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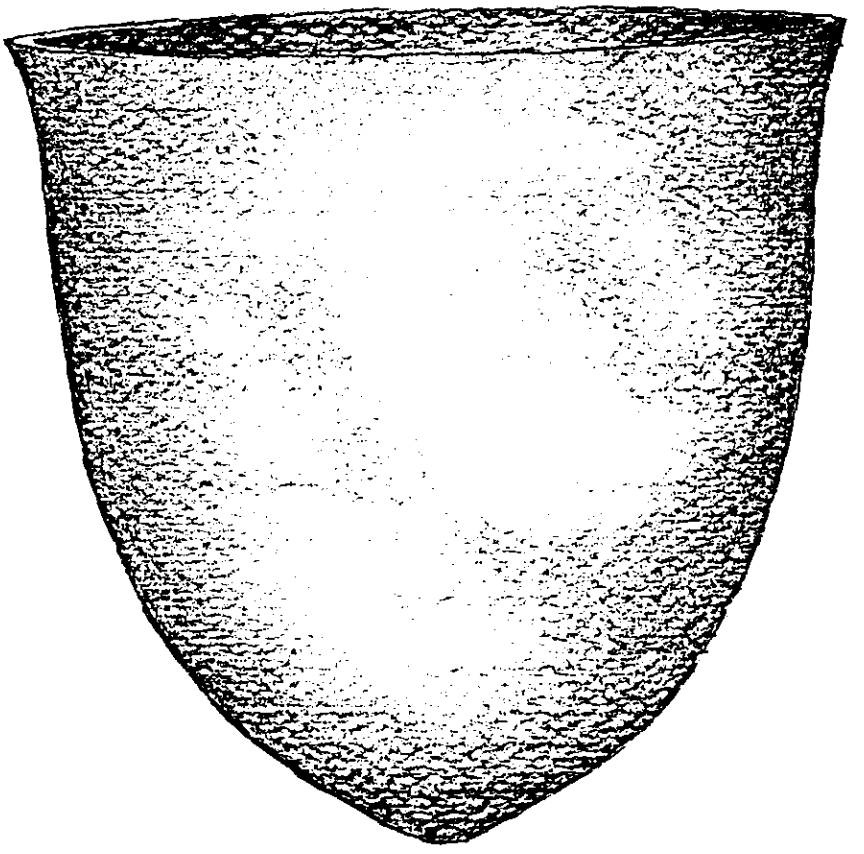

Goose Creek Pot

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Contents

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The Kovar Site, 41WH69, Wharton Co., Texas

L. W. Patterson and J. D. Hudgins

Introduction

This article describes a surface collection and results of excavations for prehistoric site 41WH69 in Wharton County, Texas. The site was originally found and recorded for state records by Joe Hudgins. Work at this site was made possible through the courtesy of the landowner, Dennis Kovar.

Site 41WH69 is located on the west bank of the San Bernard River in a sandy area. Its location is typical of known locations for prehistoric sites in this geographic area. The general area is a mixture of woodlands and coastal prairie. A wide variety of faunal and floral food resources would have been available to prehistoric Indians in this area.

Participants in the excavation work by the HAS included Alexandra Hamaker, Rita Crofton, Jeff Hansen, Ray McCausland, Allen Swift, Linda Swift, Fr. Edward Bader, Carolyn Walker, Ramon Canti, Eileen Smith, Anna Rozin, Dee Rhea, Sabrina Weil, Sterling Fener-West, Mike Johnston, Terry Paliwoda, Robert Shelby, Linda Moorrees, Dave Atherton, Mike Marshall, Bernard Naman, Dick Gregg, Gary Ryman, Karen Acker, Ray Trebbi, Kim O'Conner, Joan Allen, Cindy Johnson, Wayne Kerr, Carolyn Faz, Maggo Faz, Renny Wolf, Rick Bailey, Tom Nuckols, C. R. Ebersole, David Pettus, Pam Wheat, Lee Patterson, Joe Hudgins, and Sheldon Kindall. Field work was directed by Sheldon Kindall and laboratory work was directed by Melissa May.

The field work at this site also provided an educational opportunity for two groups of students. Fr. Edward Bader brought a group of students from St. Thomas University, and Pam Wheat brought a group of students from the University of Houston West Institute.

Surface collection

The surface collection for site 41WH69 made by Mr. Kovar consists of projectile points, lithic flakes, miscellaneous lithic tools and a potsherd. Artifact types indicate an occupation sequence from the Late Paleo-Indian period (8000-5000 B.C.) through the Early Ceramic period (A.D. 100-600). The Late Paleo-Indian period is represented by a Scottsbluff point and an Angostura-like point. A Williams and a Pedernales point represent some portion of the Middle Archaic (3000-1500 B.C.) to Late Archaic (1500 B.C. - A.D. 100) time periods. A Gary and a Kent point represent some portion of a long time period from the Middle Archaic through the Early Ceramic periods. All projectile points are shown in Figure 1. The points are made of local types of chert, except that the Angostura-like point is made from petrified wood and the Scottsbluff point is made from exotic Edwards Plateau flint. The basal edges of the Scottsbluff point are ground. Several of the lithic specimens, including some projectile points, show evidence of heat treating, in the form of reddish coloration and waxy luster.

Dart point preforms found include 3 complete specimens and 2 fragments. Other lithic tools found include a stemmed scraper, with a bifacial stem and a unifacial working end (Figure 1G), and a bifacial tool with a graver spur (Figure 1H). Both of these tool types are representative of the Late Paleo-Indian time period.

Lithic manufacturing activities are shown in the collection by 7 chert cores and 106 chert flakes. A summary of flake size distribution is shown in Table 1. Although this is probably a biased sample, the large proportion of flakes with sizes above 20 mm square probably represents the earlier time periods of this site, as is typical of other sites in this area (Patterson et al. 1987: Table 11). A quartzite flake that was found shows use of quartzite hammerstones at this site.

A Goose Creek Plain sandy paste sherd that was found could be from either the Early Ceramic or the Late Prehistoric time periods. Since no arrow points were found, this ceramic specimen is probably from the Early Ceramic period.

Excavation results

Excavations were conducted by the Houston Archeological Society on March 31 and April 21, 1990, to determine if there were any portions of the site remaining intact. Nine one-meter square test pits were made outside of the main area of sand removal, as shown in Figure 2 (from a sketch by Sheldon Kindall). Excavations were made in 5 cm levels and all soil was put through 1/4-inch mesh screens. Excavation results show some soil disturbance over the general area of excavation. Modern materials were found at 10-15 cm in Pit B, at 10-15, 15-20 and 20-25 cm in Pit D, at 45-50 cm in Pit G, and at 30-35 cm in Pit I.

A Goose Creek Plain sherd with a brushed surface was found at 60 cm in Pit G. Dart point fragments were found at 15-20 cm in Pit G and at 35-40 cm in Pit H. A dart point preform fragment was found at 125-130 cm in Pit H. A summary of chert flakes recovered in the excavations is shown in Table 2. Most of the flakes were under 20 mm square in size. The quantity of flakes at any level in any test pit was small. Small amounts of freshwater mussel shell were found as deep as 35 cm in Pit A, 25 cm in Pit B, 20 cm in Pit D, 35 cm in Pit E and 50 cm in Pit G.

It is concluded that most of site 41WH69 was destroyed by modern sand removal operations.

Summary

A long occupation sequence is shown by the surface collection from site 41WH69, from the Late Paleo-Indian through the Early Ceramic time periods. Excavations made by the HAS indicate that little of this site remains intact. It is important to record surface collections of this type while the locational context is still available. Data from surface collections are an important part of the regional archeological data base.

This is one more addition to an increasing number of sites in Southeast Texas that have very long occupation sequences (Patterson 1983). Even though Indians of this region practiced a nomadic hunting and gathering lifeway, a rather stable settlement pattern is indicated by data now available.

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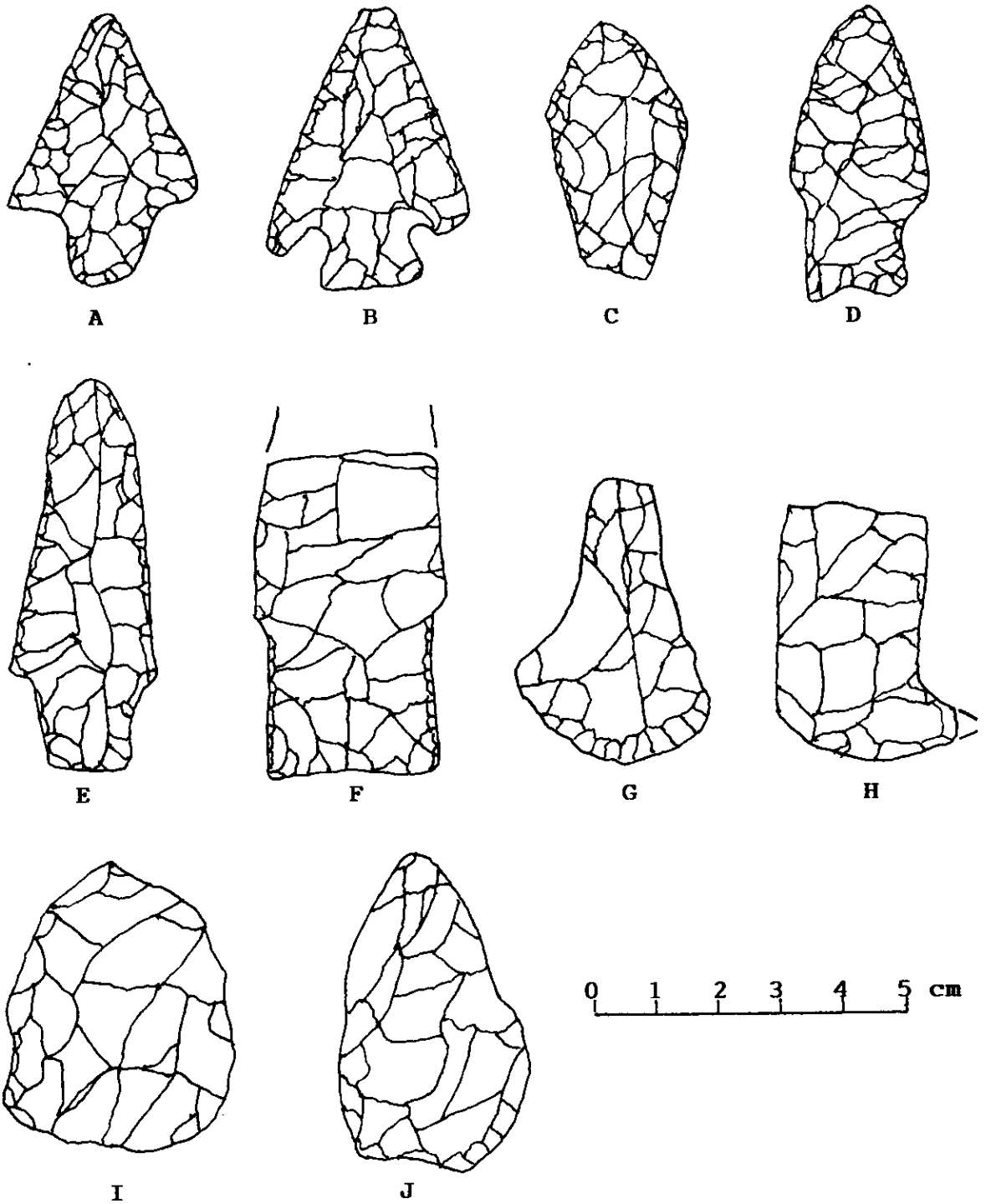
Table 1. Flake Size Distribution, Kovar Collection

size range mm square	number	percent
under 15	13	12.3
15-20	14	13.2
20-25	27	25.5
25-30	21	19.8
30-35	22	20.7
35-40	6	5.7
40-50	3	2.8
total	106	100.0

Table 2. Summary of Excavated Chert Flakes

	excavation pit								
level, cm	A	B	C	D	E	F	G	H	I
0-5					1				
5-10		1		4	1		1		
10-15	2	3		2	1		2		
15-20		1		1	1		1	1	
20-25	1	2	1	2	2	1		1	
25-30	1	2	2	1	3	3	1	1	
30-35	4			5	3		2		
35-40					3				
40-45						3	3	1	
45-50							4	2	
50-55								1	
55-60								1	
60-65							6	2	
65-70								3	
70-75									1
75-80								5	
80-85								3	
85-90									
90-95								1	
95-100								3	
100-105									
105-110								3	
110-115								2	
115-120								8	
120-125								2	
125-130								7	



A – Gary point, B – Williams point, C – Angostura-like point, D – Pedernales point, E – Kent point, F – Scottsbluff point, G – stemmed scraper, H – bifacial tool with spur, I – misc. biface, J – dart point preform

Figure 1. Site 41WH69 lithic artifacts

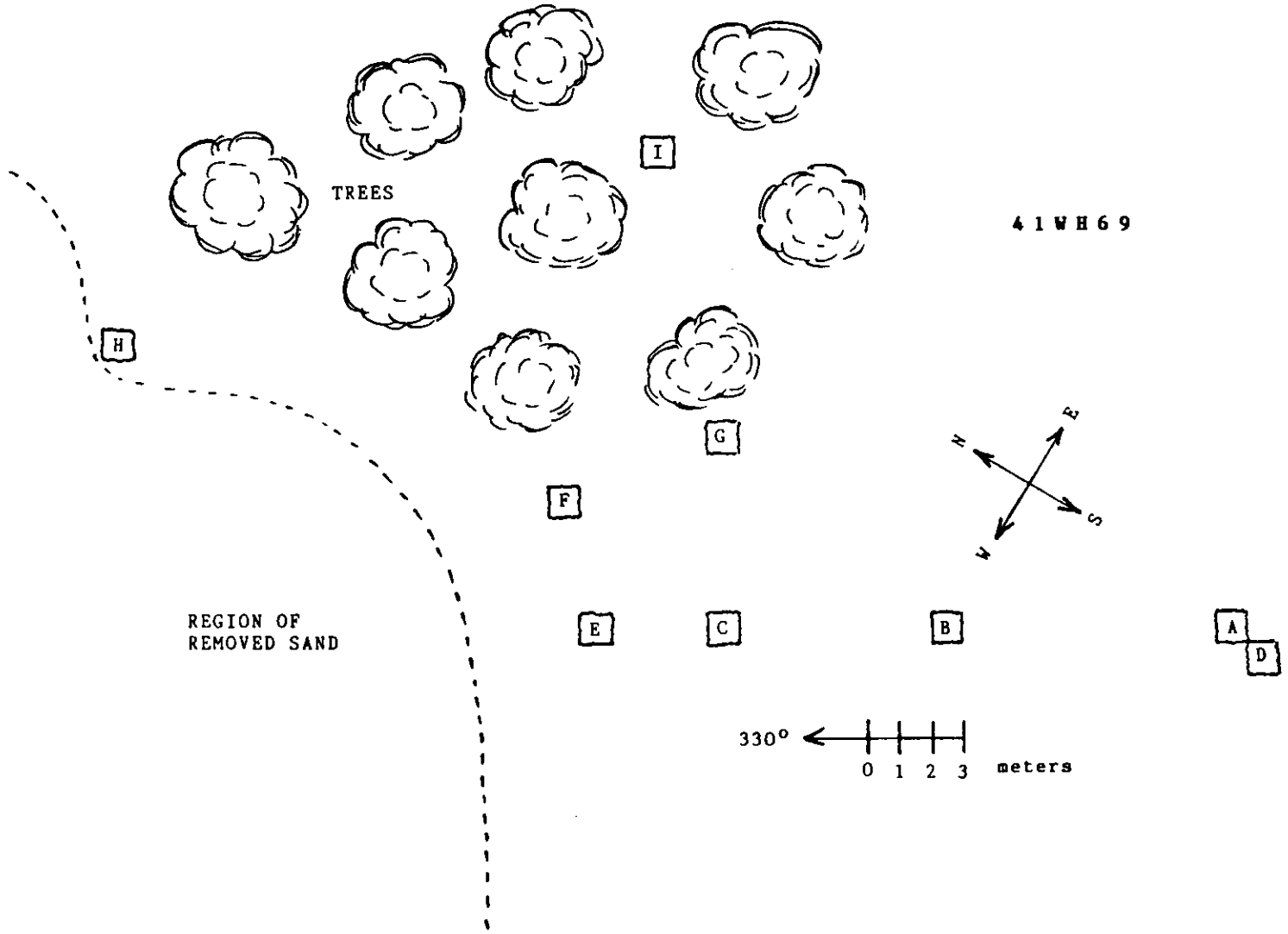


Figure 2. Site 41WH69 excavation layout

Seaberg Site C, 41HR684, Harris Co., Texas

Leland W. Patterson

Introduction

In a separate article (Patterson 1990), artifact collections made by Curtis Seaberg have been described for prehistoric sites 41HR641 and 41HR642 in eastern Harris County, Texas. These sites were found during farming operations. Mr. Seaberg has now found a third site, 41HR684, and the collection of artifacts from this site is described in this article.

Site 41HR684 is about 50 by 100 yards in size. It is located on sandy soil near a relic lake bed. This would have been a good campsite area for Indians with a hunter-gatherer lifestyle when the lake existed. A wide variety of food resources would have been available.

Artifact types found on site 41HR684 indicate an occupation sequence from the Early Archaic through the Early Ceramic periods. The presence of bone-tempered pottery may indicate some even later occupation of this site, during the Late Prehistoric time period. This is another example to be added to an increasing list of sites in Southeast Texas that have long occupation sequences (Patterson 1983).

Projectile points

Dart point types found on this site represent a possible time range from the Early Archaic period (5000-3000 B.C.) through the Early Ceramic period (A.D. 100-600). The Early Archaic period is possibly represented by two specimens that might be classified as Trinity points. This point type occurs during the Early Archaic at other sites in Southeast Texas (Patterson 1980, 1983). A Williams-like point represents some portion of the Middle Archaic (3000-1500 B.C.) or Late Archaic (1500 B.C. - A.D. 100) time periods. A stem from a possible Pedernales point also may represent some portion of these same time periods. Gary and Kent points found at this site occur during the Middle Archaic, Late Archaic, and Early Ceramic periods at other sites in this region. Yarbrough points found here represent some portion of the Late Archaic and/or Early Ceramic periods. Since ceramics were found at this site, occupation during the Early Ceramic period is better demonstrated than by projectile point types alone. A summary of dart points is given in Table 1. Some of the dart point specimens are illustrated in Figure 1.

Ceramics

Fourteen Goose Creek Plain sandy paste sherds were found. A Goose Creek Incised sherd was recovered, with one horizontal and two vertical lines. Goose Creek pottery occurs in both the Early Ceramic and Late Prehistoric time periods. Three bone-tempered sherds were also found. Bone-tempered pottery might indicate additional later occupation of this site during the Late Prehistoric period (A.D. 600-1500). Bone-tempered pottery is found in the Late Prehistoric period in the Galveston Bay area (Aten 1983: Figure 14.1), but bone-tempered pottery starts in the Early Ceramic period at some sites in inland Southeast Texas (Patterson 1980).

General lithic materials

Formal types of lithic tools, other than projectile points, found at this site include a bifacial pebble tool, a bifacial drill, and 3 unifacial scrapers. Two miscellaneous biface fragments were also

found.

Lithic materials present at this location include chert, petrified wood, and a fine-grain red quartzite. This type of quartzite is not common at sites in Harris County. At site 41HR684 this material was used to manufacture a Gary point (Figure 1L). Petrified wood is a fairly local material here, especially from the Trinity River Basin. The chert types found at this site are the same as can be found in the Brazos and Colorado River Basins. There is evidence for the use of heat treating on several lithic specimens, in the form of reddish coloration, waxy luster, and potlid surface facture scars. Lithic raw material pieces and cobbles include 1 fine-grain red quartzite, 14 chert, and 11 petrified wood specimens.

A summary of lithic flakes collected at site 41HR684 is given in Table 2. The flake size distribution gives a fairly good approximation of a linear relationship on the semi-log plot of percent of flakes vs. flake size shown in Figure 2. This would be expected for byproduct flakes from bifacial reduction (Patterson 1990). It is concluded that most of the lithic flakes represent the manufacture of bifacial dart points at this site. For flake specimens over 15 mm square in size, there were 8.9% primary flakes (covered with cortex), 47.5% secondary flakes (partially covered with cortex), and 43.6% interior flakes (no remaining cortex). The high percentage of flakes with remaining cortex indicates that at least some of the raw material was brought to this site in the form of cobbles and large flakes with remaining cortex (Patterson 1981). This could especially apply to petrified wood, as a more local raw material. Lithic raw materials brought from long distances would more likely be trimmed for less weight in transport and to test quality.

A piece of red ochre which was found probably had a nonutilitarian use such as body painting.

Summary

Prehistoric site 41HR684 has a long occupation sequence that possibly starts as early as the Early Archaic period and continues until possibly as late as the Late Prehistoric period. Evidence is strongest for occupations during the Middle Archaic, Late Archaic, and Early Ceramic time periods. This site probably functioned as a seasonal campsite for nomadic Indians with a hunting and gathering lifeway.

The various collections of artifacts made by Curtis Seaberg for prehistoric sites in eastern Harris County represent a significant amount of data for the regional data base.

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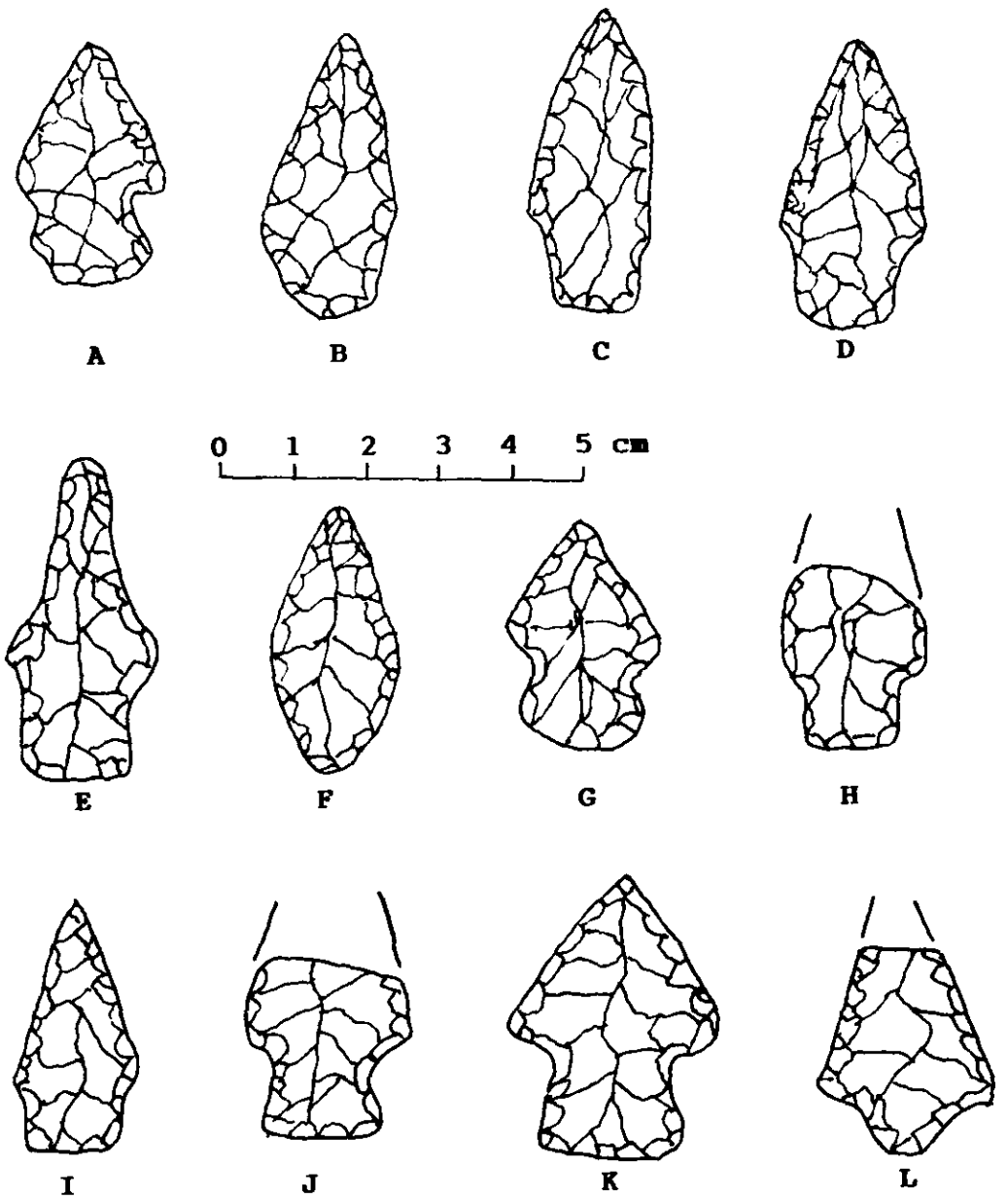

A – Trinity(?); B,C,D – Kent; E – reworked Kent; F – Gary-like; G – Trinity(?); H,I – Kent; J – Yarbrough; K – Williams-like; L – Gary

Figure 1. Site 41HR684 dart points

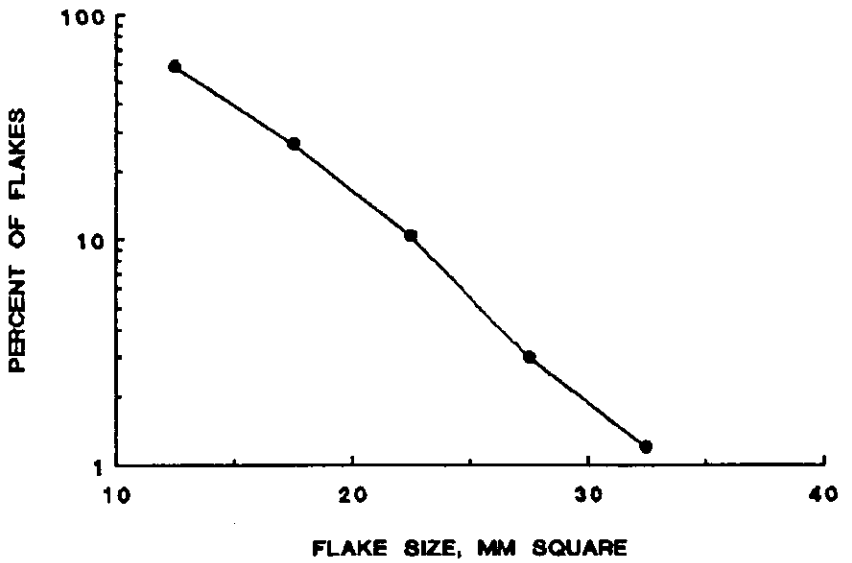

Figure 2. Flake size distribution

Table 1. Site 41HR684 Dart Points

type	number
Trinity	2
Williams-like	1
Kent	6
Gary	1
Gary-like	1
Yarbrough	2
unclassified	3
preform	3
fragments:	
contracting stems	4
straight stem	9
Pedernales stem (?)	1
preform	1
blade tip	3

Table 2. Flake Size Distribution

flake size, mm square	number	percent
under 15	254	58.7
15-20	116	26.7
20-25	45	10.4
25-30	13	3.0
30-35	5	1.2
total	433	100.0

The Abuse of Data and Method: A Reaction to Patterson

G. Lain Ellis

In a recent article, Patterson (1990) presents an argument for certain relationships between projectile point types in Southeast Texas. These relationships are put forth in an attempt to begin in earnest to integrate archaeological data into the description and explanation of behavioral and cultural phenomena. Despite this very laudable goal, however, Patterson's article is an example of unsupported conclusions drawn from incomplete, irrelevant data and covert analytical methods.

Irrelevant data and covert method

Patterson notes (1990:1) "that the first step in the study of possible behavioral patterns ... is to establish if any relationships may exist." He lists (Table 1) a series of possible behavioral interpretations that may be relevant to projectile points commonly found in Southeast Texas. Interestingly, the possibility that a single group could have used the same site for different functions at different times (see Binford 1982) does not appear on the list, despite the fact that such a behavioral pattern would determine the character of the archaeological record at such a site. But, this omission is understandable: Patterson does not talk about the interpretations, so there is no need for the list to be complete.

Patterson notes (Table 2) that seven different point types have been found in certain frequencies at certain numbers of sites. He goes on (Tables 3-5) to calculate "ratios of the number of sites with a specific group of points to the number of sites that have only one of the types in the group" (Patterson 1990:2). He continues by discussing how the strength of the relationships expressed by the ratios leads to certain conclusions about point types. Several things about this presentation are disturbing.

First, the presentation of ratios is incomplete. For example, we are given the ratio "(Gary, Kent, Yarbrough) / Yarbrough," but we are not given ratios for any other permutation of these three point types. In fact, a large number of possible ratios have been omitted. Not only are we not given any reasons for these omissions, we are not given any basis for producing the missing ratios ourselves: the only raw data in the article (Table 2) does not convey the information needed to calculate the ratios. Thus, we do not know if the ratios treat a site with one point the same as a site with 20 points. We do not know if the "(Gary, Kent)/Gary" ratio compares sites with both Gary and Kent points to sites with only Gary points, or to sites that have Gary points and any point other than Kent points. We cannot tell whether the omitted ratios contradict his conclusions. We cannot even check Patterson's arithmetic to see if he made any mistakes. Patterson's article is therefore immune to any evaluation of the validity of the ratios.

The next difficulty involves the interpretation of the ratios, assuming that they are correctly calculated and that they are the only relevant ratios. Since one of the conclusions Patterson draws from the ratios is that the relationships are strong, he should have stated his criteria for judging strength or weakness. Is a strong relationship any ratio greater than 1.93? Greater than 0.73? Since there are no such criteria given, we must take him at his word. Moreover, regardless of the definition of "strong," what justification is there for using the ratios in the first place? What are the ratios supposed to tell us about behavior even if they are strong? For all the reader can tell, there is no obvious method involved in the interpretation of the ratios.

Unwarranted technological conclusions

However, the presentation of irrelevant data in Tables 1 and 2 and the absence of any discussion of the premises underlying the use of the ratios may be merely sloppy reporting: the actual data *may in fact* lead to the ratios given; the ratios given (whatever they may mean) *may in fact* be the only relevant ones; the method (whatever it is) *may in fact* be useful; and the judgments of strength (whatever their criteria) *may in fact* be justified. That is, despite the above complaints, Patterson may still have a point (no pun intended). Indeed, he lists five such points, three of which are conclusions about the technological relationships between projectile points. Among these technological conclusions is the statement, "Gary and Kent points form a definite technological series" (Patterson 1990:3).

Patterson notes (1990:1, emphasis added) that "it has previously been noted (Patterson 1983:257) that Gary and Kent points *seem* to form a technological series." He then claims (Patterson 1990:2), on the basis of the ratios in Table 3, "As expected, there are strong relationships ...[which support] the concept of these point styles forming a technological series." Thus, the claim in Patterson (1983) is a hypothesis to be demonstrated in Patterson (1990). Indeed, he explicitly asserts (1990:3) that the claim regarding the Gary/Kent technological series is a conclusion "that can be made from this study." If this conclusion follows from the premises presented in Patterson (1990), then it is a conclusion based on the ratios, since the ratios are the only evidence invoked in support of the conclusions. Since the ratios themselves tell us about relative frequency phenomena, Patterson's argument must look something like this:

Premise 1: The number of sites that have both Gary and Kent points is 1.94 times the number of sites that have Gary points, but no Kent points.

Premise 2: The number of sites that have both Gary and Kent points is 4.12 times the number of sites that have Kent points, but no Gary points.

Premise 3: The relationships noted in premises 1 and 2 are strong.

Conclusion: Therefore, Gary and Kent points form a definite technological series.

If this argument is deductive, it is invalid. The conclusion of a deductive argument contains only information that was contained in the premises of the argument (Copi 1982). Since there is no information regarding technological series in the premises, there can be no deductive inference of technological series in the conclusion. If Patterson's argument is deductive, he therefore has no grounds for drawing technological conclusions from co-occurrence premises alone. The invalidity of the argument follows from the fact that the premises are facts about the archaeological record, whereas the conclusions are alleged facts about human behavior reflected in the archaeological record (Schiffer 1972; Binford 1982, 1975).

To be deductively valid, Patterson's argument must contain a major premise that serves as a basis for inference from the archaeological record to the systemic context. Such a premise would look something like this:

Major premise: Strong relationships of the kind Patterson uses imply a technological series.

The inclusion of such a premise would make Patterson's argument valid, but would not necessarily make it sound. A *valid* deductive argument is one whose conclusion follows from the premises, independent of the truth of the premises. A *sound* deductive argument is a valid argument whose premises are true, and whose conclusion is therefore true because it follows from a valid argument structure (Copi 1982). However, it remains to be seen whether a strong relationship such as Patterson's implies a technological series. In the absence of such a demonstration, the soundness of Patterson's argument has not been shown even if the major premise is implicit in his argument.

Indeed, each of Patterson's technological conclusions is a statement about a behavioral or cultural relationship between artifacts. Each of Patterson's premises is a statement about a relationship between sites: sites that do have and sites that do not have certain combinations of points. None of the premises contain any technological information. Therefore, all of the technological conclusions Patterson reaches on the basis of his ratios are conclusions of invalid arguments if the arguments are deductive. None of them can be considered valid until he makes his major premises clear, and none of them can be considered sound until he establishes the truth of the major premises.

Perhaps, however, Patterson is not using deductive logic to reach his conclusions: they could be the conclusions of inductive arguments (see Salmon 1982). In inductive arguments, the conclusion contains information that is *not* contained in the premises, but which seems likely on the basis of information that *is* contained in the premises (Copi 1982). The conclusion of an inductive argument is therefore a hypothesis. However, even as conclusions of inductive arguments, Patterson's conclusions are literally unfounded on the basis of the evidence he gives. For just as there is no technological information from which to *deduce* technological series information, there is no information from which to *induce* it, either. Thus, on the basis of the evidence provided, it is just as likely that the Gary and Kent styles are in different technological series whose members often co-occur as it is that they are in a single technological series whose members often co-occur. Thus, if Patterson's argument is inductive, his technological conclusions are vacuous: on the basis of the evidence, the negation of any of his conclusions is just as likely to be true as any conclusion itself. Moreover, if his argument about the Gary/Kent series is inductive, it does not advance the Gary/Kent thesis beyond its status in Patterson (1983): if it was an unconfirmed hypothesis in 1983, it remains one in Patterson (1990).

Conclusion

Patterson (1990), therefore, leaves the reader no more informed than he or she was before reading the article. Tables 1 and 2 are irrelevant to his analysis, and take up space that could have been used for more pertinent information. The data base that is presented (i.e., the ratios) is incomplete, and may omit potentially falsifying cases. If there is a method to the analysis and a significance to the ratios, that method and significance are covert at best. And, the conclusions are either invalid or trivial: if the conclusions are true (which they may be), they do not follow from the evidence given. Thus, to cite Patterson (1990) as a source that demonstrates his conclusions is to rely on Patterson's reputation, and not on his data and arguments.

More importantly, Patterson has sloppily reported his work by not carefully laying out the relevant data and the methods by which he himself reaches the conclusions. The net result is that the content of Patterson's presentation is completely immune to public critique. In this case, Patterson's neglect of basic logic is sufficient grounds for rejecting his alleged demonstration of certain intuitive relationships. However, if his logic had not been flawed, the reader would have no way to tell if his arguments were sound.

Patterson (1990) therefore serves as an object lesson. Many insights start as intuitions, such as the apparent possibility of a demonstrable Gary/Kent series. However, making our intuitions public and demonstrating their plausibility requires full data presentation and explicit discussion of method. Otherwise, the acceptance of archaeological claims, whether by avocationals or professionals, depends only on the authority of the researcher, and not on the strength of his or her arguments. As they might say in Mother Russia, "Intuit, but verify." If one's intuitions are verified, then give us the means to demonstrate them for ourselves instead of forcing us to take them on faith. As Mill (1859) argues, to do anything less is an injustice to both the reader and the truth.

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On the Shape of a Goose Creek Pot

W. Marshall Black

Goose Creek ware, the provincial prehistoric pottery of Southeast Texas, is known primarily from its fragments. A type-variety matrix taxonomy has been worked out (Aten 1983); however, relatively little treatment of vessel form has appeared.

The purpose of this note is to document the shape of a medium-sized pot from northern Galveston Bay. The example embodies all of the structural characteristics generally attributed to Goose Creek pots as inferred from fragments and partial reconstructions. Moreover, it displays an elegance of style that is appealing, if quite foreign, to the modern eye.

Recovery of a number of related sherds sufficient to define the rim-to-basal-node profile of a Goose Creek pot is a rare event. The author is aware of fewer than ten instances. All came from coastal shell middens which are badly eroded and often subsided. The subject pot, actually about 65 sherds (60 percent of the whole), was found by Mr. Mike Marshall on mud flats exposed by a low tide at Crystal Bay, Baytown, Texas. The deflated shell midden is recorded as 41HR619.

This plain (undecorated) pot measures 27.4 cm (10.8 inches) in height. The major diameter at the rim is 29 cm (11.4 inches). Average thickness in the body portion is 0.56 cm (0.22 inches). The matrix core is black and the weathered surfaces are light tan. The matrix is "sandy paste." The flaring rim is thinned from the inside to a flat lip about 0.32 cm (0.125 inches) wide. Rim notching is absent, as are drilled holes in the recovered portion. The round basal node sherd is 5.1 cm (2.0 inches) in diameter. Table 1 gives the external diameters at increments of height. These data were obtained by shadow projection. Figure 1 is a scale drawing.

It is not possible to date this vessel within the generally accepted bounds of A.D. 100 to A.D. 1800. According to Aten (1983), sand was used for temper throughout this 1700-year period, although there was a nadir about A.D. 1350 in favor of grog temper. There is one radiocarbon date, A.D. 1500 ±40, from shell in a nearby midden, 41HR618, where sandy paste pot fragments suggestive of a similar form have been recovered. When correlated to charcoal equivalent (Aten 1983), this becomes about A.D. 1300. The utility is also conjectural although the adaptability to cooking in an open fire is apparent.

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Table 1. Diameter vs. Height

Height, inches	Diameter, inches	Height, inches	Diameter, inches
0.0	0.0	6.0	9.8
0.5	2.4	7.0	10.1
1.0	4.2	8.0	10.4
2.0	6.4	9.0	10.6
3.0	7.6	9.5	10.7
4.0	8.6	10.0	10.9
5.0	9.3	10.8	11.4

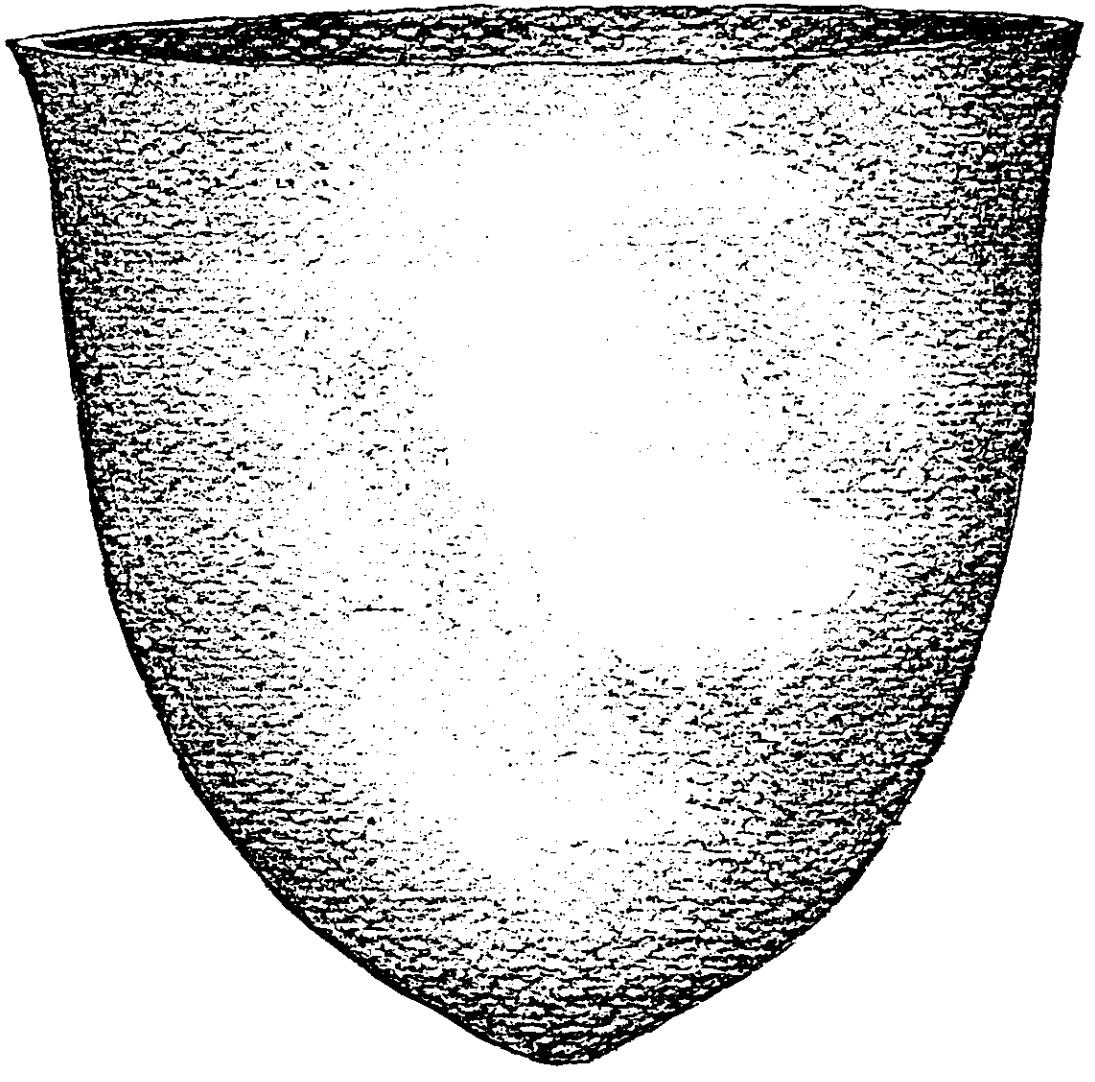

Figure 1. Representation of the subject pot

Mobility–Settlement Patterns and Population Dynamics of Inland Southeast Texas

Leland W. Patterson

Introduction

Archeological evidence in Southeast Texas indicates that Indians of this region practiced a nomadic hunting and gathering lifeway during all prehistoric time periods (Patterson 1979a, 1983). Technological changes, such as introduction of ceramics and the bow and arrow, do not seem to have had any major effects on basic lifestyle (Shafer 1975). There were changes over time, however, in degree of mobility, settlement patterns, and population levels. Recent development of computerized data bases for this region (Patterson 1989a,b) have facilitated more detailed study of these subjects.

This paper considers the relationships of mobility, settlement patterns, and population dynamics for Indians of inland Southeast Texas during various prehistoric time periods. The coastal margin is not included because little archeological data are available for this subregion before 3500 years ago when the sea level stabilized, and because of differences in settlement and subsistence patterns between the inland and coastal margin subregions of Southeast Texas. Separate studies would be required for the coastal margin on the subjects covered here.

The subjects considered here are interrelated and reasons for change are not always apparent. The availability of natural food resources is a basic factor to consider in studies of this type. Conclusions made in this paper are based on the latest available data. Concepts may be further refined as more data becomes available.

Changes in population level and mobility from the Early Ceramic to the Late Prehistoric periods are of particular interest because these changes seem to have occurred rapidly.

Subsistence considerations

Subsistence considerations are basic to the study of the lifestyles of nomadic hunter-gatherers. In Southeast Texas, faunal resources utilized seem to have been similar during all prehistoric time periods, with the exception of varying availability of bison (Dillehay 1974). A wide range of animal types were utilized for food by Indians of this region (Patterson 1989a: Tables 9,10). There are no comparable data on floral resources due to lack of preservation, even though foods from plant sources were probably as important or more important than foods from animal sources. Since Indians of this region utilized a wide variety of natural food resources, the level of availability of each type of natural food resource and its geographic distribution are as important as the type of resource for the subjects considered in this paper. Unfortunately, much of this type of data cannot be obtained from the archeological record. Therefore, the relationships of subsistence and settlement patterns will probably never be developed on a very detailed level. There are enough data available, however, to broadly define the hunting and gathering lifeway that was practiced by Indians of this region.

The subsistence carrying capacity of a region must be considered in relation to the population level and effects of climate on the availabilities of natural food resources. In the case of bison, climatic change may have caused significant changes in this food resource, by sometimes causing herd migrations farther to the south, including Southeast Texas. Data are not available at this time on the relative importance of bison in the total diet of Indians during various time periods.

Mobility-settlement patterns

Prehistoric sites of inland Southeast Texas generally have the following characteristics:

1. Sites are usually discrete locations, with fairly well-defined boundaries. Site dimensions often are in the range of 30 to 100 feet in diameter.

2. The majority of sites are multicomponent, often with very long occupation sequences (Patterson 1983), indicating frequent reuse of site locations.

3. Most sites are found near a water source, such as a stream or lake edge (Patterson 1979b).

4. There is little evidence of satellite activity areas and base camps. Most archeological sites are of a single type, simply indicating residential use.

5. There is little data to define seasonal subsistence patterns for inland Southeast Texas (Story 1990:260), although some data exists on this subject for the coastal margin.

6. Specialized subsistence activities do not generally occur in isolation at separate locations. Evidence for specialized subsistence activities, such as use of freshwater shellfish, usually occurs together with indications of more generalized subsistence activities at specific sites.

There is no model for mobility-settlement patterns of hunter-gatherers that is likely to precisely fit for specific regions (Ebert and Kohler 1988:112). However, the above characteristics for sites in Southeast Texas can be compared with two models given by Binford (1980) which represent two extremes for a spectrum of mobility-settlement strategies (Ebert and Kohler 1988:113). In one of Binford's models, the more mobile hunter-gatherers are called "foragers," with residential bases that are moved frequently and other poorly defined diffuse subsistence activity locations. Ebert and Kohler (1988:113) note that "Given a foraging adaptation, it is clear that, in much of the contemporary archaeological record, discrete 'sites' will not be apparent." In Binford's other model, the less mobile hunter-gatherers are called "collectors." In this model, there are well-defined residential bases and satellite locations that tend to be reused (Ebert and Kohler 1988:113). Collectors are characterized by logistically organized subsistence activities, using specially organized task groups (Binford 1980:10).

The characteristics of prehistoric sites of inland Southeast Texas seem to fall between the extremes for mobility of Binford's two models. The lack of visible satellite activity locations fits the forager adaptation model, but the high reuse of sites fits the collector model. In Southeast Texas, there appears to have been employed a very generalized foraging strategy, but on a highly scheduled basis. Beside being reused, sites in Southeast Texas seem to have been used for a significant time period on each stay, with less frequent change of residential location than in the forager model.

The reuse of sites in this region is indicated by the amounts of artifacts found at each site (sometimes thousands of lithic specimens) and the high proportion of multicomponent sites. Table 1 shows that over 90% of sites are multicomponent from the Paleo-Indian through the Early Ceramic periods. These data are from the 1990 current contents of the computerized data base for inland Southeast Texas (Patterson 1989a). The high reuse of sites demonstrates restricted mobility even during the Paleo-Indian period, which is sometimes considered to have had a more mobile lifeway.

There is evidence that Indians were more mobile in the Late Prehistoric period than during previous time periods (Patterson 1976:185). This is shown by less use of pottery, smaller sites, and lower amounts of artifacts on sites of the Late Prehistoric. Table 1 shows that there was also

somewhat more dispersion to single-component sites during the Late Prehistoric period, with only 75% of sites being multicomponent compared to over 90% of sites being multicomponent in earlier time periods. This is another indication of the higher degree of mobility during the Late Prehistoric period. The general settlement pattern of Indians did not change in the Late Prehistoric period, however. The same types of locations were being used as in previous time periods, but use of locations apparently changed more often with a more dispersed pattern. The degree of mobility of Indians in Southeast Texas during the Late Prehistoric period still did not approach the high degree of mobility of Binford's (1980) forager model. Reasons for change in mobility during the Late Prehistoric period are further discussed in the section on population dynamics.

There are little data to define the seasonal subsistence patterns of hunter-gatherers of inland Southeast Texas, mainly due to lack of preservation of floral remains. Some materials on archeological sites probably represent seasonal activities, but it is difficult to construct any details. Fired clayballs may represent seasonal processing of plant materials (Patterson 1989c). Freshwater shellfish may have been collected on a seasonal basis, as was done for Rangia brackish water shellfish on the coastal margin (Aten 1983). These types of specialized activities are seldom found in separate locations that do not also contain evidence for a range of other hunting and gathering activities. For example, site 41FB37 (Patterson and Hudgins 1987) had a concentration of freshwater mussel shell, but also had a wide variety of other faunal remains (McClure 1987).

Population dynamics

Two studies on the population dynamics of inland Southeast Texas have been made (Patterson 1986, n.d.). Similar conclusions were presented in the two studies, based on different data sets. The more recent study (Patterson n.d.) uses data from the computerized data base for inland Southeast Texas (Patterson 1989a), as shown in Figure 1. The Relative Population Factor is the number of sites in a time period divided by the number of years in the time period times 100. Data have been plotted for the midpoint of each time period. The same data are shown numerically in Table 2. The relative population curve shown in Figure 1 is only an approximation of population level for each time period. The true shape of this curve cannot be determined in detail, because data does not exist for short-term changes in population level within each time period.

The lower Relative Population Factor for the Early Archaic compared with the Late Paleo-Indian period shown in Table 2 may simply be due to the difficulty in identifying Early Archaic components of archeological sites. If the Early Archaic data point is not used, population growth rate would be 0.02% per year from the Late Paleo-Indian period through the Middle Archaic period. Population growth rate is also 0.02% per year from the Middle Archaic to the Late Archaic. This population growth rate level is comparable to that of estimates for the Eurasian Pleistocene period (Cohen 1977:52). The population growth rate increases to 0.12% per year from the Late Archaic to the Early Ceramic period. There is a significant increase in population growth rate for at least portions of the Late Archaic and Early Ceramic periods. This large increase may be seen graphically in Figure 1, in contrast with a constant growth rate of 0.037% per year from the Late Paleo-Indian period to the Early Ceramic period. The population growth rate of 0.12% per year from the Late Archaic to the Early Ceramic period is very high for hunter-gatherers and is comparable to the population growth rate of the more sedentary Neolithic of the Middle East (Cohen 1977:53). A high population increase seems to have also occurred in Central Texas at the same time (Prewitt 1983: Figure 6).

Several reasons to consider for the high population growth rate in the Late Archaic and Early Ceramic periods might be: (1) increase in bison availability, (2) wetter climate, (3) migration of people into the region, and (4) data underrepresented for previous time periods. There is no

indication of increased availability of bison from faunal remains at sites of the Late Archaic and Early Ceramic periods. There is a good possibility that the climate became more moist during these time periods (Story 1990:244). If migration into Southeast Texas occurred, it may have been caused by population pressures in adjacent regions. However, large scale migrations of nomadic hunter-gatherers would not be expected. It is not likely that the relative number of sites for the Late Paleo-Indian through the Middle Archaic periods is highly underrepresented because the current computerized data base is fairly large.

The introduction of pottery in the Early Ceramic period may have contributed to the increase in population growth rate by allowing for the storage of food supplies to sustain a larger population. However, a similar increase in population growth rate at the same time in Central Texas was not accompanied by the introduction of pottery.

As shown in Figure 1, there was a population decrease from the Early Ceramic period to the Late Prehistoric period. This seems to have happened also in Central Texas during the same time interval (Prewitt 1983: Figure 6). One explanation is that biological overpopulation is generally followed by a decline (Gleick 1988:62). Available natural food resources would not be expected to sustain a very high population growth rate. Another explanation is that climate deterioration caused a more diffuse subsistence pattern with a lower population level. Story (1990:246) has noted a shift to a drier climate over the last 2000 years. Still another explanation for population decrease is that increased presence of bison may have caused a change to a more mobile subsistence pattern. Story (1990:258) and McReynolds, Korgel, and Ensor (1988) note evidence for exploitation of bison in the Late Prehistoric period. However, faunal remains at archeological sites in this region in general do not indicate any major change to a high usage of bison. It should also be noted that a more mobile lifeway would possibly result in a lower birthrate, since sedentary populations are known to have higher birthrates than highly nomadic populations. The decrease in population in the Late Prehistoric period did not return the population level to as low as in the Archaic period. In other words, there was no complete "crash" in population level.

Summary

Based on present data, a mobility-settlement pattern model has been proposed here for Indians of inland Southeast Texas. A nomadic foraging lifestyle was practiced, but with a scheduling pattern that caused reuse of sites and a somewhat restricted mobility. This pattern was in place as early as the Paleo-Indian time period. Subsistence was based on a generalized hunting and gathering lifeway during all prehistoric time periods.

The population dynamics of inland Southeast Texas are characterized by a low population growth rate from the Paleo-Indian period to the Late Archaic. A higher population growth rate then occurred in at least some portions of the Late Archaic and Early Ceramic periods, followed by a population decrease in the Late Prehistoric period. Several possible reasons for these population changes have been discussed here.

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Table 1. Inland Southeast Texas Site Sequences

period	single-period sites		multiple-period sites	
	no.	%	no.	%
Paleo-Indian	6	10.0	54	90.0
Early Archaic	1	2.9	34	97.1
Middle Archaic	3	4.1	70	95.9
Late Archaic	9	8.2	101	91.8
Early Ceramic	12	9.2	118	90.8
Late Prehistoric	37	25.0	111	75.0

Table 2. Summary of Population Dynamics

period	time range, years B.P.	relative population factor
Late Paleo-Indian	10000-7000	1.9
Early Archaic	7000-5000	1.7
Middle Archaic	5000-3500	4.7
Late Archaic	3500-1900	6.3
Early Ceramic	1900-1400	24.0
Late Prehistoric	1400- 500	13.9

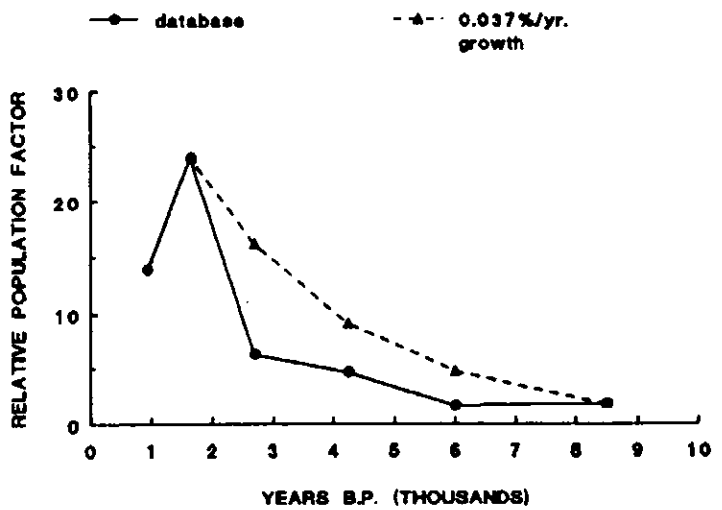


Figure 1. Population dynamics of prehistoric inland Southeast Texas

Prehistoric Site 41FB90, Fort Bend Co., Texas

L. W. Patterson and W. M. Black

Introduction

This article describes two surface collections from prehistoric site 41FB90 in Fort Bend County, Texas. Enough diagnostic lithic materials have been found to permit discussion of time periods of site occupation and lithic manufacturing activities at this location.

Site 41FB90 is located on a high terrace remnant on the east side of the Brazos River flood plain. It is estimated that the site size is about 50 meters in diameter. During the prehistoric time periods of occupation by Indians, the Brazos River may have been closer to this site. Most Indian sites in Southeast Texas are located near water sources.

Dart point types found at site 41FB90 indicate an occupation sequence covering some portions of the Middle Archaic (3000-1500 B.C.) and the Late Archaic (1500 B.C. - A.D. 100) time periods. No ceramics or arrow points have been found here to indicate later occupations.

This site was probably occupied on a seasonal basis by Indians with a nomadic hunter-gatherer lifeway. A wide variety of natural food resources would have been available in this general area. For example, native pecan trees are numerous in this area.

Projectile points

Several dart points and preforms shown in Figure 1 were collected by Marshall Black at site 41FB90 in the early 1940s. A Bulverde point (Figure 1C) represents the Middle Archaic period. Two Pedernales points (Figure 1B,D) represent some portions of the Middle and Late Archaic periods. These time periods for Southeast Texas are somewhat earlier in publications than time periods with the same names in Central Texas (Prewitt 1983), because of the earlier start of pottery in Southeast Texas. The Archaic period is considered preceramic throughout the various regions of the United States. A fairly small Gary point (Figure 1A) probably represents the Late Archaic period at this site.

The Bulverde and Pedernales points found at this site represent Central Texas (Southern Plains) technological traditions, and the Gary point represents an East Texas (Southeastern Woodlands) technological tradition. This mixture of technological traditions is commonly found in the western portion of Southeast Texas (Patterson 1983), including Fort Bend County.

The collection made by Black includes two preforms (Figure 1E,F). One specimen (Figure 1E) with a concave base may be a Pedernales preform.

General lithic materials

A collection of general lithic materials was recovered at site 41FB90 by Martin F. Koening. Most of the materials indicate activities for the manufacture of dart points at this site. Flake size distribution is given in Table 1 and Figure 2. In Figure 2, the fairly linear section of the semi-log plot for flakes in the 15-20, 20-25, and 25-30 mm square size ranges indicates the bifacial reduction process for the manufacture of dart points (Patterson 1990). It is common to have nonlinearity at the end points of curves of this type, especially due to the poor recovery of small size flakes. For flakes sizes over 15 mm square, there are 1.6% primary flakes (covered with cortex), 42.6% secondary flakes (partially covered with cortex), and 55.8% interior flakes (no remaining cortex). The high percentage of secondary flakes with some remaining cortex indicates that large flakes

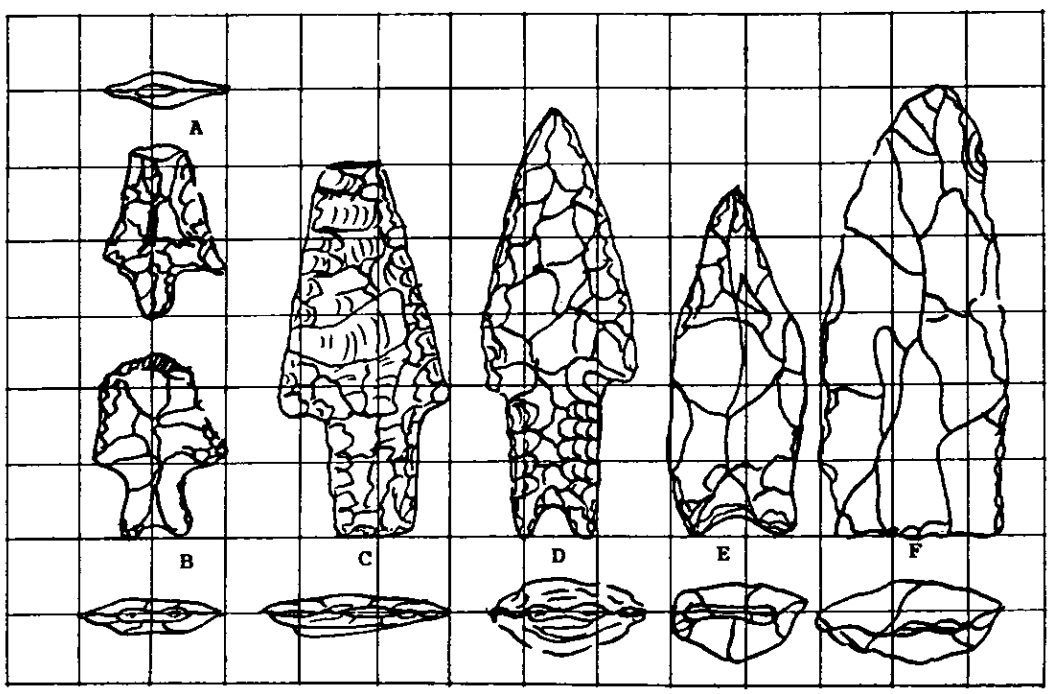
brought to this site for dart point manufacture were not highly trimmed after detachment from chert cobble cores. The low percentage of primary flakes indicates that not many whole chert cobbles were brought to this site for primary reduction.

The lithic materials found here are generally fairly local types of chert that could have been obtained at distances of about 25 to 50 miles to the northwest. Heat treating of chert was done extensively, as shown by reddish coloration, waxy luster, and potlid surface fracture scars on various specimens. The Koening collection includes one dart point preform, with a length of 54 mm, and one dart point preform fragment. A chert core was found, made from a fragment of a chert cobble.

Two small, highly polished chert pebbles were found that may have had some nonutilitarian use, such as for a rattle.

Nearby sites

There are two other sites located near site 41FB90 that have projectile points, such as Bulverde, Gary, and Pedernales, which indicate components in the Middle and Late Archaic periods. These two other sites are 41FB95 (Patterson and Hudgins 1987) and 41FB3 (HAS 1990 field notes). This area seems to have been favored for occupation during the Archaic time period, but not later, perhaps due to a change in location of the Brazos River to a location farther from this general area, possibly indicated by USGS quad map contours.



A – Gary; B,D – Pedernales; C – Bulverde; E,F – preforms

Figure 1. Site 41FB90 dart points and preforms (0.5-inch grid)

Summary

Site 41FB90 was a campsite that was occupied by nomadic hunter-gatherers during some portions of the Middle and Late Archaic time periods. Evidence of the manufacture of dart points at this site is shown by the general lithic collection. Recording of surface collections such as this one in original context is important for enhancing the regional archeological data base.

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Table 1. Site 41FB90 Flake Size Distribution

flake size, mm square	number	percent
under 15	45	42.5
15-20	41	38.7
20-25	13	12.3
25-30	6	5.7
30-35	1	0.8
total	106	100.0

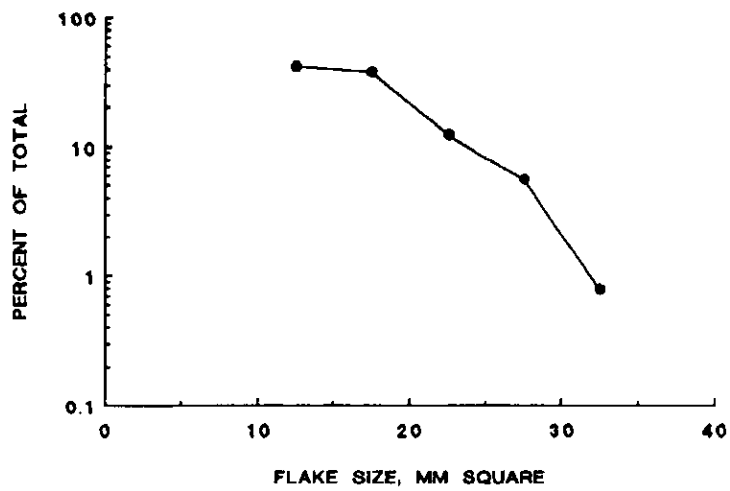

Figure 2. Site 41FB90 flake size distribution

The George S. Rhemann Collection, 41FB198, Fort Bend Co., Texas

L. W. Patterson and J. D. Hudgins

Introduction

This article describes a collection of lithic artifacts from prehistoric site 41FB198 in Fort Bend County, Texas. This collection was made by George Sterling "Buddy" Rhemann on his farm. Study of these archeological materials was made possible through the courtesy of Mr. Rhemann's daughter, Lilla Rhemann Wright, who is in possession of the collection. The artifacts were collected over time as they were exposed on the surface of this site.

Site 41FB198 is located on a high terrace remnant on the east side of the Brazos River flood plain. During the prehistoric time periods of occupation by Indians, the Brazos River may have been closer to this site. Although not shown on the USGS quad map of this area, evidence of a relic stream that once flowed near this site was noted during a visit by Grant Hall and Joe Hudgins. The river bottom land adjacent to site 41FB198 was once heavily timbered, with elm, hackberry, oak, and pecan as the major varieties of trees.

This site was probably occupied on a seasonal basis by Indians with a nomadic hunter-gatherer lifestyle. A wide variety of natural food resources would have been available in this general area. For example, pecans would have been an important food resource.

Projectile point types found at site 41FB198 indicate a long occupation sequence from the Late Paleo-Indian through the Late Prehistoric time periods. No ceramics have been collected at this location. There is an increasing list of sites such as this in Southeast Texas with very long occupation sequences (Patterson 1983). The continued reuse of many prehistoric sites in Southeast Texas indicates a mobility-settlement pattern with a high degree of scheduling for exploitation of natural food resources (Patterson 1991).

Late Paleo-Indian and Early Archaic periods

Indications of occupation of site 41FB198 during the Late Paleo-Indian (8000-5000 B.C.) and Early Archaic (5000-3000 B.C.) time periods are shown here by several types of dart points. An Early Side-Notched point (Figure 1A) is similar to Early Side-Notched Type 5 specimens from site 41WH19 in Wharton County (Patterson et al. 1987) that occur throughout the Late Paleo-Indian period. A small lanceolate point (Figure 1B) is another Paleo-Indian point type found at this site. An Early Stemmed point (Figure 1C) could be from the Late Paleo-Indian or Early Archaic period. This specimen is made from exotic Edwards Plateau flint. This may be a reworked specimen because the blade edges are steeply beveled. All three of the above specimens have ground stem edges. Two Bulverde-like specimens (Figure 1D,F), similar to specimens found at site 41WH19 (Patterson et al. 1987), may be from the Early Archaic period.

The time ranges for prehistoric periods used here are the same as given in previous regional summaries (Patterson 1979, 1983). An end scraper made on a large prismatic blade (Figure 4A) also probably represents the Late Paleo-Indian period at this site. A summary of projectile points is given in Table 1.

Middle and Late Archaic periods and Early Ceramic period

The Middle Archaic (3000-1500 B.C.) period is represented at site 41FB198 by a Bulverde point (Figure 1E). Pedernales points (Figures 1G,H; 2A,B) represent some portions of the Middle Archaic and Late Archaic (1500 B.C.-A.D. 100) time periods. Large Kent points (Figure 2C-H) and large Gary points (Figures 3A; 4H) represent some portions of the Middle and Late Archaic periods.

Several dart point types found at this site occur in both the Late Archaic and Early Ceramic (A.D. 100-600) time periods. These include small Gary (Figure 3B,C), Darl (Figure 3D), Yarbrough (Figure 3E-H), and Ellis (Figure 3I). The lack of ceramics at this site indicates that there was little activity at this location during the Early Ceramic period.

Late Prehistoric period

Although no ceramic specimens are included in this collection, two arrow points indicate some use of this site during the Late Prehistoric (A.D. 600-1500) time period. One specimen is a Scallorn point (Figure 3J) and the other specimen is an arrow point made from a worked gar scale (Figure 3K). An arrow point preform (Figure 3L) was also found.

General lithic collection

Formal lithic tool types found here include 2 bifacial drills (Figure 4B,C), a bifacial perforator (Figure 4D), and a large unifacial graver (Figure 4E). Two miscellaneous large biface fragments were also found.

The manufacture of dart points at this site is indicated by 3 preforms and 2 unclassified dart points (Figure 4F,G) that may actually be preforms. Two other unclassified dart point fragments found here may represent manufacturing failures.

Two quartzite hammerstones (25 and 50 mm diameters) and two quartzite hammerstone fragments found here are other indications of lithic manufacturing activities. A few lithic flakes also indicate manufacturing activities. The collection includes 23 chert flakes, with specimens mainly of sizes under 15 mm square, but a few of sizes up to 50 mm square.

A large leaf-shaped biface (Figure 4I) may be a dart point or a knife. This specimen has a long impact flute on one edge. It is not clear whether this flute was formed during manufacture or during use as a weapon.

External relationships

Several other prehistoric sites have been found on the same long remnant terrace as site 41FB198. Some of these include 41FB95 (Patterson and Hudgins 1987), 41FB90 (Patterson and Black 1991), and 41FB3 (HAS field notes). Site 41FB95, which is about one mile from site 41FB198, has a collection with important similarities to the collection from site 41FB198. Both collections cover the same time range from the Late Paleo-Indian through the Late Prehistoric time periods. Both collections also lack ceramics and have a few arrow points. It appears that there was little use of these sites, and perhaps this specific area in general, during the Early Ceramic period, and only short-term use of these sites during the Late Prehistoric period. While it is possible that collectors may have overlooked some pottery specimens at sites 41FB95 and 41FB198, it is not likely that potsherds would have been missed if they occurred in significant concentrations.

Site 41FB198 is located in the western portion of Southeast Texas. Projectile points found here are a mix of Central Texas (Southern Plains) and Southeast Texas (Eastern Woodlands) types, as is common for this geographic zone (Patterson 1983: Table 1).

Summary

The collection described here for site 41FB198 covers a long occupation sequence from the Late Paleo-Indian through the Late Prehistoric time periods. Surface collections of diagnostic artifacts are important in enhancing the regional archeological data base. It is especially important to record archeological collections while the original geographic context can still be determined.

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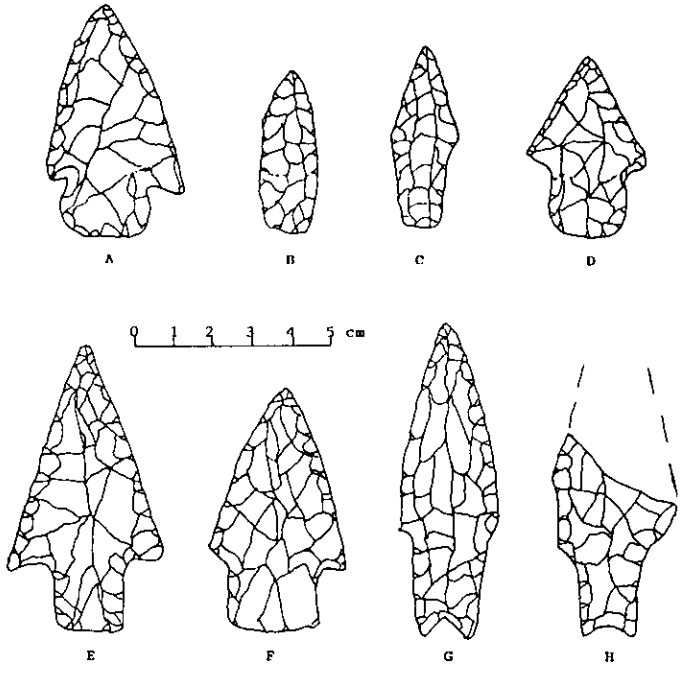
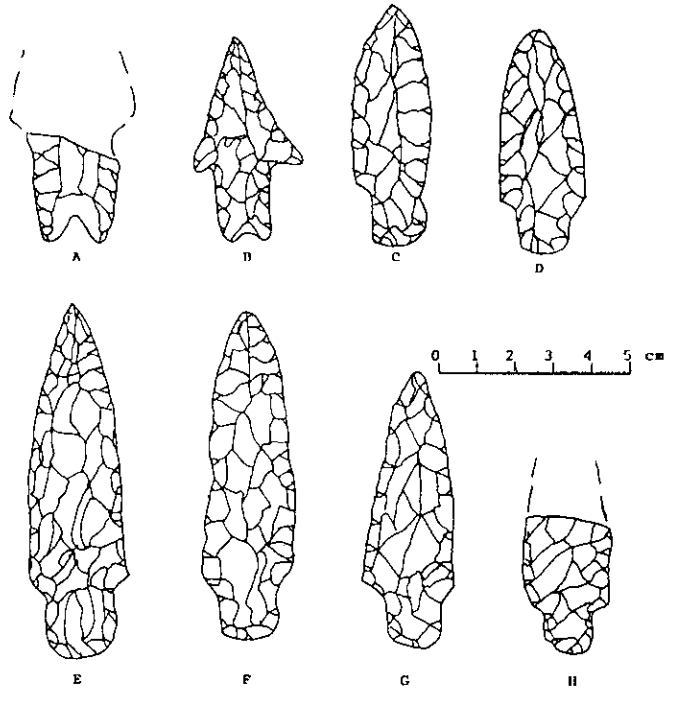
Table 1. Summary of Projectile Points

type	number
Early Side-Notched	1
misc. lanceolate	1
Early Stemmed	1
Bulverde-like	2
Bulverde	1
Pedernales	4
large Kent	6
large Gary	2
small Gary	2
Darl	1
Yarbrough	4
Ellis	1
Scallorn arrow point	1
gar scale arrow point	1
unclassified dart points	4
dart point preforms	3
arrow point preforms	1



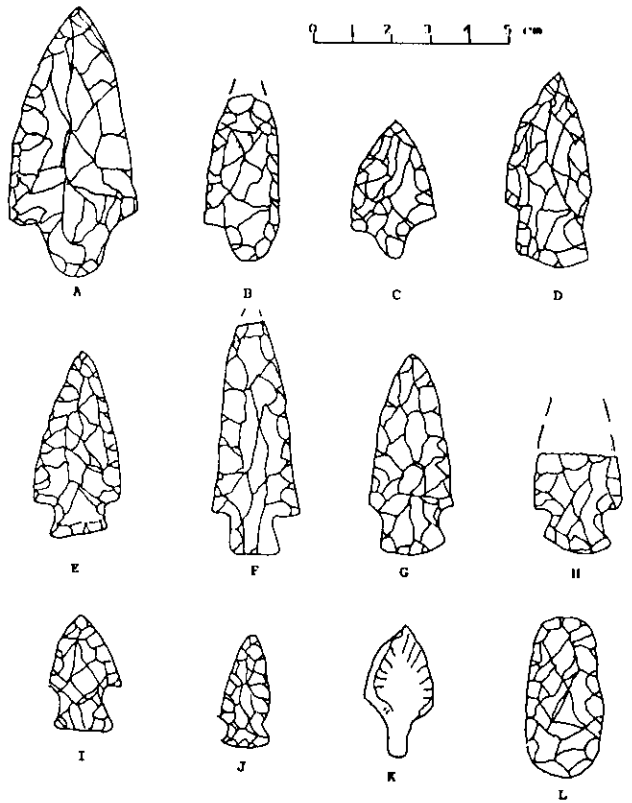
A – Early Side-Notched; B – lanceolate; C – Early Stemmed;
D,F – Bulverde-like; E – Bulverde; G,H – Pedernales

Figure 1. Site 41FB198 dart points



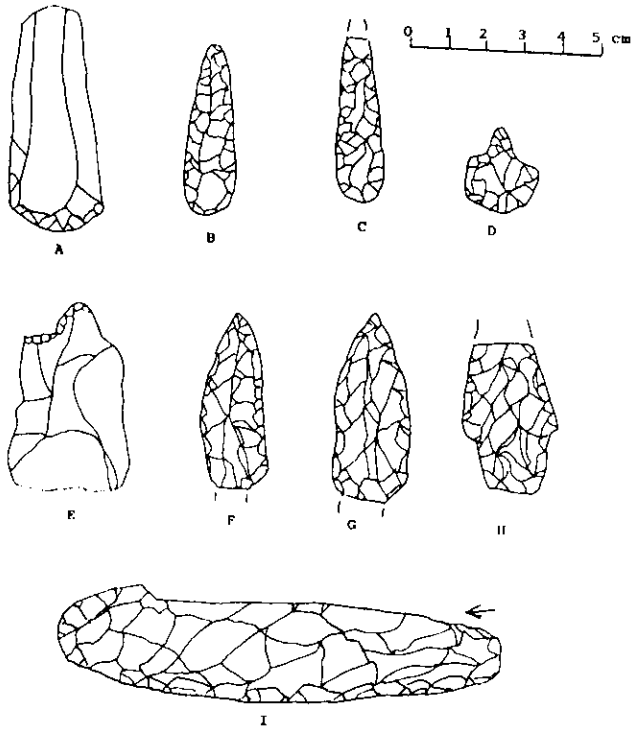
A,B – Pedernales; C to H – Kent

Figure 2. Site 41FB198 dart points



A to C – Gary; D – Darl; E to H – Yarbrough; I – Ellis;
J – Scallorn; K – gar scale arrow point; L – arrow point preform

Figure 3. Site 41FB198 projectile points



A – end scraper on blade; B,C – drills; D – bifacial perforator;
E – unifacial graver; F,G – unclassified dart points; H – Gary point;
I – dart point or knife

Figure 4. Site 41FB198 lithic artifacts