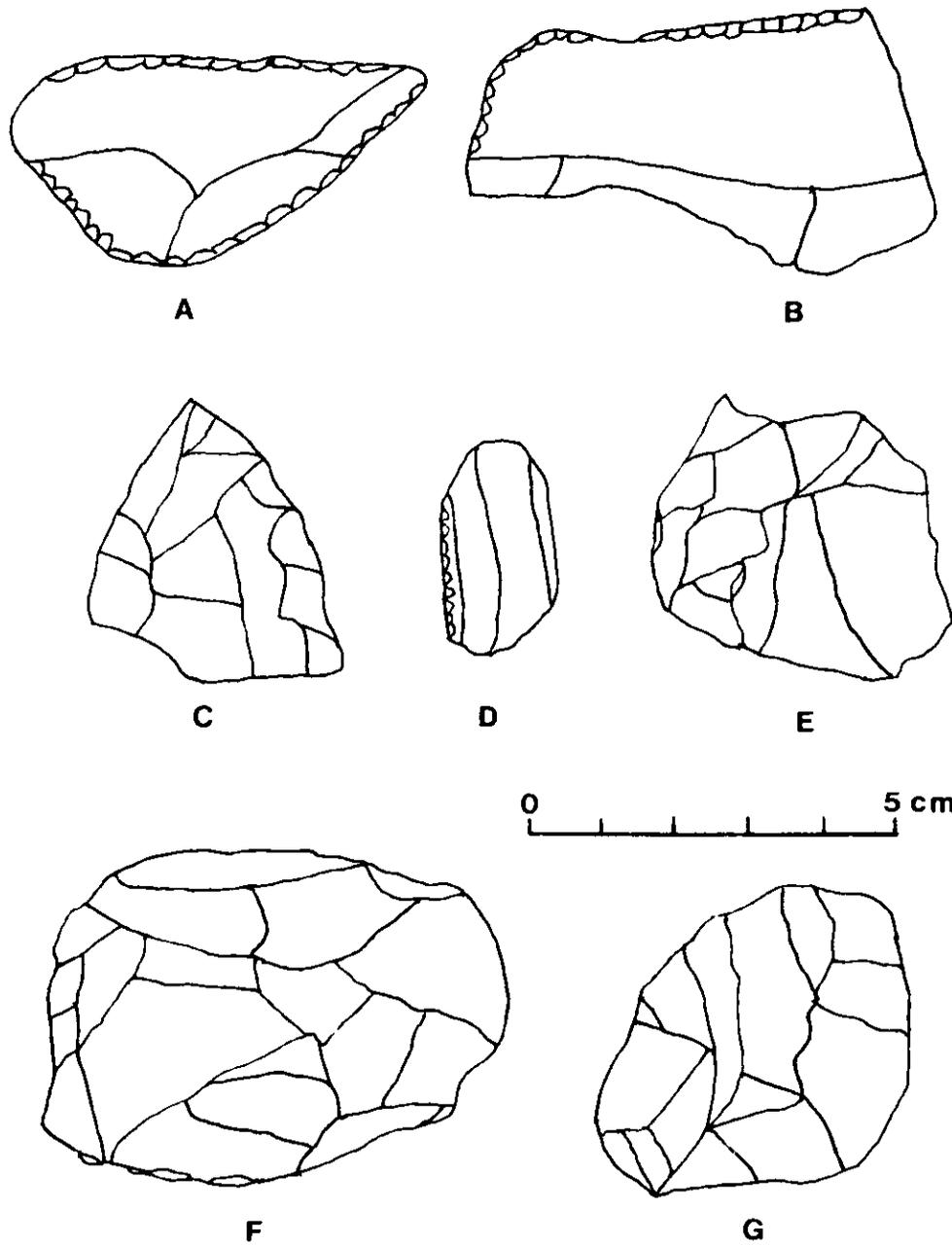
A - Early Side-Notched; B - San Patrice; C - San Patrice preform; D - Scallorn;
 E,F,G - Gary; H,J - preforms; I - Kent failure; dots show ground edges

Figure 1. 41HR792 Projectile Points



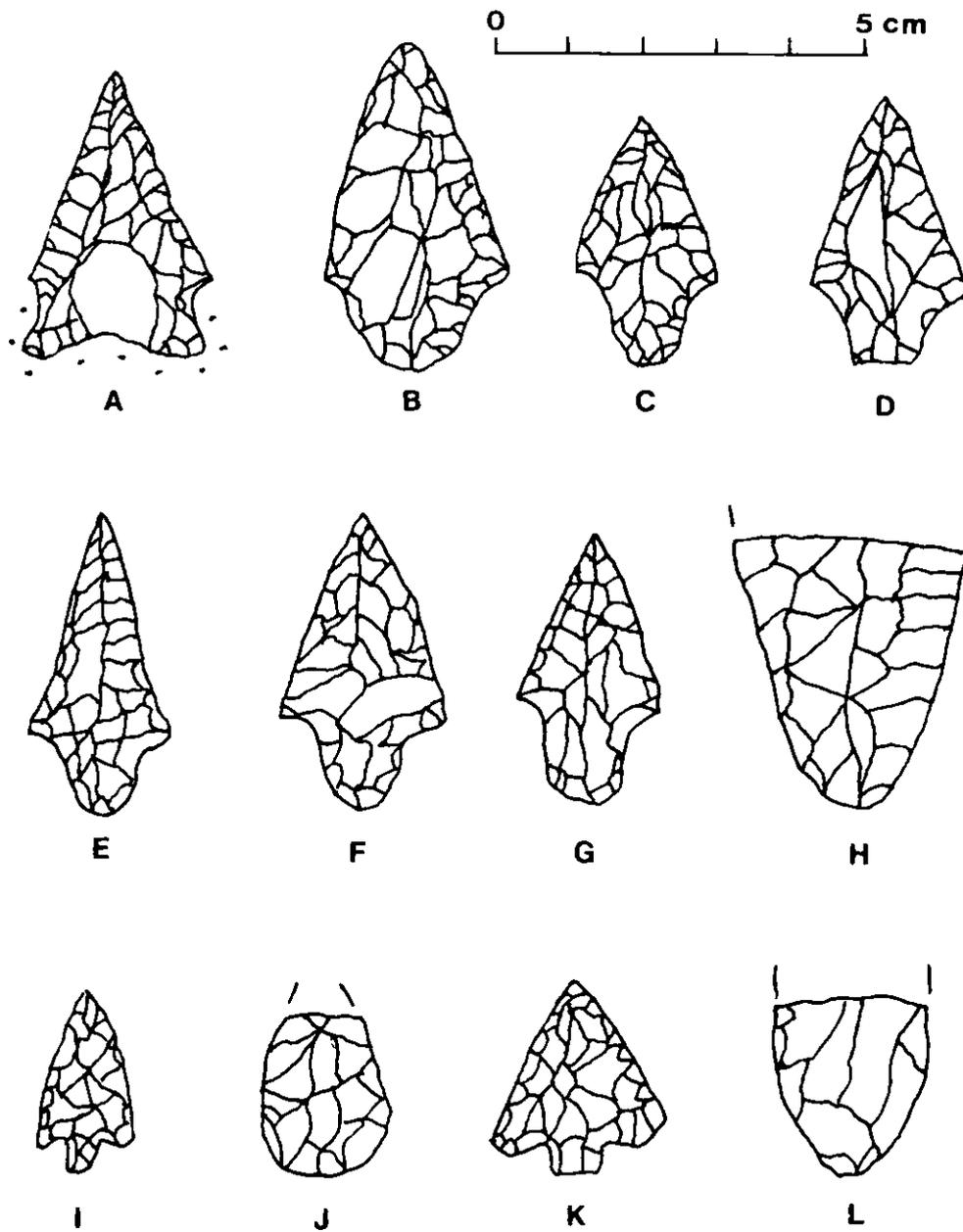
A - bifacial drill; B - preform fragment; C,G - scrapers;
 D - scraper/notched tool; E,F - denticulates; H,I,J - graters;
 K - unifacial arrow point

Figure 2. 41HR792 Lithic Artifacts



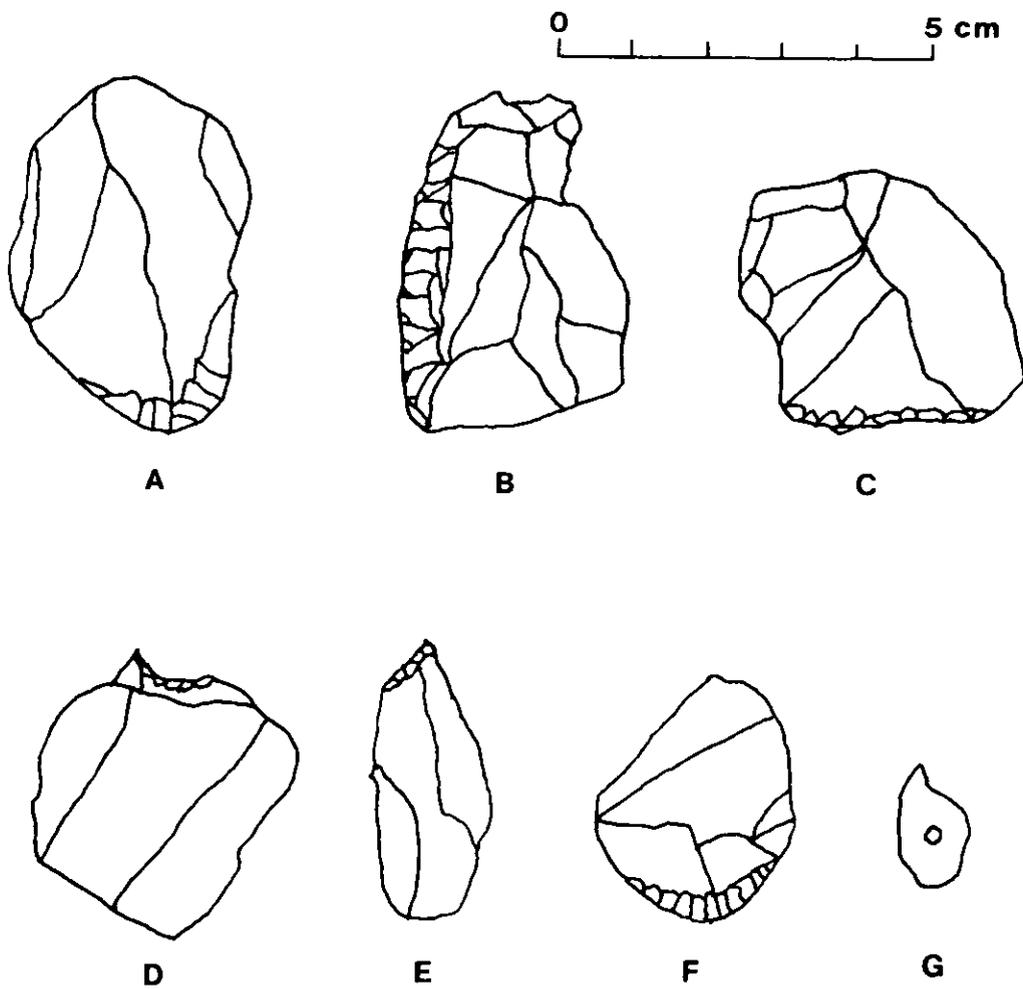
A,B – scrapers; C – biface fragment; D – prismatic blade; E,F,G – cores

Figure 3. 41HR792 Lithic Cores and Tools



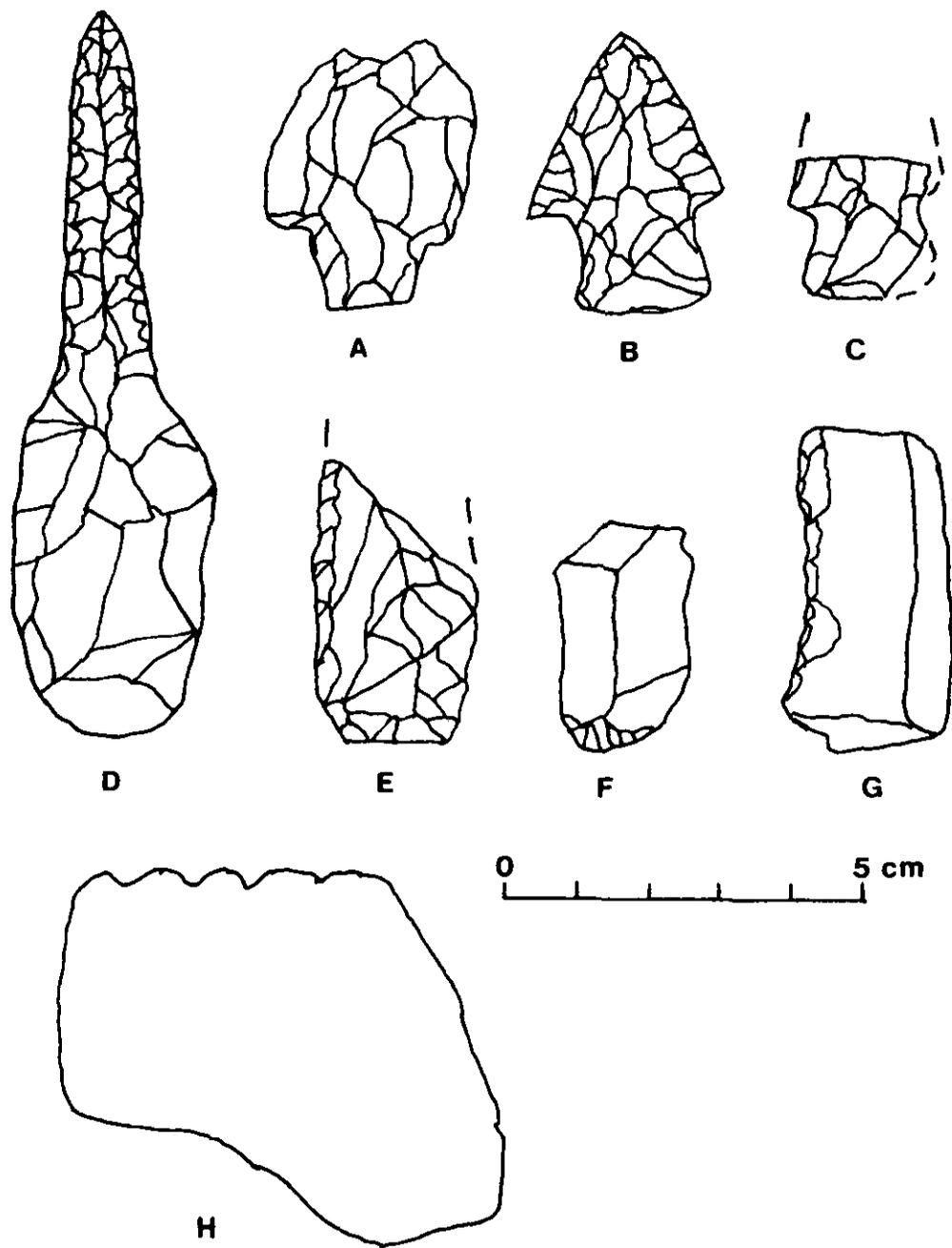
A - San Patrice; B to E - Gary; F,G - Kent; H,L - dart point preforms; I - Alba; J - arrow point preform; K - Catahoula; dots show ground edges

Figure 4. 41HR793 Projectile Points



A,B,C,F - scrapers; D,E - graters; G - shell bead

Figure 5. 41HR793 Artifacts



A - unfinished Kent point; B - Yarbrough point; C - Palmillas point;
 D - bifacial drill; E - preform; F,G - scrapers; H - notched rim sherd

Figure 6. 41HR794 Artifacts

Classification of Goose Creek and O'Neal Plain Pottery in Southeast Texas

Leland W. Patterson

Introduction

Aten has classified Goose Creek pottery (Aten 1983:231) as an untempered type having a paste that contains fine sand, and O'Neal Plain, variety Conway pottery (Aten 1983:239) as a tempered type where medium to coarse sand has been added as temper. Aten, however, did not give sand grain size ranges to define fine sand and coarse sand. In distinguishing between Goose Creek and O'Neal Plain pottery there is also a problem in determining if sand in O'Neal Plain has been added as temper or occurs naturally in the clay. Goose Creek pottery occurs in the Early Ceramic (A.D. 100-600), Late Prehistoric (A.D. 600-1500), and Proto-Historic (A.D. 1500-1700) time periods, but O'Neal Plain, variety Conway pottery occurs only in the Early Ceramic period in the Galveston Bay area (Aten 1983: Figure 14.1). Excavations at site 41HR315 (Patterson 1980) show that O'Neal Plain pottery also occurs in the inland part of Southeast Texas in the Early Ceramic period. This article discusses various aspects of the classification of Goose Creek and O'Neal Plain pottery.

Sand Grain Size Classification

The Wentworth grain-size classification method is a standard series of grain-size ranges for sediments that may be used to classify sand grain size (Waters 1992: Table 2.1). The Wentworth grain-size series is shown in Table 1. Sand grain size classification in pottery may be done either by direct measurement, using an optical comparator with a reticle that has a scale in millimeters, or by comparison with sand samples that have been sorted by grain size. For this study, I used an optical comparator with 7-power magnification, and a sand-gauge card obtained from Forestry Suppliers. The sand-gauge card has actual sand grains of various size ranges embedded in the card.

Samples of pottery from site 41CH290 (Patterson and Ebersole 1992) were used to measure sand grain sizes in pottery that had already been classified as Goose Creek or O'Neal Plain. Use of both an optical comparator and a sand-gauge card showed that most sand grains in Goose Creek pottery were of the fine sand size range (1/8-1/4 mm), and that most sand grains in O'Neal Plain pottery were of the coarse sand size range (1/2-1 mm). Few sand grains were found of the intermediate medium sand range (1/4-1/2 mm). Previous examination of sand grain size in Goose Creek and O'Neal Plain sherds from site 41HR184 (Patterson 1996) gave the same conclusion as for sherds from 41CH290. It appears that Aten (1983) probably used the Wentworth scale for sand grain size classification, although this was not explicitly stated.

It was also noted that an experienced analyst can identify fine sand and coarse sand with use of only a 10-power magnifier in a precise enough manner to distinguish between Goose Creek and O'Neal Plain pottery. With 10-power magnification, the grains of fine sand still appear to be small, and the grains of coarse sand appear much larger. Because sand grains are embedded in the clay matrix of pottery, care should be taken in determining that whole grains are being observed.

Identification of Goose Creek and O'Neal Plain Pottery

As noted above, Aten (1983) has classified Goose Creek pottery as being untempered, with fine sand grains being natural to the clay. O'Neal Plain pottery is classified as having coarse sand intentionally added as temper. The classification of O'Neal Plain can give a problem, because clay

Table 1. Wentworth Grain-Size Classification for Sand

size class	size range, mm
silt	less than 1/16
very fine sand	1/16-1/8
fine sand	1/8-1/4
medium sand	1/4-1/2
coarse sand	1/2-1
very coarse sand	1-2

at some locations can have naturally occurring coarse sand. When coarse sand occurs naturally in clay, pottery should be classified as Goose Creek because sand has not been added as a temper.

Site 41WH72 (Patterson et al. 1995:4) is an example where pottery was made from clay with coarse sand as a natural component. At this site, all pottery from both the Early Ceramic and Late Prehistoric periods contains coarse sand, and fired clayballs from this site also contain coarse sand. The coarse sand appears to be a natural component of the clay used to make these artifact types at this site, because there would be no reason to add coarse sand temper for fired clayballs. This does not fit Aten's (1983: Figure 14.1) pattern of O'Neal Plain being a type that occurs only in the Early Ceramic period. If pottery from both the Early Ceramic and Late Prehistoric periods contains coarse sand, the classification of this pottery as O'Neal Plain is questionable.

It may not be common for clay from sources in Southeast Texas to have coarse sand as a natural component. Otherwise, there would be many sites having pottery from the Late Prehistoric period that contains coarse sand, which does not seem to be the case.

Sources of Coarse Sand

It is somewhat surprising that the sand grain size range of O'Neal Plain pottery conforms to the narrow classification range of coarse sand (1/2-1 mm). Where would Indians have been able to obtain sand that was sorted into this single grain-size range? Possible methods of obtaining coarse sand might be considered. One source of coarse sand would be from beach or stream bank locations where wave or alluvial action of water has sorted sand into zones with narrow ranges of sand grain sizes. Another possibility is that Indians used a mechanical method for sorting sand grain sizes. This can be done by placing sand on a flat surface, such as a deer hide, and then shaking the surface with a swirling action, similar to panning for gold. This swirling action places heavier sand grains in an outside band around the main sand mass. It may not be possible to determine exactly how Indians selectively obtained coarse sand of a narrow size range for use as temper in O'Neal Plain pottery.

Summary

This article has discussed various aspects of sand grain size in Goose Creek and O'Neal Plain, variety Conway pottery types. Use of several methods to determine sand grain size all seem to give satisfactory results for classification of these two pottery types. Because O'Neal Plain is defined as having coarse sand added as temper, analysis of this pottery type should include the consideration that clay at some locations has coarse sand as a natural component.

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Manufacturing Variation of Gary and Kent Dart Points

Leland W. Patterson

Introduction

Gary and Kent dart point types are common in East Texas and Louisiana (Turner and Hester 1993:123,136). Gary points occur as far east as Alabama and as far north as Illinois and Indiana (Justice 1987: Map 81). I tend to regard Gary and Kent point types as a single technological series, because of overlapping attributes and because of the high frequency at which these two point types are found together (Patterson 1990). Gary points have contracting stems and Kent points have straight stems, but stem shapes for these two point types often grade into each other. Both point types have triangular bodies, indistinct, squared shoulders, and a wide range of variation of attributes.

This article discusses manufacturing variation as a major cause of overlapping in the attributes of Gary and Kent points, which can override the intent to produce these two point types as distinctive formal styles. Also, variation within the Gary point type can be considered as strongly influenced by manufacturing variation. Some investigators, such as Hall (1981) and Johnson (1961), have attempted to define subtypes for the Gary point. Much of the variation in Gary point attributes appears to be manufacturing variation, however, which does not support the use of Gary subtypes.

There are several other point types in Texas that could be subsumed under the Gary-Kent series classification, due to overlapping attributes, with much of the variation in morphology possibly caused by manufacturing variation. Point types in Texas that are similar to the Gary-Kent series include Dallas (Turner and Hester 1993:98), Woden (Turner and Hester 1993:196), Dawson (Turner and Hester 1993:102), and the straight stem variety of Neches River (Turner and Hester 1993:163). These point types occur within the geographic range of Gary and Kent points.

Important factors in manufacturing variation are skill of the knapper, morphology of starting flake blanks, quality of raw material, variable effects of heat treatment of chert, and type of percussor used for flaking.

Twelve Gary point replicates made by the author from Central Texas cherts are used here as examples of manufacturing variation by a single knapper.

Effects of Material Quality

In Southeast Texas, dart points are most commonly made of chert and sometimes of petrified wood. Petrified wood is often a course-grained material which gives finished dart points a cruder appearance than those made of chert.

Toughness of raw material is a major factor in control of bifacial reduction during the manufacture of dart points. Longer flakes can be removed from materials that are more easily worked, to achieve a higher width-to-thickness ratio for bifaces. There can be a wide variation in the toughness of different chert types, even from a single source area. There can also be variation in toughness within a single piece of chert, which may affect manufacturing results. The most difficult type of variation in toughness to overcome in bifacial reduction is a very localized hard spot. Hard spots that resist flaking by soft percussors can often be removed with a small, hard hammerstone, but sometimes with a reduction in width of the finished biface.

Effect of Heat Treatment of Chert

Heat treatment of chert can result in a significant reduction in tensile strength; this improves workability and reduces toughness. Heat treatment of some types of chert can reduce tensile strength about 40% (Patterson 1981; Purdy 1974). Heat treatment can give variable results, however, in the reduction of tensile strength. Rick (1978: Table 12) shows a range of reduction in tensile strength of 11% to 55% for heat treatment of cherts from Illinois. Therefore, the knapping quality of chert can be variable, with or without heat treatment.

Heat treatment of chert sometimes causes thermal damage (Patterson 1995). However, if severe thermal damage is confined to one area of the flake blank, it is often possible to produce a good projectile point by trimming off the most damaged area. Trimming of the flake blank reduces the size and alters the shape of the flake blank, resulting in variation in the finished projectile point.

Effects of Flaking Tool Types

Bifacial reduction of lithic materials in the production of dart points is done by percussion flaking. Final finishing of a bifacial preform is then done by pressure flaking, which gives fine control of flaking, but allows removal of only small-size flakes. Tools used for percussion flaking are usually classified by hardness, including hard hammerstones such as quartzite, soft hammerstones such as silicified limestone, and soft billets made of antler. In general, the best bifacial thinning can be done with antler billets, followed by soft hammerstones and hard hammerstones in order of preference (Callahan 1979:15). Soft percussors produce longer, thinner flakes.

Effects of Flake Blank Morphology

The starting raw material piece in the production of a bifacial dart point is generally a flake blank. Flake blanks in Southeast Texas were produced by primary reduction of chert cobbles or pieces of petrified wood. Less commonly, bifaces were produced by direct reduction of thin, flat cobbles.

The morphology of a flake blank is the most important factor in the morphology of the finished projectile point. Size and shape of the starting flake blank set limitations on length, width, thickness, and cross-sectional shape of the finished projectile point. The width-to-thickness ratio of the flake blank limits the width-to-thickness ratio of the finished bifacial point. Flake blanks have convex dorsal surfaces and flat ventral surfaces. In the production of a symmetrical biface, flake blanks with more convex dorsal surfaces require more thinning to achieve a uniform cross section for the biface. This process is often complicated when the flake blank has one thick lateral edge and one thin lateral edge, which affects the morphology of the finished biface.

Replication of Gary Points

Twelve Gary point replicates made by the author are illustrated in Figure 1, and dimensions of each specimen are tabulated in Table 1. Stem width is given as the maximum width on the contracting stem. Most variations in length, width, thickness, blade shape, and stem shape are due to variations in morphology and knapping quality of each starting flake blank. As may be seen in Table 1, the ratio of point width to stem width shows that stem width follows point width in a fairly predictable manner. Specimens I and K represent the narrow end of point width range, and specimens A and E represent the wide end of point width range.

In many of the specimens, the removal of just a few flakes in the stem area is the only reason for obtaining a contracting stem Gary point instead of a straight stem Kent point. Dotted lines in the stem areas of specimens in Figure 1 show how little difference in flaking pattern would be required to produce a straight stem Kent point instead of a contracting stem Gary point. Except for differences in stem shape, all of these specimens could be classified as Kent points instead of Gary points. In Southeast Texas, there are many data that indicate that both Gary and Kent points were being made at the same sites (Patterson 1990). This is perhaps explained by manufacturing variation and the idiosyncrasies of individual knappers, rather than as differences in technological traditions.

Other Point Types Similar to Gary and Kent

It has been noted in the Introduction that there are several point types in Texas similar to Gary and Kent points which could easily be included in the Gary-Kent point series. Some archeologists like to define different point types based on only small differences in attributes. However, when similar point types are made in the same geographic areas in the same time periods, it is difficult to assign cultural significance to point types separated only by minor differences in attributes that could just as well be explained by manufacturing variation.

Illustrations by Turner and Hester (1993) of Dallas, Dawson, and Woden points, and the straight stem variety of the Neches River point show that all of these point types fall within the variations of the Gary-Kent point series. Because these other similar point types occur in the same geographic area as Gary and Kent points, there may be little cultural significance in separate classification of these other point types. A good picture of the variations in Gary and Kent point types may be obtained from the illustrations of Suhm and Jelks (1962).

Summary

Replication of Gary points by the author shows that much of the variation in Gary points can be explained by manufacturing variation, especially due to variations in flake blank morphology and material knapping quality. Therefore, the formal definition of subtypes for the Gary point does not seem to be justified.

Gary and Kent points are closely related by having overlapping attributes and by often occurring together at archeological sites (Patterson 1990). It appears that both Gary and Kent points were being made by the same people, and that Gary and Kent points can be regarded as a technological series. The wide geographic distributions of these point types shows that the geographic distribution of technological traits can far exceed areas of social organization.

It is proposed here that several dart point types from Texas that are similar to the Gary-Kent series could be classified as Gary or Kent points, because the attributes of these other point types fall within the manufacturing variability of Gary and Kent points. These other point types that are similar to the Gary-Kent series include Dallas, Dawson, Woden, and the straight stem variety of Neches River (Turner and Hester 1993). This study has presented an example of similar projectile point types being given separate formal classifications that may exceed specific social significance.

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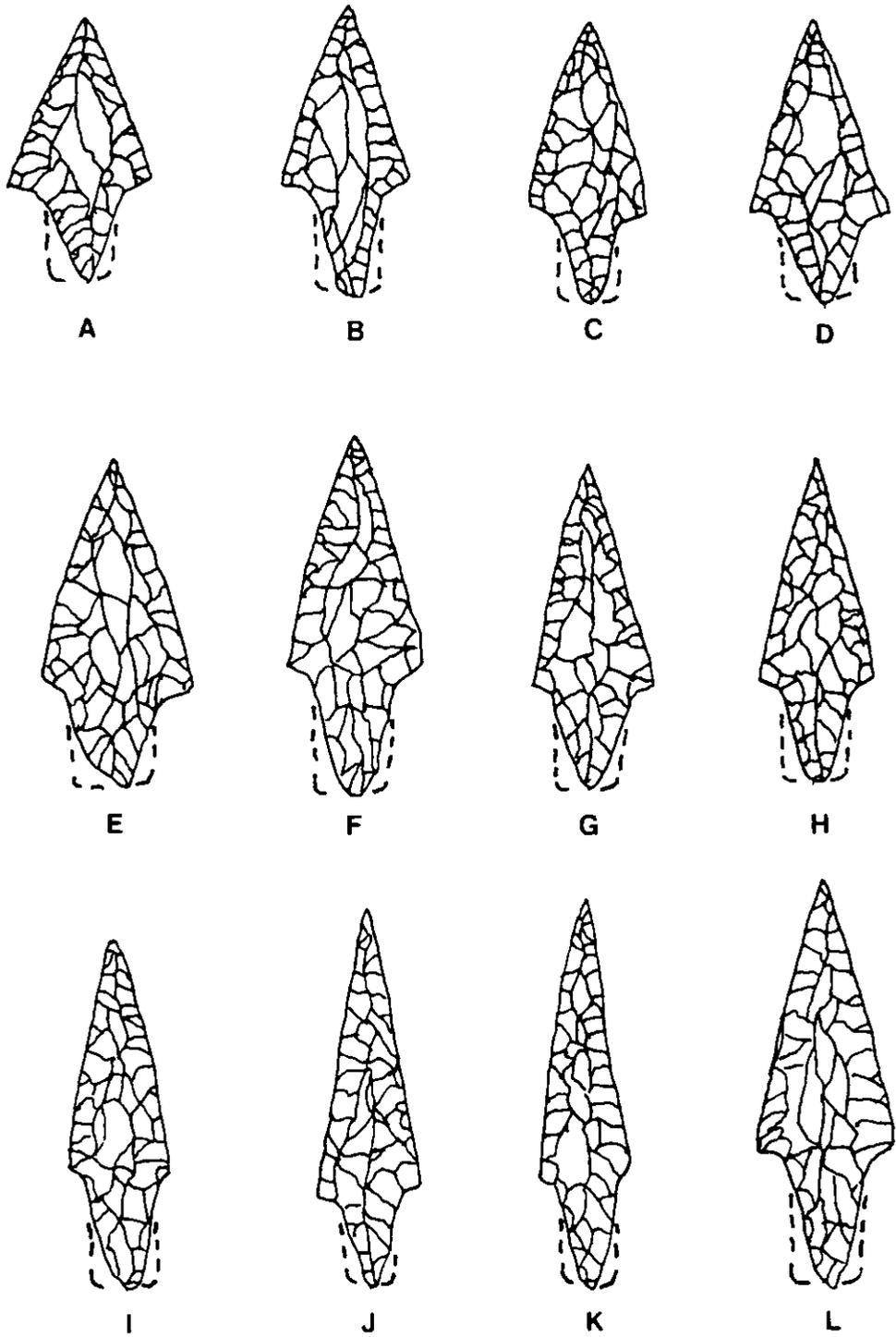
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Table 1. Gary Point Dimensions
 (all dimensions in mm)

Figure 1	length	width	thickness	stem width	W/SW
A	37.9	20.9	6.1	11.2	1.9
B	42.0	18.5	7.5	9.4	2.0
C	40.7	15.8	5.8	9.0	1.8
D	40.9	19.4	6.7	12.0	1.6
E	47.6	21.9	8.1	13.7	1.6
F	51.2	19.7	8.8	11.3	1.7
G	46.0	17.7	8.2	11.2	1.6
H	46.9	16.5	9.6	9.1	1.8
I	49.7	15.4	9.1	9.2	1.7
J	55.0	16.6	8.8	8.3	2.0
K	57.5	13.9	9.5	9.4	1.5
L	60.4	19.6	9.3	10.9	1.8

W/SW is width to stem width ratio

0 5 cm



Dotted lines show flaking pattern which would produce Kent points instead of Gary Points

Figure 1. Gary Dart Point Replicates

Temporal Trend Toward Smaller Dart Points

Leland W. Patterson

Introduction

In prehistoric Southeast Texas, there was a trend toward the use of smaller dart points in later time (Patterson 1976:173). The use of small dart points is especially noticeable in the Early Ceramic (A.D. 100-600) and Late Prehistoric (A.D. 600-1500) time periods, where dart points are usually under 50 mm in length (Patterson 1976:173; Mueller-Wille et al. 1991:Table 14). This article considers possible reasons for the temporal trend toward smaller dart points in Southeast Texas. This trend has also been noted in other parts of the Southeast Woodlands, such as for the Poverty Point Late Archaic culture in Louisiana (Ford and Webb 1956).

One possible reason for the trend toward use of smaller dart points is cultural preference. This trend is too widespread geographically, however, to be a satisfactory explanation that could be applied to specific cultural groups, or even as a regional trend, such as in Southeast Texas. Another reason for this trend might be more limited lithic raw material availability in later time, due to higher population density (Patterson 1995:Figure 3, 1996:Figure 10) being a factor in limiting lithic raw material accessibility.

Still another reason for this trend may involve efficiency of lithic raw material procurement, especially if chert quality is variable. When a good quality chert cobble is found at the source, it would be more efficient to maximize the number of flake blanks produced from this cobble for dart point manufacture, rather than search for other suitable chert cobbles. This would tend to produce smaller flake blanks, resulting in the manufacture of smaller dart points. Also, the transport of a larger number of small flake blanks would be more efficient than transporting a smaller number of large flake blanks.

The ballistics of the spear should also be considered in this study. This is discussed below in more detail.

Use of Lighter Spears

There is an advantage in use of a lighter, smaller diameter spear. Lighter spears can be thrown at a higher velocity to give a longer effective striking range. Kinetic energy is proportional to mass times velocity squared, so that halving the mass of the spear, for example, while imparting the same kinetic energy to the spear would result in an increase in initial velocity by a factor of $\sqrt{2} = 1.414$.

The use of a lighter, smaller diameter spear would probably be accompanied by use of a smaller spearpoint. The lower weight of a smaller spearpoint would help to maintain balance and flight stability for a lighter spear. Also, a smaller spearpoint would be easier to haft on a smaller diameter shaft.

Trend in Debitage Characteristics

A trend toward smaller size dart points can result in a change in the characteristics of debitage produced in the manufacture of these dart points. Examples for Southeast Texas have been given where flake size plotted versus excavation depth shows a trend toward higher percentages of smaller sizes of flakes in later time. Two of these examples are for sites 41WH19 (Patterson et al. 1987:Figure 20) in Wharton County, and 41HR315 (Patterson 1980:Figure 19) in Harris County. This trend toward the production of higher percentages of smaller flake sizes applies to dart points

in the Late Paleo-Indian, Archaic, and Early Ceramic periods, and continues further with the production of small dart points and even smaller bifacial arrow points in the Late Prehistoric period.

Manufacturing Variables

It should be noted that not all early dart points were large, over 50 mm in length. Some small dart points were produced together with large dart points throughout the Late Paleo-Indian and Archaic time periods, due to manufacturing variables. Some of the manufacturing variables that can cause differences in dart point sizes are type of raw material, quality of raw material, size of flake blanks, use of heat treatment of chert, preferences of individual flintknappers, and skills of individual flintknappers. Because of the number of variables in the procurement of lithic raw material and subsequent manufacturing processes for bifacial dart points, there will generally be a significant size range for dart points manufactured at any given time. In Southeast Texas, however, there is also a trend toward a higher proportion of small size dart points in later time. This temporal trend seems to occur at various campsites where dart points were being manufactured, regardless of distances from lithic sources.

Summary

Several possible reasons can be considered for the temporal trend toward smaller dart points in Southeast Texas. One possible reason for this trend is related to the ballistics of the spear. A lighter spear can be thrown at a higher velocity that results in a longer effective striking range. Several other reasons for this trend are given above.

Interpretations of technological change of prehistoric hunter-gatherer groups can seldom be completely conclusive, due to limitations in data and processual complexities. For example, there are no direct data for this region on sizes of spears used in various time periods because wood artifacts are not preserved. Therefore, the temporal trend toward smaller dart points cannot be conclusively based on the ballistics of the spear as a possible explanation of this trend. This article is a good example of why the study of hunter-gatherer technological change is difficult, because there are generally several alternate explanations for any type of change. It is much easier to describe technological change than to explain why it occurred.

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