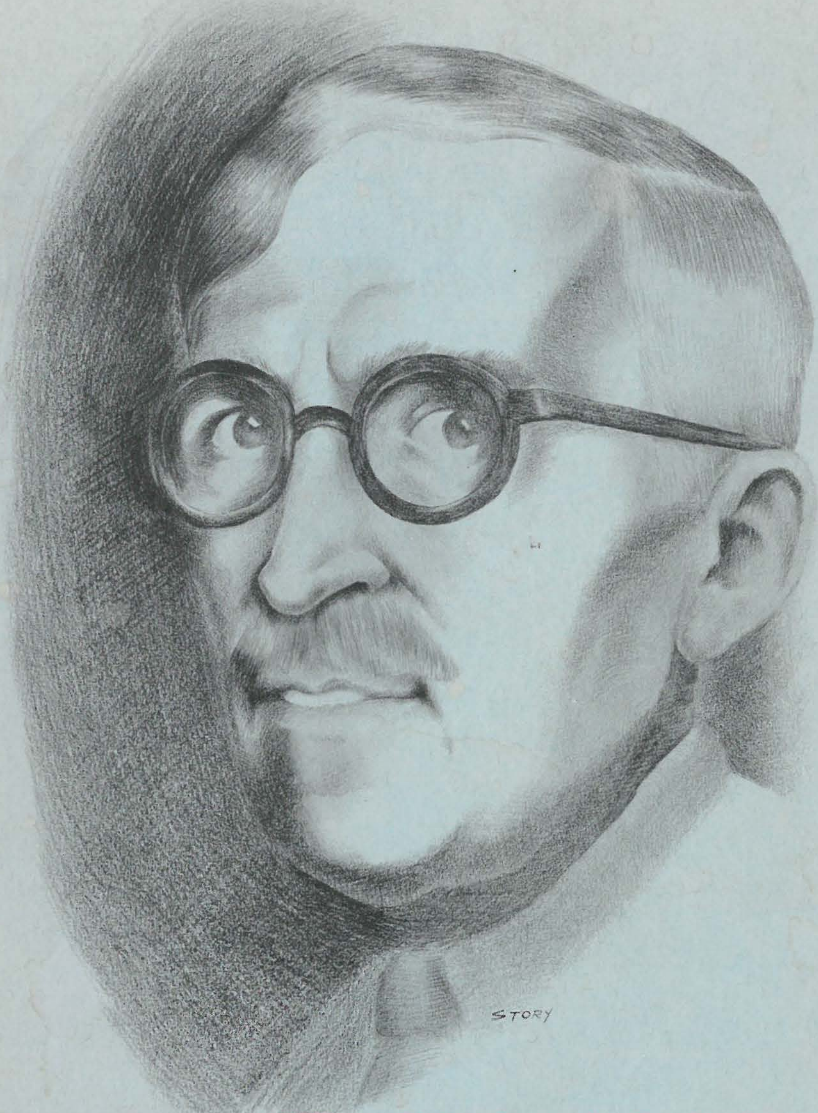

BULLETIN OF THE TEXAS ARCHEOLOGICAL SOCIETY

The George C. Engerrand Volume

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TEXAS ARCHEOLOGICAL SOCIETY

(Formerly Texas Archeological and Paleontological Society)

The society was organized and chartered in pursuit of a literary and scientific undertaking; for the study of the history, prehistory and the major artifacts of man and the fossils representing the past floras and faunas of Texas; for the encouragement of the proper collection and preservation of such artifacts and fossils in museums and their study and classification and the publication of the results of researches incident thereto.

The *Bulletin* is published annually for distribution to members of the society. Opinions expressed herein are those of the writers, and do not necessarily represent the views of the society or the editorial staff.

Officers of the Society for 1961

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BULLETIN

of the

TEXAS ARCHEOLOGICAL SOCIETY

Volume 32, for 1961

Editor: T. N. Campbell

Assistant Editors:

E. Mott Davis

Edward B. Jelks

Published by the Society at Austin, Texas, 1962

This issue is dedicated to the memory of

GEORGE CHARLES MARIUS ENGERRAND

1877–1961

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IN MEMORIAM

George Charles Marius Engerrand*

A. P. BROGAN, J. G. MC ALLISTER, AND T. N. CAMPBELL

Dr. George Charles Marius Engerrand, Emeritus Professor of Anthropology at The University of Texas, died at the age of 84 in Mexico City on September 2, 1961. His long career as a scientist and teacher includes two disciplines (geology and anthropology), three languages (French, Spanish, and English), and four countries (France, Belgium, Mexico, and the United States). He was known for the breadth of his intellectual and professional interests, for his command of anthropological literature, and for his magnetic personality in the classroom. He had the respect of scholars, students, and laymen.

Dr. Engerrand was born on August 11, 1877, at Libourne near Bordeaux in southwestern France. He was of French Basque ancestry and was proud of being both Basque and Gascon. He exhibited the rugged independence of both but was too modest and self-effacing to be typically Gascon. He received no formal secondary education but was taught at home by private tutors who prepared him for the examinations required for the B.S. degree. In France at that time a B.S. degree entitled the student to enter a university.

In 1895, at the age of 18, Dr. Engerrand enrolled as a student in the Faculté des Sciences of the University of Bordeaux. After three years of study in the natural sciences he received two degrees, a Licentiate in Geology (1897) and a Licentiate in Botany (1898). In the early part of his career as a student at Bordeaux, Dr. Engerrand's prime interest was paleontology. Then he read Topinard's *Éléments d'anthro-*

* This memorial resolution appears in *Documents and Minutes of the General Faculty of The University of Texas*, pp. 7805–7808. It was filed with the Secretary of the General Faculty by T. N. Campbell, Chairman of the Special G. C. M. Engerrand Memorial Resolution Committee, on November 18, 1961, and was distributed among the members of the General Faculty by the University Stenographic Bureau on December 20, 1961. Its publication here has been approved by the Secretary of the General Faculty.

George C. M. Engerrand

pologie générale and acquired a new interest—anthropology. This was further stimulated by the sensational archeological discoveries that were then being made in the nearby Dordogne region. He also began attending lectures by Émile Durkheim, the famous French sociologist, who at that time was teaching at Bordeaux.

During his last year at Bordeaux the Dreyfus controversy rocked France, and Dr. Engerrand aligned himself with a group of students who spoke out for Dreyfus. He decided that he could not voluntarily serve his term of military service until Dreyfus was returned from Devil's Island. In 1898 he went to Brussels, Belgium, and never lived in France again.

He chose Belgium because the great geographer, Élisée Reclus, also a Gascon, had invited him to teach at L'Institut Géographique de Bruxelles. Between the years 1898 and 1907 he held various research and teaching positions in Belgium, some of them concurrently. He was a geologist on the staff of the Service Géologique de la Belgique and eventually held professorships at a number of other Belgian institutions. During this Belgian period Dr. Engerrand published frequently, and he became more and more concerned with anthropology. His most important work was a book, *Six leçons de prehistoire* (1905), for which he received the Prix de Keyn from the Belgian Academy of Sciences. He was much in demand as a popular lecturer and became deeply interested in university extension work, an interest he retained throughout life.

His long dream of going to Mexico was realized in 1907 when the Mexican government invited him to serve as a geologist with the Mexican National Geological Survey. In time he became chief geologist, and his field work took him to many parts of Mexico. He always managed to do some anthropological work in connection with his geology. In 1908 he was also made Professor of Archeology in the Museo Nacional de Arqueología, Historia y Etnología, a position he held until 1914. For the year 1912–1913 he was elected director of the International School of American Archeology and Ethnology, succeeding the North American anthropologist Franz Boas.

Political revolutions made it impossible for Dr. Engerrand to continue work in Mexico, and in 1917 he left for the United States. After teaching one year at the Gulf Coast Military Academy at Gulfport, Mississippi, he accepted a position as Assistant Professor of Geology at the University of Mississippi, where he also acquired an M.A. degree.

In 1920 Dr. Engerrand came to The University of Texas as Adjunct

Professor of Anthropology. In 1923 he was made associate professor and in 1929 professor, a position he held until he became emeritus professor one day before his death. He became interested in the Wend colonists and their descendants in Texas and published a monograph on these people in 1934. He also received the Ph.D. degree from The University of Texas in 1935. During the summers of 1943–1946 inclusive he was a visiting professor at the Universidad Nacional Autónoma de México. In 1959 he was awarded La Croix de Chevalier de l'Ordre des Palmes, a French government decoration for distinguished teaching and scholarly publication. At the time of his death he was writing a biography of his friend, teacher, and associate, Élisée Reclus.

Dr. Engerrand is survived by his wife, five children, and eleven grandchildren. In 1898 he married Alice Delsaute, from whom he was separated in 1902. Two sons were born of this marriage—Élisée, now an attorney in France; and Gabriel, who teaches at North Georgia College. In 1904 Dr. Engerrand married Jeanne Richard, who survives him and lives in Austin. They have three children, one son and two daughters—Jacques of Kent State University in Ohio; Jeanne, wife of W. F. Helwig of the Department of Electrical Engineering at The University of Texas; and Anita, wife of F. H. Gafford of North Texas State University.

Dr. Engerrand's main contribution to The University of Texas was his forty years of successful teaching. Over these years he taught a variety of courses, each of which was carefully prepared on the basis of the latest and most reliable data. In the classroom he was dynamic and exciting, and his students felt compelled to do their best. His wit, his encyclopedic knowledge, and his cosmopolitan background made a fine antidote for Texas provincialism. Taking a course with Dr. Engerrand was, for most students, an unforgettable experience.

Publications of George C. M. Engerrand

Abbreviations

AMN	Anales del Museo Nacional de Arqueología, Historia y Etnología.
BMN	Boletín del Museo Nacional de Arqueología, Historia y Etnología.
BMSA	Bulletins et Mémoires de la Société d'Anthropologie de Paris.
BSAB	Bulletin de la Société d'Anthropologie de Bruxelles.
BSBG	Bulletin de la Société Belge de Géologie.
BSGM	Boletín de la Sociedad Geológica Mexicana.
BUPM	Boletín de la Universidad Popular Mexicana.
E	L'Essor.
EIS	Encyclopédie Illustrée du Soir.

EUB	Extension Universitaire de Belgique (pamphlets).
HP	L'Homme Préhistorique.
ICA	Reseña de la 2a Sesión del 17° Congreso Internacional de Americanistas, México, 1910.
IGB	L'Institut Géographique de Bruxelles Publications.
JMH	The Journal of Modern History.
MSC	Memorias de la Sociedad Científica "Antonio Alzate."
PIGM	Paregones del Instituto Geológico de Mexico.
RA	Revue Anthropologique.
RGS	Revue Générales des Sciences.
SHQ	The Southwestern Historical Quarterly.
SLB	Société Linnéenne de Bordeaux.
SSSQ	The Southwestern Social Science Quarterly.
UTB	The University of Texas Bulletin

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The University of Texas
Austin, Texas

George C. Engerrand in Europe, 1898–1907

W. W. NEWCOMB, JR.

At the opening of the twentieth century modern anthropology was just getting under way, a strange, unfamiliar word for a then amorphous science growing out of a maturing western world and from new discoveries about the world and man. As early as 1836, Boucher de Perthes in France had maintained that man had been a contemporary of extinct animals, though it was not until more than twenty years later that the stone artifacts of his proof were accepted by the scholarly community of Europe. In 1859, the bomb of Darwin's work exploded, reducing to rubble the fantasies of the medieval mind and leaving a deep impression not only on biological anthropology but on all its fields. Discoveries such as *Pithecanthropus erectus* in Java, the recognition of what Neanderthal man represented, and the work of many men in all the countries of the West brought the new science into a promising being by the beginning of the new century. George C. Engerrand was not, of course, present at the birth of the new science. Perhaps he should not even be called one of its pioneers, but he arrived on the scene—it is difficult not to think of it as a wild frontier—just after its boundaries had first been explored, and before its roads had been built or its fields cleared. It was an exciting time to become an anthropologist; to participate vociferously in its growth and to witness its very considerable development over the next half century and more is an experience shared by few others.

Engerrand came into the field of anthropology, as so many others after him, from geology. His first published papers were in this field. "Note sur un exemplaire de Gaulteria orbignyi trouvé à Blaye dans les carrières du haut de la ville," "Note sur deux nouveaux affleurements du calcaire grossier supérieur dans les environs de Blaye," and "Note sur un nouvel affleurement de falun situé dans la propriété de M. Piganeau, à Mérignac" all appeared in the *Bulletin de la Société Linnéenne de Bordeaux* in 1898. These brief papers resulted from a reconnaissance of the Department of Gironde in southwestern France, and he wrote enthusiastically of the discovery of new strata and their fossils. Emigrating to Belgium, and positions as Professeur á l'Institute des Hautes Études de Bruxelles and in l'Extension Universitaire de Belgique, his interest in geology continued. For example, he published a two-part review in 1902 of "Le Quaternaire Belge" in the *Revue Générale des Sciences*. Part 1 is a concise summary of the stratigraphy, fauna, and flora of Belgium during the Quaternary. Part 2, entitled "Les industries humaines," signals a new-found interest in prehistory, an interest or rather a devotion, which occupied him until his death. His conception of eoliths, derived from his mentor, M. A. Rutot, then Conservateur au Musée d'Histoire Naturelle de Bruxelles, is here found for the first time.

In the next several years Engerrand's interests ranged wider, finding expression in a number of Belgian publications. Some were unsigned and the soubriquet "Georgerrand" was often used in the *Encyclopédie Illustrée du Soir*. One short article, published in this journal in 1903 and entitled "Histoire du littoral Belge" (unsigned), was a summary of the geological and cultural history of the Belgian coast, with emphasis on the more recent past. Another of the same year, "La terre à briques de Boom et ses fossiles" (signed "Georgerrand"), told in part the tragic story of Arsène Dumont, as did another entire piece, "Démographie." Dumont, one of the founders of modern demography, was unable to pay his bills and for this reason took his own life. That society should so neglect its needed and most able members deeply shocked Georgerrand, and his biting criticism of it is as pertinent today as it was then. Dumont had assiduously sought the causes of depopulation then occurring in various French communes, and Engerrand was keenly interested in this phenomenon. It should be remarked that Dumont was one of the first to ascribe multiple socio-cultural causes for such population changes, and he was able to suggest specific factors responsible for the depopulation of certain regions.

"Un apôtre" ("An Apostle"), which briefly reviewed the life and accomplishments of Boucher de Perthes, also appeared in 1903, as did "Notions sur les premiers âges de l'humanité." This twenty-four page review of European prehistory, published by the Extension Universitaire de Belgique, demonstrated Engerrand's marked talent for condensing the pertinent facts of prehistory into a relatively few pages in a style the man in the street, or the people its author taught in the extension university, could readily comprehend. The extension university also published "L'Origine de l'homme," one part of *Six conférences sur l'évolution*. This brief summary paper is composed of a series of statements of fact and belief, and deductions from these, demonstrating that man is an anthropoid, that he evolved from non-man, and, finally, that his beginnings predate the Quaternary.

The productive year 1903 also saw publication in *Encyclopédie Illustrée du Soir* of "Les premiers évolutionnistes," in which the relatively new idea of evolution, which Engerrand fervently embraced, was examined in historical perspective. Actually a review of C. Fenizia's *Storia della evoluzione* (Milan, 1901), Engerrand recounted the insights concerning life and the principles of evolution that had dawned or almost dawned on the savants of the classical world. But he rightly concluded "La vérité ne se révèle pas subitement dans les esprits; elle se conquiert par de pénibles travaux et de longues recherches." ("The truth is not suddenly revealed in the mind; it is conquered by intensive work and lengthy studies.")

"Le collectionnisme," signed Georgerrand and placed in the *Encyclopédie*, also appeared in 1903. The vandalism of archeological sites was a subject about which he had written before in "Le Quaternaire Belge." The more recent essay could well be translated and inserted in a modern American archeological newsletter, both for its pertinence and because it is written with a dash and fire not often enough encountered these days. To him there were two kinds of collectors, those who made collections to study and those who did so ceremonially, to gratify mere personal whim and ego. He also distinguished between harmless collections of infinitely available specimens, such as leaves or butterflies, and archeological collections which are limited in number. He then caustically criticized those who were pillaging archeological sites all over Europe merely to gratify individual whim. Finally, he suggested that antiquities laws based on those already in effect in Denmark be enacted.

Rounding out the year 1903, Georgerrand penned an essay on oceanography, "L'Étude de la mer." At that point in history Belgium had done nothing to improve her knowledge of the sea, although neighboring countries had already begun scientific studies of the seas and were reaping practical benefits from them. The author, never one to let such impractical neglect pass unnoticed, made a strong plea for the government to establish a center for the study of oceanography.

The year 1905 marked the publication of Engerrand's major European work, *Six leçons de préhistoire*. It is a summary of an elementary course in prehistory given in different Belgian cities under the auspices of the extension university, but it is something more than a textbook review of what was then known about European prehistory. The first lesson is introductory in nature, defining what prehistory is, briefly surveying its development, and concludes by criticizing the shortcomings of some who have contributed more confusion than knowledge to prehistoric studies. Altogether it is a charming introduction, particularly for those who are surprised to encounter Gallic battlecries at various junctures, and to find sections concluded with such observations as "Mais la vérité triomphe toujours." ("But the truth always triumphs.")

The second lecture is entitled "L'Homme Tertiaire" (Tertiary Man) and, together with the third lesson, "Les éolithes," makes the book more than a text. For this, apparently, was one of the first times the arguments for the acceptance of an eolithic age had all been put together in one place. Drawing on the work of M. A. Rutot and others, Engerrand strongly championed the cause of an eolithic stage and, as a result, was shortly to become embroiled with Marcellin Boule in a heated argument. Chapter 2 opens with a discussion of the Tertiary, examining its climate, fauna, flora, and paying particular attention to the evolution of the primates, building a case for the logical stand that the relatively sophisticated flint knappers of the Old Stone Age must have developed from more primitive beginnings. From these prefatory remarks the author turns to a discussion of various sites where "eoliths" were found—Thenay (Loir-et-Cher), Puy-Courny (Cantal), and Saint-Prest (Eure-et-Loir) in France, Otta near Lisbon, the chalk plateau of Kent and the Cromer forest beds of England. This discussion is capped by a review of the recently (1894) discovered remains of Java man, *Pithecanthropus erectus*. In the third lesson, following Rutot, a series of Belgian Quaternary eolithic industries are described—"Reutélien," "Mafflien," and "Mesvinien." This chapter also discusses what eoliths are, describes the history of their discovery, and contains a detailed examination of the objections to the acceptance of eoliths. The geology of the Quaternary is carefully outlined, other pertinent matters are discussed, and a strong argument for an eolithic stage is made.

As is true of many similar controversies, both sides have since proved to be partly right and partly wrong. Certainly Engerrand's logic was impeccable. Lower Paleolithic cultures, the Chellean for example, were preceded and derived from more primitive cultures of earlier times. But in the enthusiastic search for what had to be, the difficulty—even the impossibility—of recognizing these cruder remains was evidently not fully appreciated. The eoliths of Thenay and Puy-Courny, both of which Engerrand felt showed traces of having been used by man, are now regarded as from Miocene deposits and entirely the result of natural causes (Breuil and Lantier, 1959: 67). The pieces of flint found in the Tertiary gravels on the North Downs of Kent, the so-called Harrisonian eoliths, can be duplicated by flints chipped naturally by the friction of one stone against the other which occurs in soil-creep (Oakley, 1957: 11). Even Rutot's Belgian Quaternary eolithic industries are now regarded as being naturally chipped flints, lacking proof of being made or used by man (Breuil and Lantier, 1959: 67). In fact, the only flints that have stood the test of time and intensive study are those from the Cromer forest beds. These East Anglia flints were presumably derived from a deposit laid down in the interglacial preceding the Mindel glaciation, and so are generally regarded today as Lower Pleistocene. Large flakes, presumably from this deposit, have been picked up along the shore at Cromer. But that they come from the Cromer forest beds has not been demonstrated. Crude hand-axes have been found *in situ* in the deposit, however, and are now considered to be pre-Chellean tools, not eoliths (Leakey, 1960: 68–69).

Dawn stones—eoliths—undoubtedly exist. Early men, as do modern campers intent on pounding a tent stake, picked up suitable rocks and used them as temporary tools. But to identify any particular pebble as an eolith, or even a piece of flint which has fortuitously come to resemble a hand-axe, scraper, or knife, and claim man used it, is to err. An eolithic stage in human cultural development was a logical construct to build; in fact, such a postulate may be regarded as almost inevitable, but for all of that it was an impossible one to demonstrate. In addition, the tremendous increase in knowledge about fossil man since the beginning of this century has brought general agreement that "man or a precursor very similar to him" did not "make his appearance on earth toward the middle of the Tertiary epoch." A chronically tool-using, tool-making primate, that is, man, is as yet confined to the Quaternary.

The remaining three chapters of *Six leçons de préhistoire* are concerned with the Lower Paleolithic, Upper Paleolithic, and Neolithic. They comprise a concise summary of European prehistory, and illustrate again the author's ability to compress a large amount of factual data into a relatively few pages. The publication of this book provoked a reply by Marcellin Boule in the pages of *L'Anthropologie* ("L'Origine des éolithes," Tome 16: 257–267) in which he roundly attacked the position of all those who accepted eoliths. Such men as Harrison, Bell, Shrubsole, Lewis-Abbott, Ashington Bullen, Johnson, and others in England; Capitan, Chantre, Thieullen in France; Hahne, Klaatsch, Krause, Schweinfurth, and others in Germany; and Rutot in Belgium, who was named as the head of this school of thought, were singled out by Boule. You might say that Engerrand, significantly not mentioned by Boule, stood with a large and distinguished company. It was in this article that Boule reported on his experiments in which, by mechanical means, he had produced eoliths. Engerrand soon replied to this assault in a privately printed paper, entitled "Les éolithes et la logique." In it he ridiculed Boule's manufacture of "artifactual" eoliths, suggesting that it was possible with modern machinery to make things much more complicated than eoliths, and again demonstrating that logically a cultural stage must have underlain the Paleolithic. Thus ended the controversy, but by such debate understanding is tested and strengthened.

The broadness of Engerrand's anthropological interests was again illustrated in 1906 by the publication of several articles. In "Les arts plastiques chez les peuples primitifs" he noted that in primitive societies men were more gaily ornamented than females, as with many male birds and other animals. Setting up an interesting classification of art forms, he also suggested that adornment of the body was the most elementary form of art. "Les géants, d'après MM. P. E. Launois et P. Roy," was a review of their *Études biologiques sur les géants*, demonstrating a continuing interest in human biology and abnormality. Another article, "A propos de la Grotte de Furninha," concerned a debate with M. J.-F. Nery Delgado, which had also been mentioned in "Les éolithes et la logique." A case of misunderstanding, it was Engerrand's contention that unknown vandals had despoiled the archeological remains of this cave while seeking treasure.

In 1907, closing out his writings in French and his Belgian sojourn, Engerrand published a three-part article in *L'Essor* concerning popular education in Belgium. Education had always been one of his keen interests, and nowhere is it better shown than in this article. He stated that the need for knowledge had become greater and greater for all classes of citizens, and that this popular demand had resulted in the creation of the extension universities. In the courses which were given, or at least in those he gave, the aim was not only to give scientific facts but to inculcate the scientific spirit. His feeling about the necessity for education was summed up in the concluding lines of Part I: "Ignorant people," really ignorant nations, "are incapable of realizing great works."

The second and third parts of "L'Enseignement populaire en Belgique" are most interesting and revealing, not so much for what they relate about their author, but in the picture they portray of Belgian society at the beginning of the twentieth century. We are treated to a vivid picture of the worker who spat on the lecture room floor because he knew no better and the bourgeoisie who spat on the floor because he did, or at least spat because he did not care for the niceties of etiquette. The author suggests ways of improving such behavior, mostly by the example to be set by extension professors. If the professors removed their hats on entering the lecture halls, most of the audience would do likewise, claims the optimistic author. In short, Engerrand not only attempted to inculcate the scientific spirit in extension courses, but he also hoped to implant civilized etiquette and raise the general level of behavior of his students. He likewise suggested that attempts be made to improve the attractiveness of lecture halls—to provide flowers, blackboards, heat, etc. It is hard to imagine that American professors, and presumably their modern Belgian counterparts, could successfully teach the type of students in the kind of setting that Engerrand was so familiar with in Belgium at the turn of the century.

This brief reveiew does not cover by any means all of the published work in French of George C. Engerrand, as a glance at the attached (perhaps incomplete) bibliography will show. He wrote many book reviews and other articles, some of which I was unable to obtain. I believe, nevertheless, that his major works and the principal currents of his thought have been covered here, enough certainly to suggest the breadth of his interests and his deep concern with education.

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George C. Engerrand in Mexico, 1907–1917

JOHN A. GRAHAM

Under invitation of the Mexican Government George C. Engerrand left Europe to go to Mexico in 1907 as a geologist. During the subsequent ten years in Mexico, until 1917 when he came to the United States to begin his long, fruitful academic career here, Engerrand was engaged in a wide variety of scholarly activities only partly reflecting the breadth and depth of his versatile personality. Here I attempt to review briefly this ten years of work and to assess their significance in the history of Mexican studies. Although Engerrand published numerous short papers and communications from his Mexican work, a great deal of it unfortunately remained unpublished.[1] In particular he had planned several monographs, including one on his excavations in Colima in 1912 or 1913; surely at least in part the failure to produce these studies may be attributed to his unforeseen and untimely departure from Mexico in 1917, when the unstable conditions of revolutionary Mexico rendered continuance of scientific field work largely impossible.

Engerrand had come to Mexico in 1907 as a geologist, and his association with the government geological agency, the Instituto Geológico Nacional, where he held the position of Chief Geologist, Tertiary-Quaternary Section, lasted until 1915. Although by this period geological research in Mexico was being implemented largely by Mexican geologists, Engerrand was in a sense a continuation of an earlier tradition when Mexican geological studies had been carried out largely by European geologists. It was not until 1888 that the Mexican Government, having been convinced of the necessity for organizing a comprehensive program for the development of Mexican geological studies, created the Geological Commission which led to the establishment of the Instituto Geológico Nacional a few years later. From the

[1] The list of Engerrand's Mexican publications in the bibliography of this paper should be fairly complete, although some minor titles have probably escaped me. I am indebted to T. N. Campbell for providing a basic bibliography of Engerrand's publications for this period.

beginning one of the Institute's primary aims had been the creation of a definitive geological map of Mexico, and much of Engerrand's geological work in Mexico was in connection with the development of this map.

In 1908, 1909, and 1910 Engerrand made important surveys in Chiapas, Campeche, and Yucatan, and in 1911 he participated in the extensive Baja California survey. He worked in Vera Cruz and Tabasco, and there is also a casual reference to mapping done in Tamaulipas in 1911 or 1912 (Engerrand, 1912: 122). As much of the surveying seems to have remained unpublished, although presumably reports were filed in the Institute, the full extent of Engerrand's field work is not immediately apparent. In any event he was soon recognized as a leading authority on Mexican geology and was later invited to prepare the section on Mexican geology for the 14th edition of the *Encyclopedia Britannica* (Engerrand, 1929).

I am not qualified to assess accurately the importance of Engerrand's contributions to Mexican geological science, even if that were possible from his published works. Perhaps, however, his significance was greatest in the influence and impetus of his personal contact with Mexican geology. Engerrand brought to Mexico a highly trained and experienced mind, well grounded in academic and practical European education, not only in geology but in other related fields of natural science. He had an aggressive and scientifically ambitious personality always demanding the highest in standards. Unfortunately this was not an auspicious time for scientific and academic endeavor in Mexico and his career there was prematurely cut short.

The bulk of Engerrand's published works during his years in Mexico dealt not with geology, however, but with anthropology. In 1909 Engerrand became Professor of Prehistory in the Museo Nacional de Arqueología, Historia y Etnología, a position he held until 1914 simultaneously with his appointment in the Instituto Geológico Nacional. Although to a certain extent Engerrand considered himself, at this time at least, above all a *géologue et préhistorien*, his interests ranged over the whole field of anthropology. He published short communications on Maya dental mutilations, Aztec shell ornaments, a Spanish translation of the Italian text of Marquez's description of the Aztec calendar, and some interesting ethnographic notes on medicinal herbs used by Nahuatl-speaking Indians at Zumpango. He was very much concerned with the inadequacy of anthropological training offered in Mexico and in 1908 published with Fernando Urbina a lengthy discussion of anthropology as an academic discipline. He discussed the extent of anthropological instruction in Europe and in the

United States, urging recognition of the need of adequate instruction in Mexico, and concluded by presenting a comprehensive program for anthropological training in Mexico. It should be noted that this was during the period when Franz Boas and others were putting their efforts into the creation of the International School of American Archaeology and Ethnology in Mexico; perhaps this was a stimulus behind Engerrand's paper and plea.

Somewhat related to his concern with competent academic training in anthropology was his life-long interest in university extension work and in bringing the results of modern scientific investigation to the attention of the public. In a paper published in 1911 which discussed the university extension program in Belgium, particularly emphasizing instruction in anthropological and biological science, Engerrand appealed to Mexican national pride to provide similar opportunities for popular education in Mexico. He was also active in extension work itself in Mexico (Engerrand, 1915b).

Engerrand's sustained interest in physical anthropology is reflected in several papers and communications published during his period in Mexico (1907a, b; 1910d; 1912b, i). The first two of these, on gigantism and acromegaly and on "telegony" are general discussions, not based upon data gathered in Mexico and, in the case of the former, represent a continuance of an earlier interest. Another aspect of physical anthropology in which he manifested an abiding interest was racial mixture. The Société d'Anthropologie de Paris, with which in addition to the École d'Anthropologie he maintained association throughout his years in Mexico, had established a *Commission permanente pour l'étude des croisements ethniques* and devised a questionnaire for cases of mixture. In Mexico Engerrand briefly studied two cases of racial mixture, one in Tamaulipas of a Chinese-Mestizo crossing, and one in Yucatan of a Chinese-Maya crossing, which he reported to the Société. He photographed both families and noted in each case the predominance of oriental physical traits in the offspring, although he reached no specific conclusions. In each case he hoped to follow the growth pattern of the children to observe the stability or instability of the observed oriental traits. He also noted such points as moral qualities of the parents, although it is not clear whether he viewed these as possibly racially linked.[2] With Fernando Urbina he also wrote a paper

[2] This was of course just prior to Boas' *The Mind of Primitive Man*. However, Engerrand long and early displayed a keen interest in national culture and character and it may be that here he was interested in what pattern these diverse personality characters might be reflected in the children.

on public education in Mexico, which he felt should pay close attention to the matter of racial mixture. In particular he urged detailed records to be kept, including annual photographs, of the physical and moral development of the Mestizo population.

As Professor of Prehistory in the National Museum, Engerrand offered instruction in European prehistory. Students in the Museum at this time should have counted themselves exceedingly fortunate in having such experienced instruction in the subject. His plan of instruction, involving a course program of several years duration, included comprehensive lectures on the various Paleolithic industries as well as Paleolithic art and advanced Pleistocene geology.[3]

In addition to teaching he carried out field research. By virtue of his position as Chief of the Tertiary-Quaternary Section in the Instituto Geológico Nacional and his related field work in the preparation of the geological map of Mexico, Engerrand was able to conveniently combine his research responsibilities as prehistorian in the National Museum with his geological field work. In fact, his discovery of the Concepción Complex in 1909 was made during geological surveying of the Yucatecan peninsula.[4]

At Concepción, one *jornada* north of the Guatemalan frontier on the itinerary from Flores, Peten, to the ports of Campeche and Champoton, Engerrand discovered a rich lithic workshop resting upon an exposed Pliocene surface and otherwise lacking any geological association. The artifact complex, which Engerrand called the industry of La Concepción, was of exceedingly primitive aspect and recalled implements of French Lower Paleolithic typology; no forms of more advanced culture types, as pressure-flaked projectile points, manos and

[3] Scattered notes on the lecture topics and instruction are to be found in the different numbers of the *Boletín del Museo Nacional de Arqueología, Historia y Etnología*, Tercera Época, Tomos 1–2 (1911–1913), but see especially Engerrand, 1911c.

[4] Two preliminary reports were published on the Concepción discovery. The original report, published in 1909, does not give the discovery date. The second report, presented to the 17th International Congress of Americanists meeting in Mexico City in 1910, was essentially a brief summary of the 1909 report, together with a republication of the 1909 plates. Here it is stated that the discovery was made in 1900—presumably a printing error for 1909. In other places Engerrand gave the date of discovery as 1909, obviously the correct date since this was the year of the Upper Usumacinta-Campeche survey (Engerrand, 1910c: 258–259; 1912f: 492).

Modern writers appear to be unaware of the slightly fuller original report of 1909, since they cite only the later summary (cf. Aveleyra, 1950, and Wormington, 1957). It should be noted that the republished plates in the later report are, on the whole, distinctly inferior to those of the original publication.

and metates, or ceramics, were present. The discovery was made near the end of the long, arduous Upper Usumacinta-Campeche survey and limited time prevented a prolonged study of the site. Furthermore, as the horses were already heavily loaded and tired, only a representative sample could be brought back from the large number of artifacts observed. Relatively speaking, however, this was a sizeable collection compared to most other finds of reputedly early archeological complexes. Engerrand planned to return to the Concepción locality for further study and hoped also to discover other similar sites during the projected Campeche mapping survey, but these plans apparently could never be carried out.

While not contradicting an assumption of considerable antiquity for the Concepción materials, the geological circumstances precluded any good geological assessment of their age. Engerrand stressed the resemblances of the Concepción implements to the French Lower Paleolithic typology, thus a suggestion of "prehistoric" or great antiquity, but denied that this meant a comparable antiquity. His approach was cautious and his presentation rigorously scientific. Finally, 39 specimens were described and illustrated at ¾ or natural size in excellent photographic plates, the quality of which is seldom approached in most Mexican publications even of today.

In spite of Engerrand's cautious presentation of the Concepción implements at the 17th International Congress of Americanists meeting in Mexico City in 1910, considerable opposition arose to according the Concepción Complex any degree of respectable antiquity. I particularly recall hearing Engerrand's vivid account, in his inimitable style, of Hrdlička's comments with reference to the antiquity of man in the New World.

In a more recent appraisal of Engerrand's Concepción Complex, Aveleyra has written (Aveleyra, 1950: 42–44):

> Desde el punto de vista estrictamente tipológico, es preciso confesar que los artefactos de La Concepción presentan un aspecto de lo más genuinamente prehistórico, pudiéndose comparar, como el autor lo hace, con el material de los niveles más bajos del paleolítico europeo aunque, con loable reserva, indica que ésta relacion es simplemente hecha a base de tipología.
>
> . . . Los artefactos de La Concepción son completamente diferentes a cualquier otro complejo de piedra de horizontes históricos; su aspecto tosco, primitivo, su forma y las técnicas de trabajo que representan, parecen confirmar la opinion que de ellos expresa el señor Engerrand que cree tienen antigüedad prehistórica.
>
> . . . Es muy probable, aún teniendo como único buluarte el inseguro argumento tipológico, que Engerrand esté en lo cierto al asegurar que el

taller de La Concepción representa "la huella más antigua del hombre en la península de Yucatán."

Further evidence of Engerrand's cautious and rigorous attitude toward early lithic complexes of the New World may be seen in his description of a group of artifact-like specimens from Baja California which he found in 1911 during a combined geological-prehistoric reconnaissance. These he published and described as pseudo-eoliths, attributing them to natural processes (Engerrand, 1912a, 1913a, b). His discussion of the eolithic question which preceded this by way of introduction is essentially acceptable even today. With the exception of some important later studies, such as that of Barnes on the fracture angles of genuine Paleolithic tools versus those of eolithic assemblages and demonstrably naturally fractured stones, it remains an up-to-date and succinct summary of the eolithic problem and still may be read with profit.

The era of modern scientific archeology in Mesoamerica was inaugurated in the Maya area in 1881 when A. P. Maudslay first began his brilliant work. Maudslay laid the foundations of a scientific Maya archeology which has continued to develop largely uninterrupted since his initial work. Outside the Maya area the beginnings of scientific field archeology were later and were perhaps more diffuse and difficult to clearly delimit. In central Mexico it might be said that modern scientific field archeology had its inception in the work of the short-lived International School of American Archaeology and Ethnology. The School came into existence in 1910 and first opened in 1911 under the directorship of Seler. Boas succeeded Seler as director for the academic year of 1911–1912 and, characteristically, energetically set about carrying out an ambitious and comprehensive program for the development of anthropological studies in Mexico. Of very great significance was his program in archeology. Boas had gathered a large series of ceramic surface collections and proceeded to organize them into the now familiar tripartite division of Mexican archeology.[5] Boas then

[5] Under the names "tipo de los cerros" (i.e., Preclassic), Teotihuacan, and Aztec. In a recent paper Gamio has given the impression that it was he who established this initial classification: "Entonces fué cuando después de detenido estudio, logré establecer que había tres tipos principales de cerámica arqueológica en el Valle de México y eran los correspondientes a teotihuacanos, arcaicos y aztecas" (Gamio, 1959: 117). In this point, as in several other statements in his paper, Dr. Gamio's memory apparently served him poorly; he himself acknowledged in an early paper that it was Boas who had originally isolated these ceramic groups, coined the name "de los cerros," and gave the first description of the Valley of Mexico Preclassic (Gamio, 1920: 128). See also Adams, 1960: 99.

directed Gamio, one of his students in the school, to undertake the demonstration of the chronological succession of these ceramic groups or horizons through stratigraphic excavation. The resulting excavations at Atzcapotzalco produced the desired verification. This clearly was a landmark in the development of Mexican archeology and stratigraphic archeology continued to be employed in subsequent work by the School.[6]

Through the personal influence of Boas, Engerrand was selected by the Mexican Government to succeed him as director for the academic year of 1912–1913. Engerrand described his program for the year as follows (1912f: 492):

> Comme géologue et préhistorien, je vais surtout m'occuper de travaux archéologiques basés sur la stratigraphie et employer des métodes purement géologiques. Une série de sondages dans la vallée de Mexico vont me permettre de déterminer les points les plus importants en ce qui concerne la succession des civilisations et d'entreprendre, par conséquent, des fouilles complètes qui nous fassent arriver, s'il est possible jusqu'aux

[6] As Adams (1960) has recently pointed out, the importance of Gamio's excavation, slightly anticipating Nelson's most important work in the Southwest, has generally been overlooked. I would argue that great credit is due Boas for it seems to have been he who first conceived the importance of undertaking stratigraphic excavations in the Valley of Mexico and established the stratigraphic principle as a basic methodology of the School's archeological program. His successors, Engerrand, Tozzer and Hay, and Gamio fully appreciated the importance of the method and carried on the work (cf. Woodbury, 1960: 401). Stratigraphic observations of one sort or another had of course been made at various times earlier, but their great significance seems to have been rarely appreciated and not adequately exploited. To mention only one instance, Holmes over two decades earlier called attention to the ceramic stratigraphy revealed in a deep exposure in Mexico City, recognizing the sherds from the upper levels as Aztec and those below as representing several earlier horizons of pottery style (Holmes, 1885: 68–81).

It would be of the greatest interest to know more of this real birth of stratigraphic archeology in Mexico with the work of Boas. Boas wrote in 1915: "A survey of the wells and brick-yards in the environment of the City of Mexico showed that this question (i.e., the sequence of cultures) could be studied by observations on geological sequence of strata. In the year 1911–1912 a careful investigation . . . was carried out under supervision of the Director (i.e. Boas) by Mr. Manuel Gamio" and conclusively proved the sequence of the three civilizations (Boas, 1915: 385). I cannot but conjecture whether Engerrand may have had some role in the development of the idea of applying the stratigraphic method at this time; he was freshly arrived from Europe with wide experience in geological stratigraphy and the current field work being carried out in European Paleolithic archeology. I have absolutely no evidence for this conjecture, although Boas does acknowledge the aid of Engerrand in studying the geological strata of the excavations (Boas, 1913: 176). In any case, Engerrand certainly embraced with enthusiasm the application of the stratigraphic principle in archeology.

couches quaternaires ou du tertaire supèrieur, de façon à étudier definitivement la question de l'homme préhistorique dans cette riche région qui a toujours été un centre d'attraction pour l'homme américain. Des études analoques se feront dans l'État de Michoacán et dans celui de Campèche, sur la frontière du Guatemala où j'ai trouvé, en 1909, des restes d'un type tout spécialement archaique. En dehors de cela, des fouilles seront faites dans les régions limitrophes des États de Vera-Cruz, Puebla y Oaxaca, où se reunissent trois civilisations differentes. Enfin des études de linguistique, de folklore et d'ethnologie seront entreprises en plusieurs points déterminés.

Thus Engerrand conceived a broad program of investigation, continuing the work of Boas and building upon its important foundations. His program fully demonstrates Engerrand's appreciation of the application of the stratigraphic method to archeology in the Valley of Mexico; but to reiterate this point, which is of great significance for this stage of American archeology's development, I quote from his address at the opening of the annual exposition of the School in 1913, at the end of his year of directorship (1913c: 263):

El método seguido en los estudios arqueológicos ha sido el moderno o sea el estratigráfico, que se aleja bastante del que llamaré tradicionalista. Se hacen excavaciones, estudiando con todo cuidado lo que se va encontrando en las capas sucesivas, de manera que, según este método, un fragmento de tepelcate adquiere el mismo valor que un fósil, pues cada uno de ellos es un dato determinativo, al que se le puede atribuir por sus caracteres, un lugar relativo en el tiempo.

As noted in his report on the work of the School during his year as director, it was not possible to carry out all of his program due to the unstable conditions of the time (Engerrand, 1914: 239). Nevertheless, two students, Isabel Ramirez Castaneda at Culhuacan and Manuel Gamio at Santa Lucia and Atzcapotzalco, carried out further stratigraphic tests, continuing the School's work of the previous year. Engerrand himself made several soundings in the Valley of Mexico in an effort to tie archeological complexes to the local geology as well as undertaking a series of archeological excavations in Colima.[7] The other two Fellows of the School, J. Alden Mason and Paul Radin, carried out linguistic, ethnographic, and folklore studies.

I have little data for Engerrand's activities in Mexico following completion of his year as director of the School until his departure in 1917.

[7] Engerrand, 1913c, d; 1914. Although there exist several references to the Colima report "in preparation," apparently none of Engerrand's work saw publication.

His professorship in the National Museum ended in 1914 and his association with the Instituto Geológica Nacional ended in 1915. Other than a short communication to the *Revue Anthropologique* on the work of the School during his directorship and a paper on folk medicine and herbs used at Zumpango, I know of no publications for this period.[8] This was an increasingly difficult period of time in Mexico, and I can only conjecture that in terms of research it was not very fruitful, particularly after 1915.

In recalling some of the more salient points which I have tried to bring out above concerning Engerrand's anthropological career in Mexico, several matters should be borne in mind. Engerrand came to Mexico as a geologist; with the exception of a year's leave of absence from the Instituto Geológico Nacional in 1912–1913 to assume directorship of the International School, most of Engerrand's time was probably consumed in his geological studies, through which he acquired an outstanding reputation as an authority on Mexican geology. Furthermore, we are dealing with a very short period in his career, a period in which scientific and academic endeavor became increasingly difficult due to the instability of the times. Finally, much of his work went unpublished and unfinished, probably in part a result of the unforeseen difficulties of a revolutionary Mexico.[9]

In Mexican archeology Engerrand as a European prehistorian was certainly something of a *rara avis*. In a field in which virtually no attention has been given to preceramic cultures even until most recently, Engerrand devoted himself to a considerable extent to discovering a Mexican prehistory—in the narrower sense of this term. In a time when some were recognizing New World "Paleolithic" assemblages on the scantiest of evidence and many were denying any antiquity greater than the time of Christ for man in the New World, Engerrand approached the problem of early man with remarkable dispassion, bold yet rigorously cautious; his discovery of the industry of La Concepción may yet prove to be of great significance. By the time of his appointment as director of the International School, he was turning his efforts toward investigating ceramic cultures and their chronology. He early embraced stratigraphic archeology, carrying on the brilliant begin-

8 Titles 1915b, 1917a, b, were prepared earlier and were delayed in publication.

9 It is particularly to be regretted that he was not able to continue his study of the industry of La Concepción and that we do not know more of his geological-archeological soundings in the Valley of Mexico and excavations in Colima during his directorship of the International School. These were investigations which might have enhanced his professional reputation enormously.

nings achieved by Boas and consolidating stratigraphic methodology as basic to Mexicanist research. His anthropological interests were not restricted to archeology, however, and in one way or another he touched upon many of the varieties of anthropological pursuit in Mexico; his continued efforts toward achieving a more adequate basis for anthropological instruction and research in Mexico and his concern with the problems of mestizoation in the development of the Mexican nation are particularly significant. Although his career in Mexico was cut short, his influence continued as a teacher of Mexicanist studies in the United States.

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Notes on Terraces of the Rio Grande, Falcon-Zapata Area, Texas

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Archeological salvage work in the Falcon Reservoir area on the Rio Grande of South Texas was carried on at intervals during the period from 1951 to 1953 by the National Park Service in co-operation with The University of Texas and the Smithsonian Institution. In the course of this work a number of archeological sites were developed in the alluvial terraces of the Rio Grande and its tributaries. At the request of Erik Reed, Regional Archeologist for the National Park Service and of other archeologists participating in the project, I made preliminary geological studies of these terrace deposits, with principal attention given to those containing buried archeological material. Until a more thorough study of the Rio Grande terraces can be made in the reservoir area, I hope that this report will serve as an aid in the interpretation of the late Quaternary geology and the human prehistory of the region.

A total of approximately 35 days, in 1952 and January, 1953, was spent in the field. Most of the work was confined to localities which could be approached by automobile, but some of the more inaccessible arroyos were covered on foot, and the section of the Rio Grande between Zapata and Falcon was traversed by rowboat. My work and the work of Hal Story, who assisted me for one week, was supported by the Texas Memorial Museum. The Museum's participation was on the basis of an informal co-operative effort in the salvage program. Special thanks are due to Mr. Philip C. Royer, General Superintendent of the Falcon Dam Constructors, who repeatedly gave valuable assistance to our work.

Inasmuch as an extensive report being prepared by Alex D. Krieger, former archeologist for The University of Texas, will include a thorough description of the physiographic and ecological setting of the area, only those features directly related to the river's geological history will be discussed in this report.

The Valley

In the Falcon Reservoir area the Rio Grande flows through a broad valley developed in marine sandstones and shales of lower Tertiary age. These strata dip northeast and the river, controlled by the strike of the outcropping beds, flows in a general southeasterly course. The bedrock consists of hard, erosion-resistant strata alternating with softer, easily eroded beds. This condition has resulted in gentle undulations and low rock benches on the valley slopes and has had a pronounced effect on the nature of the river's channel. Bordering the present channel is a series of low bluffs formed by lateral cutting of the river into the flood plain and terrace deposits and occasionally into the Tertiary bedrock of the valley wall.

Terminology and Explanation

The terminology that refers to deposits and physiographic features formed by rivers and streams is not standardized and is not without ambiguities. For this reason it seems best to explain what is meant by some of the terms used in this report. The definitions are intended to facilitate clarity. They are not offered as necessarily the best definitions, nor is it proposed that they be generally adopted.

Flood plain, or *flood plain terrace*, refers to the lowest well-developed body of alluvium which is still subject to periodic flooding. In the Falcon Reservoir area the flood plain is a nearly continuous, flat-topped terrace having an average width of about 2,000 feet and average surface elevation of 28 to 30 feet above low water level. The term *bench* applies to a discontinuous, narrow strip of alluvium bordering the main channel and having a flat or scour-grooved surface that lies well below the level of the flood plain. There are at least two benches, averaging about 12 feet and 20 feet, respectively, above the low water level, locally present along the Rio Grande. These benches are deposited during intermediate flood stages and are usually best developed on the concave side of meanders and bends. It should be noted here that the 20-foot bench appears to widen gradually downstream, and is probably the equivalent of the main flood plain of the McAllen-Reynosa area. A comparable downstream development of the 12-foot bench is to be expected.

The word terrace may be used exclusively in a physiographic sense, or it may be used to include both the physiographic feature and the underlying alluvial deposits. In this report, *terrace surface* and *terrace* *deposit* apply respectively to the physiographic and lithologic aspects of a particular stream deposit.

Inasmuch as some of the individual terraces are made up of two distinct phases of deposits, and these phases may be separated by a substantial time break, it is important to determine which phase is involved when considering the age of the deposit, or when attempting to reconstruct the environment at the time of deposition. The two phases to which reference is made are (a) *channel deposits*, and (b) *high-level flood deposits*. Theoretically, if not actually, an intermediate phase of medium-level flood deposits should also be present in some parts of the terrace sections, but I was not able to identify such intermediate phase deposits except on the relatively minor modern benches.

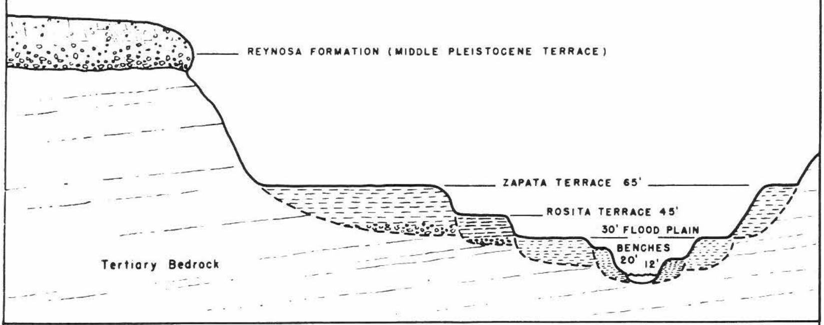
Channel deposits are characterized by heterogeneous-sized sediments, mainly cross-bedded gravel and sand, with local clay lenses. They are confined to the central and deeper parts of the valley in which they accumulated and therefore normally occupy the lower part of a terrace section. In the low series of Rio Grande terraces, with which we are primarily concerned, channel deposits probably average less than one-third of the total terrace section, but of course the thickness varies greatly from place to place.

High-level flood deposits are characterized by well-bedded, homogeneous sediments, consisting mainly of silt with subordinate amounts of fine sand, clay, and humus. They overlie channel deposits in the central parts of their respective valleys, but towards their outer edges they overlap the older gravels and rest directly on bedrock. Although there is a remarkable uniformity in the composition of the main body of high-level flood deposits, local variations in both composition and texture occur near the outer edges where tributary streams and slopewash have contributed sediments derived from the bedrock of valley walls. Whereas the channel deposits represent essentially continuous deposition and were subject to extensive reworking as the river meandered back and forth across its valley, the high-level flood silts represent intermittent, slow deposition, and show very little indication of reworking by stream action.

Channel and Modern Sediments

At low-water stage the Rio Grande channel in the Falcon area consists of a series of rapids separated by long, deep water holes. The rapids have formed where the river is cutting into the outcropping edges of resistant sandstone beds, and the deep holes are cut into the softer Tertiary strata. Gravel bars are forming against some of the rock barriers above the rapids, and in several places have built up to such an extent as to cause the river to divide, leaving gravel islands in mid-stream. Clay muds settle out in the quiet water holes and in some places overlap the up-stream edge of the gravel bars.

Modern channel sediments, then, consist of localized gravel bars which accumulate mainly during high water stages when the current is sufficiently strong to move the coarser pebbles; and fine grained muds, mainly clay, which are deposited in the quiet pools during low water stages. Sands and silts are for the most part deposited during intermediate flood stages on the low, narrow benches or incipient flood plains which border the river channel. Silts and some fine sand are also being deposited during occasional high floods on the main flood plain, and locally on the surface of the first terrace above the flood plain.



Idealized cross section showing Rio Grande terraces in the Falcon Reservoir area.

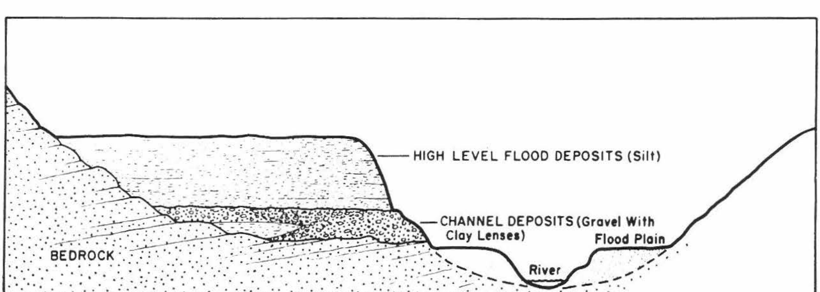
Fig. 1.

The Terraces

The physiographic relationship of the several Rio Grande terraces recognized in the Falcon Reservoir area is shown in the idealized cross-section (Fig. 1). Of these, the Reynosa is the only well preserved unit of the river's high terrace system. The Reynosa is much older and much more extensively developed than the other terraces, and probably represents a complex depositional history lasting through most or all of one of the major Pleistocene stages. The other terraces belong to a closely related series occupying the central and deeper parts of the modern valleys of the Rio Grande and its tributaries. These low terraces were formed during relatively minor sub-stages or intervals, beginning in the late Pleistocene and continuing into the present.

As with other deposits, the age of terraces can sometimes be determined on the basis of their contained faunas, the extent of leaching of their sediments, the degree and nature of cementation, and by other familiar geological criteria. However, the simplest and often the most reliable method of determining relative age of an individual terrace is by its elevation in respect to the other terraces and to the bed of the parent stream. In general, the oldest terrace of a series occupies the highest elevation, and successively younger terraces occupy progressively lower levels down to the modern flood plain deposit.

The difficulty with this method of relative dating is that it is based on an assumption that is not entirely true. And to the extent that it is not true, serious errors can be made in dating terrace deposits or any materials that may be buried within them. Partial exceptions to the rule that a higher terrace is older than the next lowest in a series occur where low terraces are separated by relatively small differences in elevation and exist on a stream that is subject to high-level flooding. In such situations alluviation may take place simultaneously on two or more terrace surfaces. Alluviation is, of course, normally much more rapid on the lower surfaces, which are subject to frequent flooding, than on higher surfaces which may be covered only by rare high floods. Thus a thick section in the lower or middle part of a given terrace deposit may represent the time equivalent of a much thinner section near the top of the next higher terrace. Furthermore, the basal part of a lower terrace may actually be older than the uppermost part of the next highest.



Diagramatic illustration of relationship between Channel and High Level Flood deposits.

Fig. 2.

It follows that we cannot accept the assumption that a higher terrace is necessarily older in all its parts than the next lower terrace of a series. When considering a related group of terraces separated by small vertical intervals, a much more dependable rule is that the base, middle or surface of a given terrace is normally older than comparable parts of the next lower terrace, and younger than comparable parts of the next higher member of the series.

The somewhat complicated interrelationship of stream deposits as outlined above is well illustrated in the low series of terraces in the Falcon area (Fig. 2), and it must be understood if we are to properly interpret the late geology and human prehistory of the area. At gauging stations in the general reservoir area floods have been recorded to heights of more than 40 feet above the river's low water stage. Such floods spread over and deposit sediments concurrently on the low alluvial benches—which are incipient flood plains, the main flood plain terrace, and parts of the higher Rosita terrace. It seems evident that a similar depositional pattern has obtained throughout the period of development of the low terrace series.

Reynosa Formation

The highest terrace preserved in the reservoir area is the Reynosa formation, a very extensive silt and caliche-capped gravel terrace named (Penrose, 1889) for outcrops at Reynosa, Mexico. This terrace is best preserved downstream from Falcon Dam, between Rio Grande City and Mission, Texas, where excellent exposures can be seen in road cuts and gravel quarries along U.S. Highway No. 83. In the reservoir area most of the Reynosa has been destroyed by erosion and is now represented only by widely separated gravel remnants which cap ridges and hills at levels from 110 feet to 135 feet above adjacent parts of the Rio Grande. The high position above the river, and vertebrate fossils found in some of the gravel quarries, indicate that the Reynosa is of middle Pleistocene age.

No special study was made of the Reynosa formation, since very little of it will be flooded by the Falcon Reservoir and since it is not involved directly in the archeological salvage work. It is of some interest, however, that the Reynosa was the source of much of the gravel that is present in the low series of terraces. These gravels, which are still being carried to the river by tributary streams, are preponderantly siliceous. A variety of brown chert is most common and is everywhere the most conspicuous of the gravel materials. Agate, jasper, and rhyolite porphyry pebbles are also fairly common. It is noteworthy that quartz pebbles are extremely rare among the gravels; and limestone pebbles, deeply etched by solution, are present, but make up less than one per cent of the total gravel in the outcrops examined.

Zapata Terrace

The name Zapata is here used to designate the highest of the low series of Rio Grande terraces in the Falcon Reservoir area. The name is derived from the town of Zapata, which was originally built on a typical area of this terrace.[1] The terrace is an important unit of the late Quaternary geological sequence, and it contains a large part of the buried archeological sites that have been discovered in the area.

The Zapata terrace is well developed and well exposed on both sides of the Rio Grande throughout the length of the reservoir area, although it is, of course, breached in numerous places by tributary streams and by meanders of the river where they impinge on the valley walls. The terrace surface is a remarkably flat plain, having an average elevation of about 65 feet above low water level of the river. The terrace base, which rests on Tertiary bedrock, has an average elevation of about 30 feet above low water level. As seen in transverse section, however, the terrace base is by no means as flat as the surface, ranging from more than 50 feet above low water level at its outer edges to as low as 12 or 15 feet above low water in the deeper channel entrenchments in the central part of its valley.

Channel deposits, consisting mainly of gravel derived from the Reynosa, make up the basal part of the terrace section and are best developed in the more deeply entrenched part of the containing valley. These channel deposits rarely extend higher than about 35 feet above low water level. The presence of the extinct Pleistocene mammals, *Parelephas* and *Mammut americanum*, at several places in the channel deposits, and the higher position of the terrace in respect to other terraces of known post-Glacial age, indicates that the basal part of the Zapata terrace is of late Pleistocene Wisconsin age.

The upper part of the terrace consists of 25 to 30 feet of light grayish-tan silts which overlie and overlap the basal gravels. The silts occur characteristically in thin, even beds which in some places exhibit indistinct laminations. The type of bedding, the fine-grained and well-sorted character of the sediments, and the absence of apparent intra-

[1] The town of Zapata has been moved to higher ground, since much of the original townsite is now beneath the waters of Falcon Reservoir.

sectional disconformities indicate that the main body of the silts represent intermittent deposition from shallow and comparatively slow-moving flood waters.

The silt section—at least in its upper part—is rich in archeological materials, but faunal material is exceedingly meager in all exposures examined. Land snails and river unios of several species occur in the silts, and are commonly associated with buried middens, but these forms belong to living species and at present have little value for age determination. Some fragmentary vertebrate remains were found (deer and bison), and these also appear to belong to modern species. Carbonaceous materials associated with buried middens may eventually provide reliable radiocarbon dates for some horizons in the silt section. In the meantime, a consideration of the nature and position of the deposits seems to be the best means of approximating their age. The silts were evidently deposited by occasional high-level floods, and continued to accumulate while a new and deeper valley was being formed. The upper part of the silt section—approximately that part which contains archeological materials—clearly belongs to a later geological sub-stage than the basal channel deposits. It would not be surprising if the uppermost part of the Zapata terrace proves to be several thousand years younger than the basal gravels.

Rosita Terrace

Remnants of a terrace occupying a vertical position below the Zapata terrace and above the main flood plain occur at several localities in the reservoir area. The name Rosita, by which this terrace is here designated, is derived from the village of Rosita in Starr County, Texas, where the terrace is well developed and where excellent exposures of the full section of deposits are easily accessible. A brief description of the terrace section has been published in abstract form (Evans, 1941).

In the reservoir area most of the Rosita terrace has been cut out of the main river valley by erosion of the later inner valley which contains the flood plain and low bench deposits. Some of the best preserved remnants of the terrace are found just inside the mouths of tributary valleys where they have been partially protected from lateral erosion by the river. In the exposures examined the terrace surface has an average elevation of about 45 feet above low water level. The base, which was exposed in only two of the localities visited, was 10 to 15 feet above low water level.

The sediments in the upper part of the Rosita terrace are light tan, well-bedded silts, and are practically indistinguishable from those of the higher Zapata terrace. A thin section of channel-deposited gravel is present in the terrace base at the outcrops examined, but exposures are too limited to permit observations on its extent or range of thickness.

No fauna of definitive value has been found in the Rosita terrace, but archeological materials occur in some localities throughout the greater part of its section. Quite possibly artifacts, and particularly carbonaceous materials associated with them, may eventually provide satisfactory dates for different parts of the deposits. At the present we can be reasonably confident that the Rosita terrace overlaps in time a part of the higher Zapata terrace and a part of the lower flood plain terrace. Consequently it can be assigned to a sub-stage near the middle of the post-Glacial period.

Flood Plain Terrace

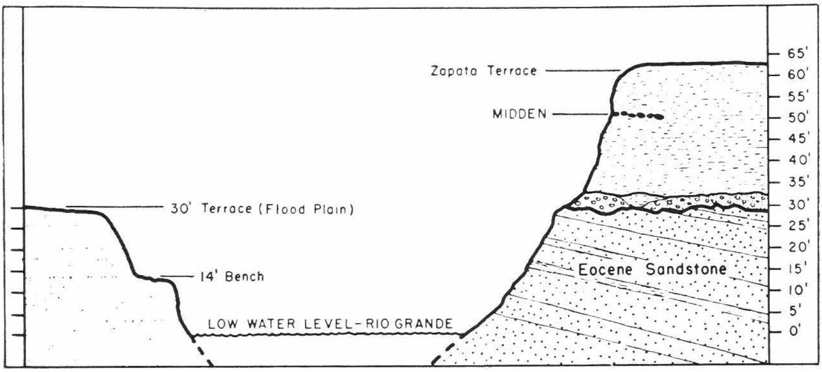
The flood plain terrace is still in the process of active alluviation in the reservoir area. That it may be approaching maturity, however, is indicated by its appreciable height and width, and by the widening channel bordered by rapidly developing alluvial benches.

The flood plain surface is approximately 30 feet above low water level. The base is rarely exposed, but appears to be near the river's low-water level. Where exposed the sediments are less compact and seemingly more sandy than those of the higher Rosita and Zapata terraces.

Although the flood plain must have been forming during the latter stages of aboriginal occupation, no archeological sites have been found either on its surface or buried in its deposits. Quite likely any artifacts which may be present are completely buried beneath flood deposits of the historic period.

Royer Site

On the north bank of the Rio Grande and near the Starr-Zapata County line the Zapata terrace is well exposed in a group of deep tributary arroyos. Archeological materials are weathering out of different horizons in the upper 15 to 18 feet of the terrace section at numerous places in the area, but none were found in the lower part of the section. Several large excavations were made at selected locations in the course of archeological salvage work previously mentioned. The deepest of these excavations was designated the Royer site (41–78B9–17) by Joe Cason (1952), archeologist in immediate charge of the field work.



Section near Royer Site, Starr-Zapata County line.

Fig. 3.

The excavations are located near the outer margin of the Zapata terrace, where the artifact-bearing, high-level flood silts, which constitute the upper part of the terrace section, rest directly on Tertiary bedrock. The section shown in Fig. 3 was measured on the river bluff about one-fourth mile west of the excavations. It was selected in preference to the excavated sites because it shows the relationship of the high silts to the underlying, older channel deposits. The upper silts outcrop continuously on river and arroyo bluffs between the measured section and the excavations, so that it is possible to estimate closely the vertical position of the excavated middens. When allowance is made for the apparent surface erosion at the Royer site excavation, the deepest artifact horizon encountered should lie at approximately the level of the 45 foot marker in the section illustrated in Fig. 3. Other middens occur in the silts at higher levels and on the weathered surface of the Zapata terrace.

It seems evident that a relatively long span of time separates the deepest buried middens from those in the uppermost beds and on the surface. The regular, thin-bedded and laminated character of the silts indicates deposition from shallow, slack water that spread out from the channel at the crest of high-level floods. Although we cannot establish the frequency, duration and amount of sediments derived from individual floods, we can be reasonably sure that flooding became increasingly rare as the terrace approached its maximum vertical development, and consequently deposition must have proceeded at a very slow rate.

Burro Site

An exposure of the Rosita terrace deposits containing buried archeological materials occurs on the east bluff of Burro Arroyo, three miles northwest of Zapata, Texas, and 1,000 feet upstream from the junction of the arroyo with the Rio Grande. The section at the Burro site, illustrated in Fig. 4, shows the relationship of the terrace to the arroyo bed, and the position of the principal buried midden.

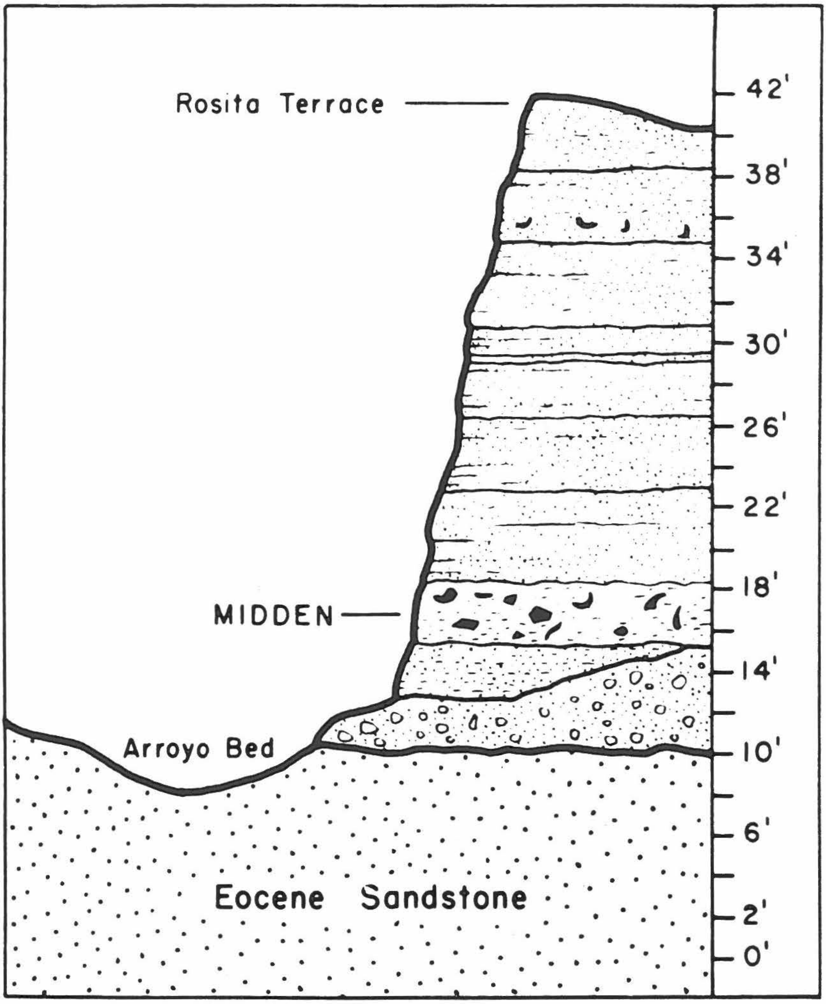
The deepest midden, which was not excavated due to the excessive thickness of overburden, lies from 24 to 26 feet below the somewhat eroded surface of the terrace. Midden materials consist of hearth stones, flint flakes, charcoal, and shells of river mussels and land snails definitely in place in terrace silt. The position of the deep midden leads me to suspect that it correlates in time with middens occurring in the uppermost few feet of the Zapata terrace. There are also archeological materials buried in silt beds near the top of the Rosita terrace at the site. These high materials should be younger than any midden materials occurring *in situ* in the Zapata terrace.

There are also remnants of the Rosita terrace with deeply buried midden materials at other localities, as, for example, in the mouths of two prominent arroyos near the Royer site previously described. For those who wish to examine this terrace, however, the best exposed localities are the Burro site and the extensive meander-cut bluff on the Rio Grande at the edge of Rosita, Texas.

Tributary Drainages

The time available for field work was completely inadequate for a thorough study of the geological and archeological sites on the many tributary streams of the Rio Grande. A study of at least one of the tributaries seemed desirable and the Arroyo Valeno was selected because its lower reaches will be inundated by the reservoir and because it affords many excellent exposures of terrace and valley fill deposits.

Arroyo Valeno is the principal tributary entering the Rio Grande on the American side of the reservoir area. It is an intermittent stream rising in Webb County about 40 miles above its mouth and joining the Rio Grande 3 miles southeast of the original site of Zapata, Texas.



Section at Burro Site

Fig. 4.

Field studies were restricted mainly to the lower 8 or 10 miles, which is approximately the portion of the stream that will be included in the Falcon Reservoir.

In its lower reaches the Valeno valley contains a broad, flat-surfaced alluvial fill. The modern arroyo, which is a deep, actively eroding channel, cuts through the fill into underlying bedrock and provides excellent and almost continuous exposures of the alluvial deposits. For the most part the deposits consist of highly compact, mixed clay and sand, with local gravel lenses in the basal part. In some areas there is a dark gray humus-bearing member making up the upper two or three feet of the section. Secondary calcium carbonate nodules, derived from leaching of the upper part of the section, occur commonly in the lower part.

Although there is indication that at least two stages of deposition are represented in the main body of alluvium, it was not possible to make a definite separation except in favorable locations. At a few places remains of the extinct elephant, *Parelephas*, were found in the basal gravels. This indicates that the lower part of the alluvium is probably contemporaneous with the channel deposits of the Zapata terrace. Archeological materials occur commonly in the upper part of the alluvium, and in one place, the Valeno site, were found at a depth of 11 to 13 feet. It seems quite likely that a comparison of artifacts from the Valeno site might serve as a basis for correlation of the artifact-bearing part of the alluvium with low terraces on the Rio Grande.

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Midland, Texas

Archeological Reconnaissance in the Drainage of the Río Verde, San Luís Potosí, Mexico

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During July and December, 1957, two archeological reconnaissance trips were made in the drainage of the Río Verde, in the state of San Luís Potosí, Mexico. This paper will present a brief summary and a preliminary analysis of the information obtained during these trips.

The south-central part of the state of San Luís Potosí consists of an extensive plateau lying at a height of approximately 1,000 meters above sea level. On the west this plateau is rimmed by the Sierra Gorda, and on the east by the Sierra Madre Oriental. Several small streams drain the area and form the Río Verde, which flows eastward into the Pánuco system. Geographically the Río Verde drainage is characterized by large flat valleys, low ranges of hills, generally fertile soil, and a temperate climate.

The archeological sites of this region have been recognized for some time as forming a westward extension of the culture of the Gulf Coast Huastecs. Joaquín Meade, who for 25 years has studied the history and archeology of the Huasteca, has been one of the most active investigators of the area. In his (1948) survey of archeological sites in the state of San Luís Potosí he recorded valuable data and descriptions of some of the sites in the Río Verde drainage. Only one archeological excavation has been published for the region, however; it was conducted by Wilfrido Du Solier (*et al.*, 1947) in 1941–42 at Buenavista, Huaxcamá.

The two reconnaissance trips were concentrated principally along the main roads of the *municipios* of Rioverde, Rayón, and San Ciro. A total of 61 sites was located in the region. Of these, 41 lay near the San Luís Potosí-Rioverde highway within 50 kilometers to the west of the latter town. The remaining sites (numbering 20) were located within a triangle formed by the towns of Rioverde, Rayón, and San Ciro which measured approximately 50 by 40 by 40 kilometers, respectively. This clustering of sites generally reflects the division of the region into eastern and western areas by a zone of alkaline soil unfit for agriculture which extends along the north bank of the Río Verde from the east to the northwest of the town of Rioverde. During the two trips a total of some 20 sites was visited, of which eleven will be briefly described below in order to demonstrate the type of sites characteristic of the Río Verde drainage. Four of these lay in the western zone and the remainder in the eastern area.

Descriptions of Sites

The westernmost site visited was in the *municipio* of San Nicolás Tolentino; it may be one of the sites mentioned by Meade (1948: 97–98, #137) for that area. Most of the site has been plowed over, and only two undestroyed mounds were seen. However, this was the only site in the Río Verde drainage at which sherds identical to those found west of the Sierra Gorda in the valley of San Luís Potosí were also noted.

Twenty kilometers west of the town of Rioverde was a site consisting of some 20 mounds lying on the south bank of the Río Verde. Most of these mounds were grouped around a plaza measuring about 50 meters in length from east to west. The tallest mound seen was some 4 meters high. In the eastern part of the site were two long parallel mounds close to one another whose long axes were oriented slightly east of north. A few mounds on the north bank of the river appeared to be a continuation of the site. Burials and whole pottery vessels were said to have been found at this site.

A number of sites extending discontinuously for several kilometers along the Río de los Morales appeared to be associated with the extensive site of La Manzanilla. La Manzanilla was the largest site seen in the Rioverde *municipio* and was undoubtedly a major center for the area. It was estimated to contain at least 100 mounds, although most of these were relatively small and none of those seen was more than 4 meters in height. A pair of long parallel mounds oriented north-south were noted. Unfortunately, a considerable number of the mounds at La Manzanilla already have been damaged, especially by the activities of local treasure-hunters. The site is very rich in cultural materials and a number of important artifacts were said to have been taken from it. Notable among these was a very finely carved basalt yoke reportedly found lying around the head of a burial with which three carved basalt bowls were also associated. Numerous pottery vessels and figurines have also been found at the site.

The site of El Jaral consisted of a compact cluster of 16 mounds arranged in the form of a hollow rectangle measuring about 140 meters north-south by 120 meters east-west, with a mound approximately in its center. Two parallel mounds some 50 meters long and oriented north-northwest formed the southwestern side of the rectangle. The central mound was about 6.50 meters in height and 30 meters in diameter; treasure-hunters had dug a large pit into the middle of it and were reported to have found a burial. Their digging had revealed several periods of construction within the mound.

In the Rayón *municipio* in the eastern zone of the Río Verde drainage, a small site called Salinas was found near the town of Rayón. It had been badly destroyed by road construction and treasure-hunting, but consisted of several mounds grouped around a plaza, the tallest mound being now no more than 2 meters high. Treasure-hunters had cleared the debris from one mound and exposed a fine lime plaster floor extending across most of its top.

At the site of Los Becerros, most of the mounds were grouped around a large plaza. Rough limestone fragments set in mud had been used in construction, and some mounds were faced with trimmed limestone slabs. Two long parallel mounds on the western side of the site were oriented approximately north-northwest. The tallest mound of the site was about 10 meters high, with the others ranging downward from 7 to 1.50 meters in height.

The site of Las Revolcaderas lay on an old stream terrace southeast of Rayón. It was a large site and contained a number of mounds covered with a dense semi-tropical growth of trees, brush, and vines. Mounds were faced with trimmed limestone slabs laid in courses. Two parallel mounds each about 40 meters long were oriented north-northwest and faced on their interior sides with trimmed limestone slabs laid in stepped courses. The tallest mound seen had smooth sloping walls and reached a height of some 12 meters; recent damage to one side of it had revealed the almost vertical wall of an interior construction.

The largest site seen in the Rayón *municipio* was Los Juzgados, which lies on the north edge of the Plan de la Quemada, an ancient lake bed. A brief description and a sketch of part of the site have been published by Meade (1948: 81–82, #104; 171, Lám. 42). The site covered an extensive area and there were a number of plazas, the principal one having a large mound approximately in its center. Both volcanic rock and uncut limestone were used in construction, with a few mounds still retaining façades of trimmed limestone slabs laid in courses in a clay-mud mortar. One mound in the northeastern part of the site retained several courses of its facing of volcanic stones and definitely had a circular base. The most unusual construction seen during the reconnaissance trips was found at Los Juzgados. It consisted of two parallel mounds or platforms each about 1.50 meters high and 76 meters long, standing 12 meters apart and oriented 15° west of magnetic north. The interior sides of both mounds were faced with trimmed limestone slabs laid vertically in courses. The ground between the mounds was very flat and was lower than the surrounding ground level; there appeared to have been several steps at the north end of the structure leading down to the interior level. At the northwestern corner the stone façade was continued outward to form a three-sided area similar to a room, which had the same floor level as the area between the mounds.

On the eastern side of the Plan de la Quemada, at the base of the Espinosa del Diablo, was found the site of El Calichal. The mounds extended for some 500 meters but unfortunately many of them had been destroyed by plowing. The principal plaza was relatively small and compact. This was the only site visited at which two separate pairs of long parallel mounds were seen. One pair, oriented north-south, formed the southeastern side of the main plaza. The other pair, measuring approximately 40 meters in length, were faced with trimmed limestone slabs laid in stepped courses and oriented 17° west of magnetic north.

The largest site visited in the *municipio* of San Ciro was La Soledad de los Tepehuanes, which was called La Cuidad Muerta de la Sierra Gorda by Velázquez (1946: Vol. I). The site is built on a low ridge, with terraced platforms used to secure level bases on the slopes. Forty mounds were counted but the site contained many more and many of these were in an excellent state of preservation. One mound was approximately 20 meters tall and at least three others reached 15 meters in height. Mound facings consisted of large limestone fragments set in a clay-mud mortar. A pair of long parallel mounds was also noted.

Approximately two kilometers north of the town of San Ciro was a small site which is a favorite treasure-hunting area for the townspeople. This digging, coupled with natural erosion, has caused extensive damage. The tallest mounds of the site were some 6 meters high, and mound facings were of limestone fragments set in a clay-mud mortar.

Discussion

A study of these eleven sites reveals both the range of variety as well as the essential unity of the archeological culture of the Río

Verde drainage. All the sites visited were of a similar nature, consisting of a cluster of mounds usually grouped around one or more plazas. The number of mounds in a site varied from only a few to as many as 100 or more. Most of the mounds appeared to have had square or rectangular bases, although a few were seen which were definitely circular. With one exception (at Los Juzgados), no type of structure was seen at any site which did not also occur at many or even most other sites. There appeared to be no "typical" pattern of relationship or arrangement for the mounds and plazas; the positioning of these varied from one site to the next. Rarely was there any obvious orientation of the mounds to one another. Most mounds appeared to lack stone façades and perhaps had been faced with mud originally. Two types of stone façades were seen: untrimmed limestone or volcanic fragments, sometimes set in courses, and trimmed limestone slabs laid in courses; both types were set in a mud matrix. At any single site there was a definite tendency towards consistency in the façade material used. No evidence was found of plaster facings over the stone façades. Generally, sites in the eastern area appeared to be less numerous but individually larger than those in the western region.

The pairs of long parallel mounds noted in a number of the sites appeared to be ball courts of the open-end type. Ball courts were widely used in Mesoamerica during the pre-Hispanic period for a game with quasi-religious significance. In the Río Verde sites the mounds were usually at least 40 meters long and 6 or 8 meters apart, with the long axes all arranged in a north-south direction. At all sites except one the orientation was to the west of magnetic north. Use of a Brunton compass at El Calichal produced a reading of 17° west of magnetic north, while readings with a smaller compass at other sites showed slightly north of north-northwest. One site showed a reading with a small compass of slightly east of north. The consistency of the north-south orientation would appear to be an intentional feature of these constructions and may therefore be assumed to be a matter of importance to the builders.

In relation to these ball courts, it is noteworthy that a class of ceramic figurines which may represent ball players was seen in several private collections. These figurines were hand-modeled and sometimes carried a ball held against the side or at times an instrument resembling a bat. Some were decorated with knee guards and belts crossed diagonally on the chest. It was reported that a stone ball court ring, such as was sometimes used in open-end courts, has been found at a site in the Rioverde *municipio*, but no information concerning it could be obtained. There is a possibility that the unique construction encountered at Los Juzgados may also represent a ball court. If the room-shaped projection at the northwest corner of the two mounds were to be matched at the other three corners, the structure might be an I-shaped ball court of exceptional length. Its orientation, 15° west of magnetic north, is similar to that of the open-end courts. However, the possibility must also be considered that this construction represents a ceremonial avenue; Meade's (1948: 82) description of Los Juzgados notes the occurrence of two "streets."

The similarities of the ceramics seen on the surface and in mound fills appear to indicate that all the sites of the Río Verde drainage were occupied more or less contemporaneously. If true, the large number of sites concentrated within this relatively small area would indicate an intensive occupation by a large population. Economic support was undoubtedly founded upon a firm agricultural basis; it is noteworthy in this regard that sites are located in areas of fertile soil but are lacking in the alkaline soil zone which is unfit for farming. The number and size of the mounds in the region would indicate that the population had a plentiful food supply and sufficient leisure time for construction activities, and would probably imply the existence of effective social controls to direct these activities.

Data collected during the two reconnaissance trips may most usefully be compared with the only published account of archeological excavations in the Río Verde drainage, that by Du Solier at Buenavista. Du Solier (*et al.*, 1947: 16, 18; 17, Fig. 2) mentions the excavation of only two structures, one of which was a long narrow mound having a series of eight steps up its southwestern side. Measurements of his scale drawings of this structure show that it was approximately 38.50 meters in length by 11.50 meters in width by no more than 3 meters in height, and that its orientation was to the northwest. The similarity of its size and orientation to the ball court mounds discussed above is obvious, but as there was no parallel companion mound the structure does not represent a ball court. Du Solier suggested that it might have been a temple base "or even a gallery to view some spectacle."

Most of the pottery types reported by Du Solier (*et al.*, 1947: 18–21) for Buenavista were encountered at various sites during the reconnaissance trips, and other varieties were also noted. A possibly significant difference in percentages was discovered between the pottery found in the eastern and western zones of the Río Verde area. The most common type seen in the eastern area was a red-on-white ware, while in the western region a polished and incised blackware appeared to be of equal importance with the red-on-white. Du Solier (*et al.*, 1947: 18–20) noted the importance of the polished blackware at Buenavista but did not report the red-on-white ware for that site.

Krieger and Griffin (Du Solier *et al.*, 1947: 27–30) have pointed out the similarities existing between the pottery of the Caddoan area and the polished incised or engraved blackware of Buenavista. They noted that Buenavista sherds so closely resembled Barkman Engraved (which is characteristic of the Texarkana focus) that it was difficult to distinguish the two types. Because the technique of incising and engraving with colored pigments filling the lines is known to have occurred quite early in Mesoamerica, they suggested that this method of decorating polished monochrome vessels had diffused from northern Mesoamerica into the Caddoan area.

During the Río Verde reconnaissance trips a number of ceramic smoking pipes were noted in private collections. All those seen had a delicate conical bowl affixed near the end of a long slender round stem which projected slightly beyond the bowl and often was formed into a stylized ornament. These appear to be very similar in both shape and size to the Caddoan "long-stemmed" pipes illustrated by Krieger (Newell and Krieger, 1949: 147–148; Fig. 54) for the Davis site. The presence of these pipes in both areas, when considered along with the similarities in the polished blackwares, may indicate that the Río Verde drainage served as a route of reciprocal diffusion and contact between the cultures of Mesoamerica and the Caddoan area.

Temporally, the sites of the Río Verde drainage may be equated in a general way with the archeological sequence developed by Ekholm for the Huasteca. On the basis of ceramic similarities, the principal period of Río Verde occupation would seem to correlate with late Pánuco IV and early Pánuco V (Ekholm, 1944: 358–364), although the area may possibly have been occupied prior to this time but on a more limited scale. This period might very tentatively be estimated at approximately A.D. 600 to 1000. Within the wider frame of Mesoamerican history these dates span the end of the Classic period and the beginning of the Post-Classic. During this period the southward movements of aggressive nomadic groups caused increasing pressures on the sedentary peoples of northern Mesoamerica and eventually brought about widespread cultural changes. These pressures may have been a factor in the abandonment of the Río Verde drainage. At the time of the Spanish Conquest, the Huastecs were living primarily in the coastal plains and low foothills to the east of the Sierra Madre

Oriental, and the Río Verde area was occupied by the nomadic Pame Indians.

Summary

This paper has reported the results of two archeological reconnaissance trips which were made in the drainage of the Río Verde, in south-central San Luís Potosí, Mexico. The culture represented in this area was a western extension of the Gulf Coast Huasteca. Sixty-one sites were located, 20 of these being in the eastern Río Verde zone and 41 in the western. Sites were found to consist of a cluster of mounds usually grouped around one or more plazas; many sites contained two long parallel mounds which appeared to be open-end ball courts. The architecture and pottery seen during the reconnaissance were similar to those reported for Buenavista, Huaxcamá, but significant differences were also noted. Similarities in the polished incised blackwares and ceramic smoking pipes were found to exist between the Río Verde region and the Caddoan area of the United States, perhaps indicating reciprocal contacts and influences. The principal occupation of the Río Verde drainage was tentatively estimated to have been from A.D. 600 to 1000.

Acknowledgments

The two reconnaissance trips reported in this paper were made possible as a result of the interest and kindness of Sr. Dn. Octaviano Cabrera Ipiña, of San Luís Potosí, S.L.P. He also gave freely of his own time and his wide knowledge of the history and geography of the region to aid in the reconnaissance. Special thanks are due to Sra. Profa. Antonieta Espejo, who first drew attention to the possibilities of a site survey in the Río Verde drainage and who participated in the July trip as a representative of the Instituto Nacional de Antropología e Historia. Sr. Dn. Joaquín Meade has generously shared his extensive knowledge of Huastec archeology and history gained from his many years of study both in the field and in the archives.

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Ankara, Turkey

Notes on Coahuiltecan Ethnography

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Prior to the nineteenth century, the area which today comprises southern Texas and northeastern Mexico was inhabited by roving bands of hunting-and-gathering Indians known collectively as Coahuiltecans. The name "Coahuiltecan" was first used in a linguistic sense by J. W. Powell (1891: 68) to refer to the related dialects spoken throughout this area. He adapted the term from the designation "Coahuilteco" coined earlier by Orozco y Berra (1864) from the state name of Coahuila, Mexico. There is no evidence, however, that these groups of Indians ever considered themselves a single people. On the contrary, the Spanish sources refer to numerous small bands which bore distinct names and which were often at war with one another.

The size and composition of these bands must have differed considerably, and probably even varied seasonally with changes in the available food supply. The combination of a simple technology and a harsh environment made it necessary for them to spend most of their time in the quest for food. Except in summer, when plant foods were abundant, starvation was an ever-present threat to these people. Nevertheless, the adaptation of their culture to the environment was sufficiently successful to permit a much higher concentration of population than is found in many parts of the same area today.

By 1800 the Coahuiltecans had virtually disappeared due to the combined effects of war, disease, and acculturation. Our somewhat meagre knowledge of their culture is derived principally from seventeenth and eighteenth century Spanish accounts. Most of the available information on Coahuiltecan culture has been summarized and analyzed in a series of articles by Ruecking, (1953, 1954a, 1954b, 1955), and a small amount of additional data from documentary sources has been published recently (Troike, 1959). In general, ethnographic references to the Coahuiltecans are so fragmentary and scarce that it seems worthwhile to translate and publish them in order to make the data more readily available.

In 1749 José de Escandón established the first Spanish settlements in the colony of Nuevo Santander (the present-day state of Tamaulipas, Mexico). He was accompanied on this colonizing expedition by Fray Simón del Hierro, who left a valuable diary covering the activities of the expedition from December, 1748, to June, 1749 (Lejarza, 1947: 29*–57*; Archivo General de la Nación, México, Ramo Historia, Tomo 29, Exp. 20). Hierro mentions numerous encounters with groups of Indians throughout the territory, and occasionally gives information of ethnographic significance.

While Escandón's party was camped along the Soto la Marina River east of the Sierra de Tamaulipas, a group of Indians came from the Sierra to meet them. Hierro (Lejarza, 1947: 51*) identifies them as Pasitas Indians. He states (Lejarza, 1947: 32*; translation mine) that there were

> about 150 tramp Indians, well armed, all strong, stout, and of similar stature, about 20 years old and upwards. They came in peace, loaded with squash, sweet potatoes, and beans, so that they provided food for all the companies of settlers and soldiers for some time. After three days they promised to return, and they returned loaded in the same fashion, so that there were squash and beans to eat along much of the distance of the road until the return to the north.

The Spaniards distributed gifts of clothing and trinkets to the Indians, but succeeded only in causing dissatisfaction among them because some Indians received more gifts than others. In addition to the 150 Pasitas who came the first time, Hierro states that more than 50 additional warriors remained behind as a rear guard.

The Pasitas Indians were evidently agricultural, as indicated by the reference to squash, sweet potatoes, and beans, and the large number of warriors in the party which met Escandon. Hierro (Lejarza, 1947: 51*) confirms this when he describes the Pasitas as the "best" (most advanced?) and most numerous "nation" of Indians in the colony, and states that "They sow much corn, squash, sweet potatoes, and tobacco." This appears to be the northernmost occurrence of agriculture in Tamaulipas known from ethnographic sources. These ethnographic data correspond closely to the archeological evidence for the northward extension of agriculture in the Sierra de Tamaulipas (MacNeish, 1958), and indicate that it was still being practiced at the time of Spanish contact.

The only additional information on Pasitas culture in Hierro's account concerns an interesting ritual performed by the Pasitas leader to signalize peace between themselves and the Spanish (Lejarza, 1947, 32*; translation mine).

The leader of these Indians, who was a captain, asked for a jar of water and, beginning with the Colonel [Escandón], went about washing the hands of all the captains and chiefs who were seated at the table. Afterward, gracefully taking off the breech-cloth which covered him between his two legs, with it he went about cleaning the washed hands in sign of peace. He washed and cleaned the hands of the Priest, who was also seated at the table, and the top of his head as well. Indeed the admonition was necessary not to laugh; as he did it with such seriousness, the same was shown: but then and afterwards the joke was celebrated among those who had been washed.

This unusual ceremony is somewhat reminiscent of the Caddo practice of washing the faces of visitors (Swanton, 1942: 178–181), though the similarity may well be fortuitous. Culturally, the Pasitas must be classified as a peripheral Mesoamerican group rather than as part of the Coahuiltecan (or Western Gulf) area, because of their knowledge of agriculture. Since they were the closest Mesoamerican group to the Caddo area, further information on their culture and language would be very desirable.

Along the route of the expedition Hierro records encounters with various bands of Indians. During the journey from Barra de las Salinas (near San Fernando) to Camargo, the Spaniards followed the Rio San Fernando and the Arroyo San Lorenzo (Lejarza, 1947: 36*–37*). The party left Barra de las Salinas on April 25, following the river upstream. On April 26 they encountered some Pintos Indians, who guided them as far as the Sierra de los Pamonares, where they found a camp of Pamonares Indians. These Indians guided them the next day, until they came to a place with some pools of water, which they named San Macario. Here they encountered a Boca Prieta Indian who seems to have been a somewhat Hispanicized band leader. He led them as far as the juncture of the river with the Arroyo San Lorenzo and thence up the arroyo to the Charco de Ramirez.

From here on the Boca Prieta said that he did not know the road, because these were now the lands of other different *rancherías*. They either did not want to pass for fear of the other Indians, or because each one observed the boundaries of his lands. The same almost happened with the Pinto and Pamorano [sic] Indians who served as guides the previous days. (Lejarza, 1947: 37*; translation mine.)

It is evident from this remark that the bands did observe some sort of territorial boundaries, within which they carried on their nomadic existence.

Hierro mentions the location of two Indian camps (*rancherías*) with sufficient precision that it might be possible to locate the corresponding archeological sites. Such a possibility would be significant for the development of historical archeology in the area. A camp of Pinto Indians was reported as being located on the Arroyo de las Chorreras about three leagues from San Fernando, at a place where there was a spring of good water. Escandón ordered that a mission should be established there for the Pintos (Lejarza, 1947: 39*–40*). The second site is stated to have been on the road from Santander (Jimenez) to La Barra, at a distance of four leagues (presumably from Santander), where a very thick growth of tall royal palms was found around a spring. The Indians were identified only by the name of their leader, Santiago. An interesting reflection of Spanish influence beyond the boundaries of actual settlement was revealed in the fact that a number of the Indians in this band understood and spoke Spanish, albeit poorly (Lejarza, 1947: 40*).

Ruecking (1955: 377) notes only one reference to the taking of heads of enemies killed in battle, and this instance occurred north of the Rio Grande. The trait was also found in southern Tamaulipas, however. While Escandón's party was at Horcasitas, word arrived from Llera of a fight between the Spanish and the Janambre Indians. The Janambres killed two Spaniards in the battle, then fled the field, taking the heads with them and leaving the decapitated bodies behind (Lejarza, 1947: 45*). Usually, however, the Indians of Tamaulipas tried to carry off the entire bodies of enemies fallen in battle (Santa María, c. 1795: 418).

Demographic data on Coahuiltecan groups are rather scarce; however, some population data are available for Indian groups living in or near the missions of Nuevo Santander. The information given in two reports, one written in 1757 by José Tienda de Cuervo and the other in 1770 by Lino Nepomuceno Gómez (Cervantes, 1942), is summarized in Table 1. Unfortunately, comparable figures are not available for most groups, and those for which such figures are given (Pisones, Janambres) are not properly Coahuiltecan groups. Additional data are necessary before it will be possible to assess the impact of Spanish colonization on the native population of this area.

Gabriel Saldívar (1943) has published the most complete map available to date showing the geographical location of the Coahuiltecan

TABLE 1

Place	Indians	1757 Fam.	1757 Per.	1770 Fam.	1770 Per.	Remarks
Aguayo	Pisones	26	150	18	50	1757 figure for families refers to "houses"; name not given in 1757.
Altamira	Anacanaes	—	116	x	x	No Indians in 1770.
	Aretines	—	—	x	x	Seasonal.
	Huastecos	—	17	x	x	Came with settlers.
Camargo	Tareguanos, Pajaritos, Venados, Tejones, Cueros Quemados	—	243	58	246	
Escandón	Pames	13	—	21	51	Ladinos from Santa Rosa mission
	Janambres	—	—	—	—	In mountains; made attacks on settlement.
Horcasitas	Olives	21	71	37	—	1757: stated they were from the Sierra de Tamaulipas.
	Huastecos	30	107	24	—	
	Palagueques	—	97	x	x	Lived nearby; had 2 captains.
Llera	Pisones	40	166	24	69	Many originally from Santa Rosa mission near Jaumave.
	Janambres	80	300	—	200	1757: recently missionized. 1770: seasonal, pagans.
	Malahuecos	—	144	x	x	
Mier	Garzas			26	101	
Revilla	Garzas, Malahuecos, Gualagueños	x	x	11	25	No Indians in 1757. Children included?
Reynosa	Pintos	x	x			
	Comecrudos			60*	222	
	Tejones					
	Nazas	—	169	x	x	*600 in text.
	Narices			x	x	
San Fernando	Pintos (1)			13	—	(1) Christians;
	Pintos (2)			13	—	(2) pagans.
	Quiniquames*	—	150	—	—	*1770: Quiniacapemes.
	Pamoranos			x	x	
	Comecrudos	—	—	—	—	Lived nearby.
	Querefeños	—	73	—	—	1770: Quedejeños. In 1757 were ten leagues from mission.
Santa Barbara	Pames	—	139	74	243	1757: 48 men, 41 women, 33 children, 17 absent.
	Pisones	—	31	6	—	1757: rancheria nearby; 10 men, 10 women, 11 children.
	Janambres	—	76	x	x	1757: 28 men, 18 women, 22 children, 8 absent.
Santander	Bocas Prietas	80	150			1770: left mission.
	Damiches	x	x	—	100	
	Inapanames	x	x			
	Mezquites	—	80			Said to come and go.
	Pames	x	x	16	70	Work on farms for Escandon.
Santanilla	Inapanames, Temacapanes	—	400	—	130	1757 figure includes Inapanames and an unnamed group, neither in mission. Left mission in 1768.
Soto la Marina	Villegas, Comecamotes, Morales, Matucapames	c.70	200	x	x	
	Aracates			—	—	1770: Left area in 1765–66.
	Chapoteños			—	—	
Tamaulipa (San Carlos)	Dienteños	x	x	—	30	1770: Recently missionized.

— = Mentioned but no population figures given.
x = Not mentioned.

bands in Tamaulipas. His map is undoubtedly a composite of information from various sources and does not indicate changes which may have occurred from time to time. One discrepancy between the map and the report by Nepomuceno Gómez may be noted in respect to the Saulapahuemes, Taniacapemes, and Cotomanes (or Cotonames). Saldívar (1943: map) locates these bands on the south bank of the Rio Grande, whereas in 1770 they are definitely stated to be "On the other [i.e., north] side of the Rio Bravo del Norte, at a distance of about six leagues. . . ." (Cervantes, 1942: 62). It is possible that the map is in error, but it seems more likely that these bands simply moved from one side of the river to the other at some time during the century. A map or series of maps which would show the band locations at different times is needed in order to give a more accurate picture of Coahuiltecan geography.

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Lake Creek: A Woodland Site in the Texas Panhandle

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This paper reports the results of some initial investigations of an Indian campsite with probable Woodland affiliations in the Panhandle of Texas. The investigations were sponsored by the Panhandle-Plains Historical Museum in the fall of 1952. The site is numbered A48 in the museum records.

Location of the Site

The site is located on the J. Evetts Haley Ranch in the eastern part of Hutchinson County. It is situated on the west bank of Lake Creek, which empties into the South Canadian River about 4 miles southeast of the site. It is near the center of the John Gibbs tract and is about ¾ of a mile upstream from the ranch headquarters.

Natural Setting

The Canadian River has cut a valley about 15 miles wide and 500 feet deep in this part of its generally eastward course across the High Plains. Both rims of the valley are bordered by extensive level plains of Quaternary loess (the Panhandle formation). The long slopes on both sides of the valley are Tertiary sediments (the Ogallala formation) dissected by many tributary streams, of which Lake Creek is typical. At the mouths of these creeks, their floodplains of Quaternary alluvium merge with the broader floodplains bordering the wide sand-clogged channel of the river. Spurs of Permian redbeds (the Quartermaster formation), held up by a resistant dolomite layer (the Alibates member), extend into the river floodplains at intervals.

Winter and summer, this semi-arid land has prevailingly pleasant weather, bright and mild—but subject to sudden violent storms of wind, dust, rain, hail, or snow.

Above all, this is grass country—on uplands, slopes, and lowlands.

The uplands are treeless. Rougher parts of the slopes are sprinkled with junipers. Cottonwoods and several other kinds of deciduous trees and shrubs are clustered along the wetter parts of the stream valleys.

Chief game animals were the grazing bison and antelope of the grasslands, and the browsing deer of the woodlands. Although faunal, floral, and mineral resources are limited in variety, most of the elements present in this environment were eminently useful to primitive man for food and fuel, tools, clothes, and shelters.

Historical Background

In historic times this stretch of the Canadian valley was a favorite wintering ground of the Comanche and their allies. In a creek valley some three miles east of the Lake Creek site are the remains of Adobe Fort, which was built before 1840 by William Bent for trade with the Comanche, Kiowa, and Apache (Grinnell, 1923: 42–44). In November, 1864, a strong cavalry force from New Mexico under Col. Kit Carson found the winter villages of these tribes, with some Cheyenne and Arapaho, near the ruins of the fort. The troops burned one village, but barely escaped encirclement, and retreated under continual harassment. Ten years later, in June, 1874, a second battle took place at some sod houses near the ruins of the fort, when a small party of buffalo hunters withstood repeated attacks by a large number of Comanche, Kiowa, and Cheyenne.

Description of the Site

The Lake Creek site occupies a small bench between the main stream to the east and a tributary draw to the south. The east and south sides of the bench are steeply eroded slopes about 20 feet high. Along the base of these cutbanks are bogs fed by seep water.

The bench is capped by a deposit of eolian sand several feet thick, which forms a gently rounded surface about an acre in area. The bench top rises gradually toward the northwest to merge with the valley slope, and is overgrown with grass, sage, and yucca. The edge of the marshy floodplain below the bench is tree-covered. The southern slope of the bench has a small plum thicket. Wildlife, notably deer and turkey, is still plentiful around the site.

Cultural remains are strewn over the upper parts of the cutbanks around the southeastern corner of the bench. They are especially abundant along the southern edge of the bench, where the sand is darkened with soot and contains charcoal, burned rocks, flint chips, animal bone fragments, and a variety of artifacts.

Investigations

The site was first visited on the afternoon of Friday, October 3, 1952. A brief inspection produced a small sample of artifacts, and indicated the desirability of further surface searching coupled with some exploratory trenching. With the able assistance of Mr. Curtis Tunnell, then a student at West Texas State College, some additional work was accomplished in the following November, from Friday 14 through Sunday 16. I am much indebted to the owner, Mr. Haley, the noted rancher-historian, for guiding me to the site, for giving me permission to excavate, and for providing the generous hospitality of his ranch during the work.

A test trench was staked out at a place near the eastern edge of the site where a concentration of pottery had been found, although the southern edge looked more promising otherwise. The trench was 15 feet long in a northeast-southwest direction, averaging about five feet wide, bounded on the east by the irregular edge of the bench and on the west by a line roughly parallel to the edge.

The trench was excavated to a depth of 30 inches, in five 6-inch levels parallel to the slight southward slope of the surface. Each level was removed with trowels and shovels, the earth being passed through a ½-inch screen. Except for flint chips and burned rocks, all cultural materials found on the screen were saved and sacked according to the level from which they came.

Stratigraphy

The surface of the test trench produced only a few burned rocks, evidently representing a disturbed hearth, and indicating a final occupation of the site that was very light, at least in the area tested.

The 0 to 6-inch level was brownish humic sand. The site probably was not occupied during its deposition. This level was practically sterile, producing only two specimens. These probably were intrusive from above or below by means of trampling, burrows, roots, or other kinds of disturbance.

The 6 to 12-inch level was the same brownish humic sand as the overlying level, except toward the south end of the trench, where the sand became less humic and more yellowish, and all along the bottom of the level, where a dark sooty sand with occasional burned rocks and flint chips marked the top of an occupational zone. Nine specimens were collected from the 6 to 12-inch level, but most of these came from the dark sooty sand at the bottom of the level. This level, like the overlying one, probably was not occupied during deposition.

The 12 to 18-inch level was the same dark sooty sand of the occupational zone that appeared at the bottom of the overlying level. Here and there in the 12 to 18-inch level were clusters of three or four burned rocks and small patches of soot. This level produced 22 specimens.

The 18 to 24-inch level was similar in all respects to the overlying level, except that in some places a yellowish limey sand appeared at the bottom of the level, especially toward the northern end of the trench. The 18 to 24-inch level produced 13 specimens.

The 24 to 30-inch level was the same yellowish limey sand that appeared at the bottom of the overlying level, except toward the southern end of the trench, where the top of the level had some remnants of the dark sooty sand of the occupational zone. The 24 to 30-inch level probably was not occupied during deposition. It was essentially sterile. Most of the five specimens found in it came from the dark sooty sand at the top of the level.

In summary, the test trench revealed a rather simple stratigraphy: 1) at the surface, scant traces of a brief occupation; 2) below the surface, a sterile layer of brownish humic sand about 12 inches thick; 3) in the middle, a zone of dark sooty sand, ranging from about 10 inches thick at the northern end of the trench to about 14 inches thick at the southern end, heavily occupied without detectable hiatus for a considerable period; 4) at the bottom, a sterile layer of yellowish limey sand, of undetermined thickness.

By inference, an important occupation of the test area seems to have been followed, after a period of abandonment, by a very minor occupation. The 49 specimens found below the 0 to 6-inch level probably represent the earlier occupation; the two items found in this level (a snub-nosed end scraper, #105, and a bison limb bone fragment, #106) probably represent the later occupation.

Collections

In all, 154 items were collected at the Lake Creek site, of which 103 came from the general surface, and 51 from the test trench. These specimens are described under the following headings: pottery, projectile points, knives, scrapers, gravers, blade, chopper, chopper-hammer, hammer, cores, manos, grinding slabs, bone bead, and animal remains. In the descriptions the numbers given in parentheses are the catalog numbers of the specimens. If a specimen came from the test trench, its level is added; if it came from the general surface, no provenience is given.

For the 53 objects of chipped stone, the probable source of the material is usually indicated. Most of these objects (45) are Alibates flint; one is Tecovas flint; one is Edwards flint; and six are miscellaneous rocks of indeterminate origin. The Alibates flint probably came from the Alibates dolomite member of the Quartermaster formation of uppermost Permian age. Silicified zones in the Alibates dolomite outcrop at several places on both sides of the Canadian River north of Amarillo. The Tecovas flint probably came from the Tecovas formation of upper Triassic age, which contains siliceous lenses outcropping in numerous places along the eastern Caprock escarpment from Palo Duro Canyon southward. The Edwards flint may have come from the Edwards formation of lower Cretaceous age in Central Texas.

Although Alibates and Tecovas flints are not invariably distinguishable megascopically (Green and Kelley, 1960), my geological and archeological experience in this region leads me to believe that the distinction generally is reliable and important enough to be worth recording.

Pottery

The Lake Creek site produced 48 sherds of two very different kinds of pottery which may be characterized as corded ware and plain ware.

Corded ware. Most of the sherds (43) belong to a distinctive type of corded ware. Except for one rim sherd (#121, 12–18″), all are body fragments. Only seven of the corded sherds came from the test trench (#113, 6–12″; #121 through 125, 12–18″; and #149, 6–12″). The other 36 corded sherds were surface finds (#16 through 26 and 54 through 78).

The outer surface of the body sherds is predominantly gray, ranging from light brown to black. It shows the marks of a cord-or fabric-wrapped paddle. The cord impressions on most sherds are too indistinct for the arrangement to be clear; on several examples they are rather deep and coarse, showing a roughly parallel, widely spaced arrangement; on a few others (Fig. 1, a), an open-mesh, fabric-like pattern is suggested by additional transverse impressions. The inner surface

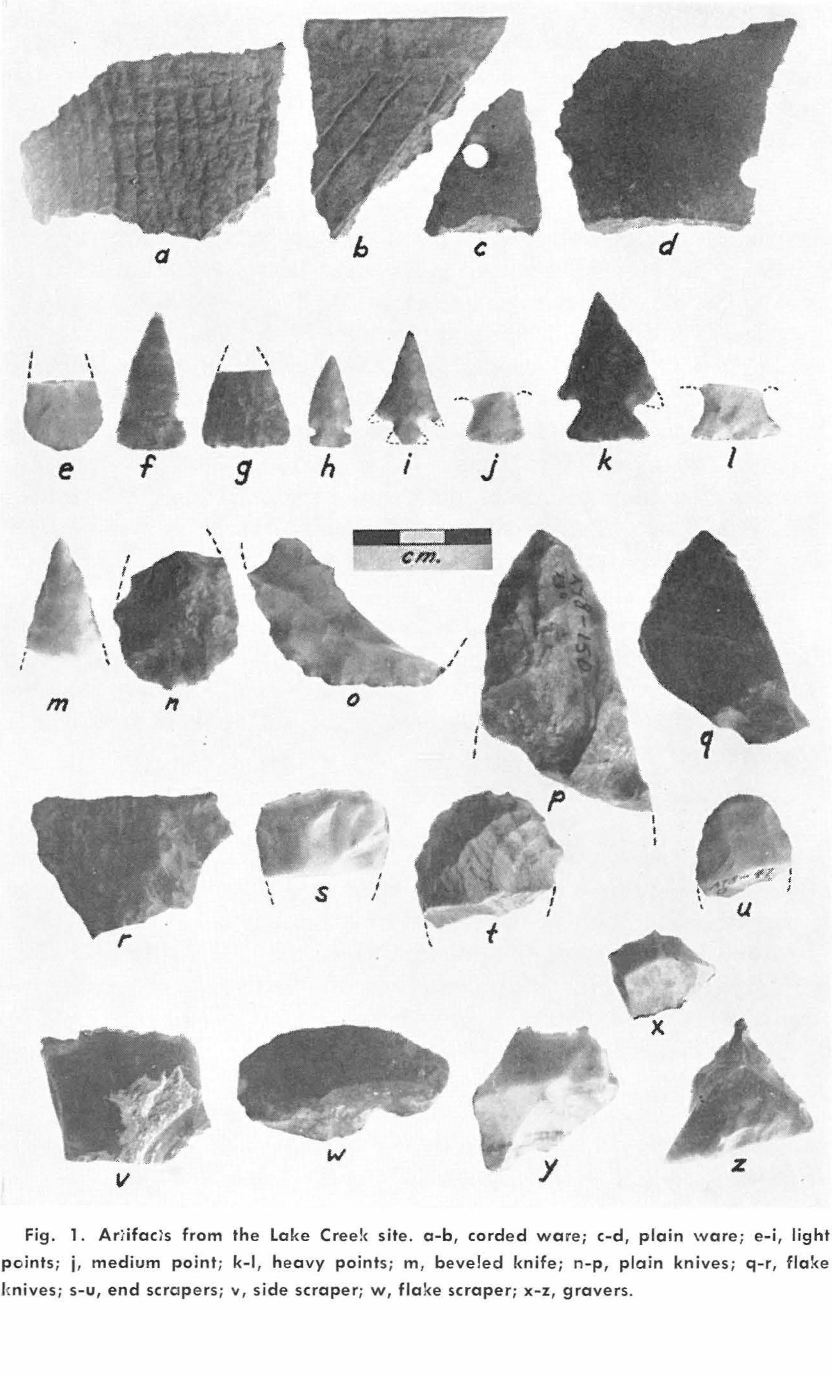

Fig. 1. Artifacts from the Lake Creek site. a-b, corded ware; c-d, plain ware; e-i, light points; j, medium point; k-l, heavy points; m, beveled knife; n-p, plain knives; q-r, flake knives; s-u, end scrapers; v, side scraper; w, flake scraper; x-z, gravers.

is similar in color to the outer, tends to be rather uneven, has small cracks and pits, and visible particles of temper.

The core of the sherds tends to be darker than the surfaces. The paste has abundant coarse temper of angular limestone particles and rounded quartz grains in about equal proportions. The "limestone" may be caliche or dolomite rather than ordinary limestone. The paste is soft and lumpy, the edge of the sherd crumbling easily under the thumbnail. Vessel walls were rather thick; measurement of 25 unsplit sherds showed an average and median thickness of 11 mm., and a range of 7 to 13 mm.

The body sherds do not reveal much about vessel size and shape, the largest fragment having a maximum dimension of 64 mm. Curvature of even the largest sherds is slight, suggesting big vessels; none of the sherds shows the high curvature of a little vessel. That the vessels may have been shoulderless is hinted by the absence of any fragments representing a neck-shoulder junction. The possibility of pointed bottoms is indicated by one body sherd (#122, 12–18″) which becomes thicker and more strongly curved toward one end.

The rim sherd (#121, 12–18″, Fig. 1, b) resembles the body sherds, but gives a little more information about form and decoration. It indicates a vessel having the upper part contracting gradually toward a somewhat thinned and slightly everted lip, the outer surface of the upper part being smoothed, and decorated below the lip with long incised diagonal lines.

Although this corded ware may represent the same general ceramic tradition as the Borger Cordmarked type characteristic of the Antelope Creek Focus or Panhandle Aspect (Suhm *et al.*, 1954, pp. 390–93), it belongs to a different type as yet undefined in this region. The traits of fabric-marking, limestone temper, shoulderless form, pointed bottom, and diagonal-incised decoration all point toward an earlier Woodland horizon.

Plain ware. A ceramic tradition quite different from that of the corded type is represented by five plain body sherds (#27, 28, 52, 53, and 139, 18–24″).

The outer surface of these sherds is light brown to dark gray, undecorated, smooth and even, and sometimes has a few specks of temper visible. The inner surface is similar but lighter in shade.

The core is dark brown to black. The paste is tempered with abundant fine angular particles of feldspar. The paste is compact and homogeneous, the edge of the sherd flaking with some difficulty under the thumbnail. Vessel walls were moderate in thickness, one sherd having a thickness of 5 mm., three of 7 mm., and one of 8 mm.

Curvature of all fragments is slight, indicating fair-sized vessels—the largest piece is 64 mm. across. There is no clue as to vessel form. Two sherds (#52, Fig. 1, c; #139 ,18–24″, Fig. 1, d) have a repair hole drilled near the edge.

This plain pottery closely resembles the so-called "brown ware" of the middle Pecos River valley in eastern New Mexico (Jelinek, 1958).

Projectile Points

Eleven specimens are classifiable as projectile points, representing three main categories—light, medium, and heavy.

Light points. Most of the projectile points (seven) are the relatively small and thin kind usually regarded as arrow points. The light points include ovate, triangular, side-notched, and corner-notched forms, and unclassifiable fragments.

The single light ovate specimen (#2, Fig. 1, e) is tipless, measures ? × 17.0 × 3.8 mm., and is milky Alibates. Points of this type (cf. Young points) occur sparsely in several late complexes of this region.

One of the two light triangular points (#34, Fig. 1, f) is complete, has a convex base, slightly convex lateral edges (one edge has an accidental nick), measures 30.6 × 15.3 × 3.9 mm., and is maroon Alibates. The other (#132, 18–24″, Fig. 1, g) is tipless, has a straight base, straight to slightly convex blade edges, measures 17+ × 19.0 × 4.2 mm., and is maroon Alibates. Light triangular points (cf. Fresno points) are not uncommon locally in several late complexes. The base is more often straight or concave than convex.

The one light side-notched point (#1, Fig. 1, h) is complete and unusually small, measuring 20.8 × 9.5 × 2.5 mm. Unlike most light side-notched points, maximum width occurs at the notches rather than at the base. The base is also unusual in being convex rather than straight or concave. The blade edges are convex, with small notches located closer to the base than usual. Width between the notches—a possible indication of foreshaft diameter—is 6.4 mm. The material is milky Alibates. Except for the peculiarities noted, this specimen resembles the Harrell point, characteristic of the Antelope Creek Focus and other late complexes hereabouts.

The one light corner-notched point (#3, Fig. 1, i) has the tips of the barbs and the corners of the base missing. It measures 25.5 × 15+ × 3.7 mm. It was notched diagonally from the basal corners to produce an expanding stem and pronounced barbs. The base seems to have been straight; the blade edges are concave. Minimum stem width—which may conform to foreshaft diameter—is 5.5 mm. Material is milky Alibates. Points of this type (cf. Scallorn points) occur locally in several late complexes; they are not characteristic of the Antelope Creek Focus.

Unclassifiable fragments of light points include a tip fragment (#101) of maroon and yellow flint which may be Tecovas, and a medial fragment (#133, 18–24″) of maroon Alibates.

Medium points. One point represented only by a stem fragment (#4, Fig. 1, j) appears to have been intermediate in weight (and size) between the light and heavy points often regarded respectively as arrow and dart points. The stem fragment apparently belonged to a corner-notched point. The edges expand from a neck width of 9.6 mm. (foreshaft diameter?) to a base width of 13.3 mm. The base is convex. The stem is about 10 mm. long. It is milky Alibates. Similar points are found locally in several middle to late contexts; they are not typical of the Antelope Creek Focus.

Heavy points. Two of the three heavy points are corner-notched; one is an unclassifiable tip fragment.

One of the heavy corner-notched points (#107, 6–12″, Fig. 1, k) is complete except for a missing barb. Diagonal notching from the base corners gives a sharply expanding stem and definite barbs. Neck width is 11.8 mm., base width 18.3 mm. The base is slightly convex and the blade edges are straight. The point measures 33.5 × 22+ × 4.7 mm. It is maroon Alibates. The other example (#5, Fig. 1, l) is a stem fragment that is slightly larger than the stem of the complete specimen and more flaring from a wider neck (12.8 mm.) toward a wider base (19.8 mm.). The base is slightly convex. Material is milky Alibates. Locally such points (cf. Ellis points) characterize several middle to late complexes, but not the Antelope Creek Focus.

The unclassifiable tip fragment (#6) is pink Alibates. It may represent a knife rather than a heavy point.

Knives

Eleven bifacially chipped flint artifacts probably were used chiefly as cutting tools. Three main categories—beveled, plain, and flake knives—are recognizable.

Beveled knife. A small tip fragment (#35, Fig. 1, m) of a narrow-pointed, straight-edged knife of milky Alibates has a right-bevel (when the specimen is lying on either face, pointing upward, beveling is visible on the right edge). Diamond-shaped, alternate-beveled knives are characteristic of the Antelope Creek Focus and other late complexes in the Panhandle.

Plain knives. Six knives are plain in the sense that they are not beveled. Several sizes and shapes are represented.

One tipless plain knife (#114, 12–18″, Fig. 1, n) of maroon Alibates is small, thick, and ovate, has a rounded base, and measures ? × 26.2 × 10.0 mm.

The basal portion (#36, Fig. 1, o) of a large, thin, presumably ovate plain knife with flattened base is milky Alibates.

Three tip fragments suggest plain knives of medium size. One (#7) of translucent orange quartzite is medium thick with convex edges. Another (#150, 12–18″, Fig. 1, p) of pink Alibates is thin with convex edges. Another thin tip (#37) of maroon and milky Alibates is crudely flaked, with straight edges and blunted point.

One plain knife of pink and brown Alibates is represented only by a small piece of its thin convex edge (#134, 18–24″).

Flake knives. This category includes four flakes with bifacially retouched edges. One is pointed; the rest are unshaped.

One medium-sized flake knife of maroon Alibates (#50, Fig. 1, q) has a thin point with short bifacial retouching on one edge and longer unifacial retouching on the other; the opposite end is wide, thick, and unworked.

Three other flake knives of irregular outline are unworked except for a single long bifacially retouched edge. One flake (#40) of blue and gray Alibates is small and thin with a straight worked edge. A larger flake (#145, 24–30″, Fig. 1, r) of maroon Alibates also is thin and has a straight worked edge. The worked edge on another flake of maroon Alibates (#115, 12–18″), small and thick, is convex.

Scrapers

Twenty-one unifacially chipped flint artifacts probably served mainly as scraping tools. Principal categories distinguishable are end, side, and flake scrapers.

End scrapers. Six specimens are assignable to this category. Two varieties—snub-nosed and thin-bitted—are recognizable.

Five incomplete specimens appear to represent ordinary snub-nosed end scrapers of medium size and thickness. Three are bit fragments and two are medial fragments. One bit fragment (#41, Fig. 1, s) has a very steep, slightly convex bit; a flat dorsal face worked on both lateral edges; and retouching on one edge of the ventral face. It is milky Alibates, measuring ? × 28 × 8 mm. Another bit fragment (#105, 0–6″, Fig. 1, t) has a less steep, more rounded bit, and a low-peaked dorsal face roughly worked on both lateral edges. Of buff Alibates, it measures ? × 32 × 10 mm. Another bit fragment (#9) has a heat-damaged bit and a low-ridged dorsal face with worked parallel lateral edges, one edge being slightly worn. It is maroon Alibates and measures ? × 32 × 11 mm. One medial fragment (#8) of maroon Alibates has a flat dorsal face with worked lateral edges expanding bitward. The other medial fragment (#42) of gray Edwards is similar except for some retouching on both lateral edges of the ventral face.

One end scraper bit fragment (#47, Fig. 1, u) differs from the rest in being thinner and narrower toward the bit than toward the base; it is also smaller, measuring ? × 22 × 5 mm. The bit and lateral edges form a worked parabola around the flat dorsal face. Material is milky Alibates.

Side scraper. A tabular flake fragment of smoky chalcedony (#43, Fig. 1, v), of medium size and thickness, with both ends broken away, has one long, slightly convex edge dorsally pressure-flaked and retouched, and a short, straight, convergent part of the opposite edge dorsally retouched. It measures 34+ × 29 × 10 mm. It could be part of a peculiar end scraper, but seems more likely to represent a side scraper.

Flake scrapers. Grouped under this heading are 14 flakes and flake fragments unworked except for some retouching along one or more edges of the dorsal face. The complete and broken flakes are of various shapes; they range in size from very small to medium, and in thickness from thin to thick. Parts of one or two edges may be retouched, varying a good deal in length of retouching, and in shape of the retouched edge, which may be straight, convex, sinuous, or rounded. Except for one specimen, all are Alibates.

No. 10 is a small thick flake of maroon and milky Alibates retouched on two slightly convex edges forming a corner. No. 11 is a small thin flake of maroon Alibates retouched on one convex edge. No. 12 is a very small thin flake fragment of milky Alibates retouched on one convex edge. No. 38 is a small thick flake fragment of milky and maroon Alibates retouched on one rounded edge. No. 45 is a small thin flake fragment of milky and maroon Alibates retouched on two sinuous edges. No. 46 is a small medium-thick flake fragment of milky Alibates retouched around a corner. No. 48 is a small thin flake of maroon Alibates retouched on one rounded end. No. 49 is a medium-sized thick flake fragment of milky Alibates retouched on one convex edge. No. 108, 6–12″, is a small thick flake fragment of maroon Alibates retouched on one convex edge. No. 117, 12–18″, is a small thick flake fragment of milky Alibates retouched on one straight edge. No. 118, 12–18″, is a very small thick flake fragment of maroon Alibates retouched on one straight edge. No. 136, 18–24″, is a very small thin flake of milky and maroon Alibates retouched on one convex edge. No. 137, 18–24″, is a medium-sized and medium-thick flake of colorful silicified wood retouched on one rounded corner. No. 151, 12–18″, Fig. 1, w, is a medium-sized thin flake of maroon Alibates retouched on one convex edge.

Gravers

Three unifaces may have functioned as gravers. These are small flint chips of irregular outline with edges dorsally retouched so as to produce one or more small beaks.

One small thin flake fragment of milky Alibates (#13, Fig. 1, x) has a single beak between finely retouched concavities near the middle of a convex edge. A larger thicker flake of maroon and milky Alibates (#44, Fig. 1, y) has two beaks with retouched concavities between them and on both sides, as well as a retouched straight edge on the opposite side of the flake. One flake fragment of maroon Alibates (#116, 12–18″, Fig. 1, z), of similar size but greater thickness, has two slightly concave edges crudely worked to form a strong sharp point.

Blade

One piece of pink and milky Alibates (#39) appears to be the broad thick tip fragment of a percussion-flaked blade or blank.

This artifact (#110, 6–12″, Fig. 2, a) is a tabular piece of buff chert, roughly trianguloid in outline, with one edge sharpened by removal of a few chips by percussion from one face. Most of the rest of the artifact is encrusted with a thick patina. It is small as choppers go, measuring 69 × 65 × 27 mm.

Chopper-hammer

This artifact (#79) is a block of translucent gray quartzite broken away from one corner of a large stream-worn cobble. The broken face is percussion-flaked at one end to produce a sharp edge, and the rest

CHOPPER

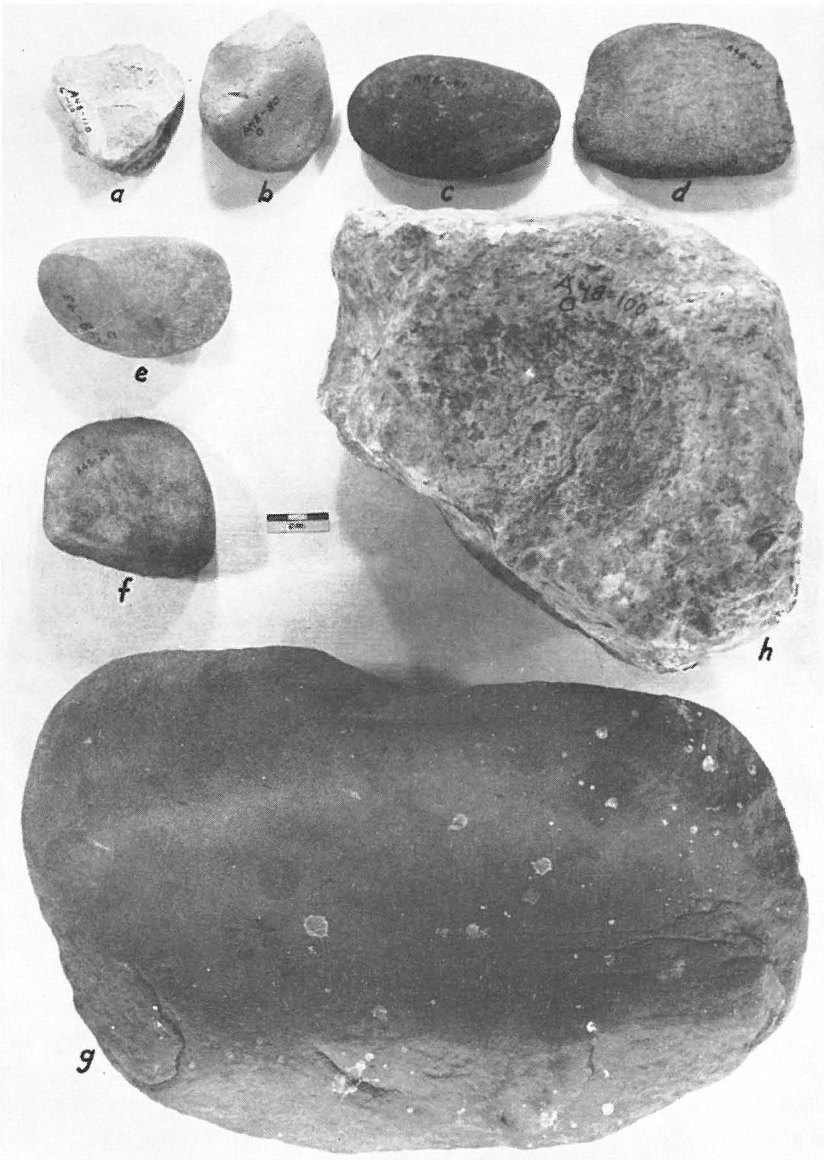

Fig. 2. Artifacts from the Lake Creek site. a, chopper; b, hammer; c, oval mano; d, thin mano; e, beveled mano; f, wedge-shaped mano; g, thin slab; h, thick slab.

of this face is battered around the edges from hammering. It measures $111 \times 77 \times 55$ mm.

Hammer

This artifact (#80, Fig. 2, b) is a yellow-crusted stream pebble of light gray andesite porphyry. The original tetrahedral shape of the pebble is unmodified except for a battered edge at one end. It measures $105 \times 62 \times 42$ mm.

Cores

A polyhedral block of maroon Alibates flint (#51) the size of a small fist evidently had a number of flakes removed from it by percussion. Two other fragments of maroon Alibates (#109, 6–12″, and #135, 18–24″) show percussion flaking.

Manos

Twenty-one manos, only five of which are complete, may be sorted into oval, rectanguloid, beveled, wedge-shaped, and unclassifiable categories. As a whole they are small relative to the usual mano size in this region; only two or three approach medium size. Grinding surfaces rarely show peck-marks. Materials are mainly sandstones and gneisses. All materials are available locally: the sandstones occur in bedrock and in gravels; the gneisses, other metamorphic rocks and various igneous rocks occur in gravels. The finer-grained reddish sandstones probably come from Permian or Triassic formations, the coarser-grained grayish sandstones from Triassic or Tertiary beds.

Oval manos. Most of the manos (11) are of this type. Only two are complete; the rest are end fragments, except for one longitudinally split specimen. Most of these manos are small thick oval stream pebbles, little modified except for more or less grinding on one or both faces. The worn face is transversely convex, the convexity varying from nearly flat to highly arched.

Six of the oval manos, all end fragments, are bifacially worn. One fragment (#84) represents the largest mano in the collection, approaching medium size for the region; it is a light gray to brown, coarse-grained, hard gneiss pebble with one face slightly convex and the other highly convex, the latter retaining a few peck-marks. Another (#85) is light brown, fine-grained, medium-hard sandstone with both faces moderately convex. Another (#86) is a light gray to reddish, fine-grained, hard gneiss pebble with both slightly convex faces showing much wear. Another (#119, 12–18″) is brown, fine-grained, hard sandstone with both faces moderately convex. Another (#89) is light gray to brown, coarse-grained, medium-hard sandstone with one face slightly convex, the other largely split away. The last of the bifacially worn oval manos (#111, 6–12″) is a red, medium-grained, hard gneiss pebble with both faces moderately convex.

Five of the oval manos are unifacially worn. Two are complete, two are end fragments, and one is a side fragment. One of the complete specimens (#81, Fig. 2, c) is a red, coarse-grained, hard gneiss pebble with a slightly worn, slightly convex face; size is 105 × 61 × 42 mm. The other complete specimen (#82) is similar except that it is a reddish, fine-grained, hard andesite pebble; it measures 95 × 62 × 37 mm. One of the end fragments (#83) is a reddish, medium-grained, hard gneiss pebble with a moderately worn, slightly convex face. The other end fragment (#102) is a light brown, fine-grained, hard andesite pebble with a slightly worn, moderately convex face. The side fragment (#87) is a light gray to brown, fine-grained, hard gneiss pebble with a well-worn, slightly convex face retaining a few peck-marks.

Thin manos. This group consists of one complete specimen and three edge fragments which may represent a similar kind of mano. The complete specimen (#30, Fig. 2, d) not only is thinner than the oval manos, but also is more rectangular and somewhat larger, approaching medium size for the region; it measures 108 × 78 × 30 mm. It is a light brown, medium-grained, hard gneiss pebble. Both faces are much worn, one slightly convex, the other moderately so, in such a way that on both faces the crest of the convexity runs diagonally across the long axis of the mano from upper left to lower right corners (when either face of the mano is observed with the long axis in a horizontal position). The three edge fragments resemble this specimen in thinness; size and shape are indeterminate. One (#120, 12–18″) is light brown, fine-grained, medium-hard sandstone with two well-worn, slightly convex faces. Another (#91) is similar except for light gray color. Another (#90) is pinkish, medium-grained, medium-hard sandstone with only one grinding surface, well-worn and slightly convex.

Beveled manos. Two manos, one complete and the other essentially so, are worn in a peculiar fashion. Both are small thick oval pebbles of light gray to brown, medium-grained, hard sandstone. The complete specimen (#93, Fig. 2, e) has one face steeply beveled toward both ends by much grinding in such a way that a sharp crest runs diagonally across the long axis of the mano from upper left to lower right corners (with the specimen oriented as described above). It measures 94 × 61 × 54 mm. The damaged specimen (#31) has *both* faces beveled in this manner, the form of the mano resembling that produced by cupping the left hand across the right hand. It measures 87 × 67+ × 38 mm.

Wedge-shaped manos. Two other manos also are worn peculiarly. Both are small, squarish, made of brown, fine-grained, medium-hard sandstone, and much worn bifacially so that one end is much thinner than the other. One is complete, the other is a side fragment. The complete specimen (#29, Fig. 2, f), measuring 84 × 83 × 41 mm., has slightly convex faces with low crests running diagonally across the long axis of the mano in the same direction noted for previously described manos. The side fragment (#88), split from thick end to thin end, has flat faces; it measures 85 × ? × 42 mm.

Unclassifiable mano fragments. A probable central fragment of a mano is a small block of light brown, medium-grained, medium-hard sandstone (#112, 6–12″) with one flat worn surface. A probable edge fragment is a large chip of light gray, medium-grained, medium-hard sandstone (#92) with a flat worn surface.

Most of the manos from the Lake Creek site resemble those of various non-ceramic complexes in the Panhandle more closely than those of the Antelope Creek Focus, which are generally larger, thicker, more rectanguloid in outline, and less aberrant in manner of grinding.

Grinding Slabs

Ten grinding slabs are separable into thin and thick groups. The thin slabs are sandstone, the thick are dolomite. Most of the specimens are small fragments; only one is complete.

Thin slabs. Of the seven thin slabs, one is complete, three are edge fragments, and three are central fragments. The complete specimen (#33, Fig. 2, g) is rather small relative to the usual slab size in this region, measuring 375 × 250 × 85 mm. It is brown, fine-grained, medium-hard sandstone, oval in outline, with edges partly shaped by chipping. Worn into one face is a long oval trough, rather deep and narrow—140 mm. wide and 30 mm. deep. The trough has much higher sides than ends, giving an open-ended effect. The rim of the trough is worn flat near one corner of the slab. A slightly convex portion of the opposite face also shows some wear.

The three edge fragments are worn more or less concavely on one face only, and show no definite shaping of the roughly convex edges.

One (#97) is a large fragment of a thin slab (maximum thickness 40 mm.) of light brown, fine-grained, hard sandstone. Its basin evidently was quite shallow. Another (#138, 18–24″) is a smaller piece of a somewhat thicker slab (maximum thickness 50 mm.) which evidently possessed a deeper basin with a thin bottom. It is light gray, fine-grained, medium-hard sandstone. Another (#96) is a small fragment of gray, fine-grained, soft sandstone. The slab was thin (maximum thickness 38 mm.), and the worn concavity suggests an open-ended trough like that of the complete slab described above.

Two of the three central fragments are worn on both faces. One (#32) is a very small piece of white, coarse-grained, hard sandstone with one face worn deeply concave, the other worn flat; the bottom of the basin evidently was very thin. Another (#98) is a large fragment of pinkish, medium-grained, medium-hard sandstone with both faces worn very slightly concave. Another (#94) is a small thin fragment of light gray, medium-grained, medium-hard sandstone with one flat-worn face.

These thin grinding slabs resemble those of various local non-pottery assemblages.

Thick slabs. This type of slab is represented by a large end fragment, a smaller corner fragment, and a very small central fragment. All are white, fine, hard Alibates dolomite. The end fragment (#100, Fig. 2, h) indicates a very thick slab of medium size (? × 220 × 105 mm.) and subrectangular outline, with edges partly shaped by chipping. The worn oval basin in one face evidently was more than 35 mm. deep. The smaller corner fragment (#99) indicates a slab not quite so thick with a basin not quite so deep. The very small central fragment (#95) has a worn and pecked concavity on one face, the other being split away; it is grouped with the larger pieces because it has the same composition.

The usual grinding slab of the Antelope Creek Focus resembles these specimens in both form and material.

Bone Bead

A tubular bird bone bead (#140, 18–24″) may be represented by a weathered half-cylinder of thin bone, 17.2 mm. long and about 8 mm. in diameter, which appears to have been cut at both ends.

Animal Remains

In the collection from the Lake Creek site are 21 unworked pieces of animal material. Bison is represented by two teeth (#128, 12–18″;

#141, 18–24″); one limb bone fragment (#106, 0–6″); six foot bones (#14; #103; #127, 12–18″; #142, 18–24″; #143, 18–24″; #152, 24–30″); and two rib fragments (#129, 12–18″; #130, 12–18″). Deer: one foot bone fragment (#104). Jackrabbit: one tooth (#144, 18–24″); one limb bone fragment (#131, 12–18″). A small unidentified rodent: one limb bone fragment (#146, 24–30″). Terrapin: two shell fragments (#147, 24–30″; #148, 24–30″). Mussel: four shell fragments (#15; #126, three pieces, 12–18″).

Conclusions

The Lake Creek site made an attractive camping place for small groups of prehistoric Indians, situated as it is on a small bench very close to spring water but well above flood level, in a sheltered part of a little valley with plenty of timber, game, and other resources.

Present evidence indicates that the site was occupied long enough for accumulation of an occupational zone about 1 foot thick; abandoned during deposition of about 1 foot of blow sand; and reoccupied very briefly when the surface was about as it is now.

The only items referable with much certainty to the latest occupation found at or near the surface of the test trench are a bit fragment of a snub-nosed end scraper, a bison limb bone fragment, and some burned rocks.

Found in the buried occupational zone in the test trench, and almost certainly referable to the earlier occupation, are the following items: eight corded sherds of Woodland ware; one plain sherd of Pecos valley "brown ware"; one light triangular point; one medial fragment of a light point; one heavy corner-notched point; one small ovate plain knife; one tip fragment of a plain knife; one edge fragment of a plain knife; one graver; two flake knives; six flake scrapers; one chopper; two core fragments; one bone bead; two bison teeth; four bison foot bones; two bison rib fragments; one jackrabbit tooth; one jackrabbit limb bone fragment; one small unidentified rodent limb bone fragment; two terrapin shell fragments; three mussel shell fragments; and a quantity of unworked flint flakes and burned rocks.

It seems very likely that most of the rest of the collection, gathered from the eroded edges of the site, also belongs to the earlier occupation, although any particular item, of course, could as well represent the later occupation. The surface finds could represent the Antelope Creek Focus, or more broadly, the Panhandle Aspect, except for the following items which rarely or never appear in this complex: Woodland sherds; Pecos valley "brown ware" sherds; a light side-notched point rather different from the usual Harrell point; corner-notched light, medium, and heavy points; beveled and wedge-shaped manos; and thin grinding slabs. Several traits most distinctive of the Panhandle Aspect are lacking among the surface finds, chiefly Borger Cordmarked sherds and ordinary Harrell points. The only artifacts in the entire collection which have been considered diagnostic of the Panhandle Aspect are the thick grinding slabs found on the surface.

Although it is not clear, therefore, whether the latest occupation represents the Panhandle Aspect or some other complex, the conclusion seems inescapable that the earlier occupation represents a complex quite different from the Panhandle Aspect.

At present this complex, which may be designated the Lake Creek Focus, seems to be characterized chiefly by a distinctive type of Woodland pottery associated with large to small corner-notched projectile points. Full definition of the focus is not yet possible.

As for the temporal position of the focus, a few clues are available, but much more work at the Lake Creek site, and at other components elsewhere in the region, will be needed to establish the age of the complex satisfactorily. The fact that the type component of the complex is buried under a foot of blow sand does not necessarily imply much antiquity; many of the latest manifestations in the Panhandle have a much thicker eolian overburden. Some light may be shed on the age of the focus if further work at the Lake Creek site can determine the identity and age of the component which overlies the Lake Creek component. Further work at the site probably would produce enough organic remains for radiocarbon dating of the Lake Creek component.

At present, perhaps the best indication of the age of the Lake Creek Focus is provided by the definitely associated trade pottery from the Pecos valley. According to Jelinek (1958), the Pecos valley pottery was being manufactured from about A.D. 950 to 1300.

A date well before A.D. 1300 is also indicated by trait similarities of the Lake Creek Focus with complexes which are older than the Upper Republican Aspect in the Central Plains and the closely related Panhandle Aspect of the southern High Plains, since the Upper Republican Aspect is now thought to have originated as early as A.D. 1000 (Wedel, 1959: 570), and the Panhandle Aspect as early as A.D. 1100 (Suhm *et al.*, 1954: 392). Similarities with the Woodland complexes which pre-date the Upper Republican Aspect are provided by the corded pottery, which closely resembles Woodland ware in essential traits of surface finish, tempering material, and vessel shape, and by the light to heavy corner-notched points. Similarities with certain as yet undefined complexes of a late pre-pottery (late Meso-Indian or Archaic) stage of development which locally pre-date the Panhandle Aspect are provided by the points, and by the grinding implements.

Although Woodland pottery, and all other elements of the Lake Creek Focus, are known from various sites in this region, nothing is known as yet about the distribution of the particular complex of traits which constitutes the focus.

Use of local flint for most of the chipped stone artifacts suggests that the Lake Creek Focus represents a group residing in this region rather than one passing through it. All in all, the trait assemblage is suggestive of a local complex which has passed from a late pre-pottery (Meso-Indian or Archaic) stage of development into an early pottery (Neo-Indian or Neo-American) stage, largely through the borrowing of a Woodland tradition of pottery-making.

The general character of the pottery, the light triangular points, and certain other traits indicate that the Lake Creek Focus ultimately may be shown to have a place somewhere in the genealogy of the Panhandle Aspect.

Perhaps the most significant discovery at the Lake Creek site was the finding of Woodland and Puebloan sherds in clear association. This is an important addition to the accumulating evidence of cultural exchange between the Plains and the Southwest at an early date.

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The White Site: An Historic Indian Burial In Yoakum County, Texas

DEE ANN SUHM

Introduction

In the summer of 1955, J. D. White, in the course of levelling a freshly plowed field, uncovered objects of historical and archeological interest. Unable to investigate the site himself, Mr. White reported the find to H. C. Morgan who, along with several friends, undertook limited excavation. Shortly thereafter, news of the discovery reached the Museum at Texas Technological College. After an examination of the site by William M. Pearce and A. A. Andretta, members of the Tech Museum field school, under the direction of Jane Holden Kelley, spent most of one day excavating what remained of the site.

The White Site lies in the southwestern portion of Yoakum County, approximately seven miles west and two miles north of Denver City, Texas. Since at the time of investigation the site had been badly disturbed—in fact, almost entirely destroyed—by deep plowing, the exact structure and extent of the site is impossible to determine. The limited data available, however, indicate that the artifacts were concentrated in a relatively small area, approximately 15 to 20 feet square, and that they were not deeply buried.

In view of these circumstances, the analysis has necessarily focused upon the objects recovered rather than the specific context of each find. But, unfortunately, it is difficult to appraise the completeness of the collection. The site was known to a number of individuals and, consequently, it is quite possible that some of the artifacts are in private collections. At any rate, the materials examined represent, by and large, a consistent and significant complex which, with reasonable assurance, can be identified as an historic Indian burial. As relatively few historic Texas Indian burials have been described in detail, the White Site, in spite of the severe disturbance to the burial and the possible incompleteness of the collection, merits reporting.

In writing this paper I am indebted to The Museum at Texas

Technological College for generously making available the materials they collected, as well as the objects from the site donated to them by H. C. Morgan; to Jane Holden Kelley of Lubbock for her invaluable cooperation and assistance; to Edward B. Jelks for the section on beads; to William W. Newcomb, Jr., for his many helpful suggestions; to Florence E. Petzel for analysis of the textiles; and, finally, to Chris Jelks and Hal M. Story for the illustrations which greatly enhance this report.

Objects Recovered

The more than 2,000 specimens from the White Site can generally be sorted into two major categories: personal paraphernalia and horse trappings. While this gross breakdown has some measure of validity and utility, there are specific subgroupings, such as conchas, which are not mutually exclusive, and others, such as buckles, which are somewhat arbitrarily assigned to one or the other major category. Fortunately, the excellent preservation of materials, especially when used in conjunction with ethnographic observations, provides an unusually good opportunity to examine function. The main emphasis, however, has been placed on a detailed description of the objects collected from the site. Comparative materials have been introduced whenever possible, although no attempt has been made to provide an exhaustive account.

Human Skeletal Remains

All human bones recovered belong to a young child (Fig. 8, O) probably between one and three years of age at the time of death (T. W. McKern, personal communication). Many of the bones have traces of a greenish stain derived from the numerous metal objects which accompanied the burial. Considering the age of the individual and the disturbance caused by the plow, the skeleton is surprisingly well represented. Specifically, those parts found include a humerus, radius, ulna, two probable finger bones, a tibia fragment, a fibula, portions of the lower jaw, eight teeth, a number of rib and vertebra fragments, part of a clavicle, a nearly complete scapula, and slightly less than a third of the skull.

Since the bones were scattered by the plow, none of the details of burial can be determined. Thus, the possibility of establishing tribal identity is rendered difficult on several counts: condition of the bones, age of the individual, and lack of specific data on mode of interment.

However, it is interesting and significant to note that such copious and valuable offerings (assuming that virtually all artifacts found and described herein were intended as burial furniture) should be placed in the grave of such a young child. It is, therefore, possible that the child was a male member of an important and well-to-do family; or that one or more adults were also buried at the site. The latter hypothesis seems more in keeping with the richness of the offerings, but is not—because of the circumstances of excavation?—supported by actual skeletal remains.

Brass bells (Fig. 1, A, B). So-called hawk or morris bells (Quimby, 1938) are represented by 27 complete or nearly complete specimens, and by 22 small, unrestorable fragments. Each bell is formed from two hemispheres of sheet brass joined together by rolling of the joint and/or solder. Obvious clappers are lacking, although four of the complete bells did contain poorly preserved pieces of calcite which could have served as such. The calcite pebbles, however, are heavily coated with iron sulfides of copper and may be fortuitous deposits which collected in the bell interiors.

In spite of being similar in many ways, two kinds of bells can be recognized. The most common type (Fig. 1, A)—25 of the complete specimens and probably most of the fragments—is almost a perfect sphere: 21 mm. in diameter and 20 mm. in height. The upper or proximal parts have centrally placed, thin (1 mm. in diameter) brass wire loops or shanks which provided for attachment to cloth or leather. The distal end of each bell has two narrow slits (2.5 mm. wide and 11 mm. long) which intersect one another and form an equilateral cross. The two hemispheres are joined together by slight overlapping (or rolling) of the lower hemisphere over the upper one, and possibly by the use of solder.

The second type (Fig. 1, B) is represented by two very poorly preserved bells. In general appearance they are squat: 21 mm. in diameter and approximately 16 mm. in height (the latter dimension is not exact because of the condition of these bells). Attachment loops are of narrow (2 mm.) sheet brass rather than wire. This type also differs from the former in that the two halves were joined by soldering together two narrow (2 mm.) rims and thus producing a small medial shelf around the exterior of the finished bell. Since traces of a slit can be detected on one of the distal ends, it is probable that both, like those of the first type, had an equilateral cross cut into the base.

Hawk bells have a long history in Europe where, as the name suggests, they were attached to the feet of hunting birds. However, the

Personal Paraphernalia

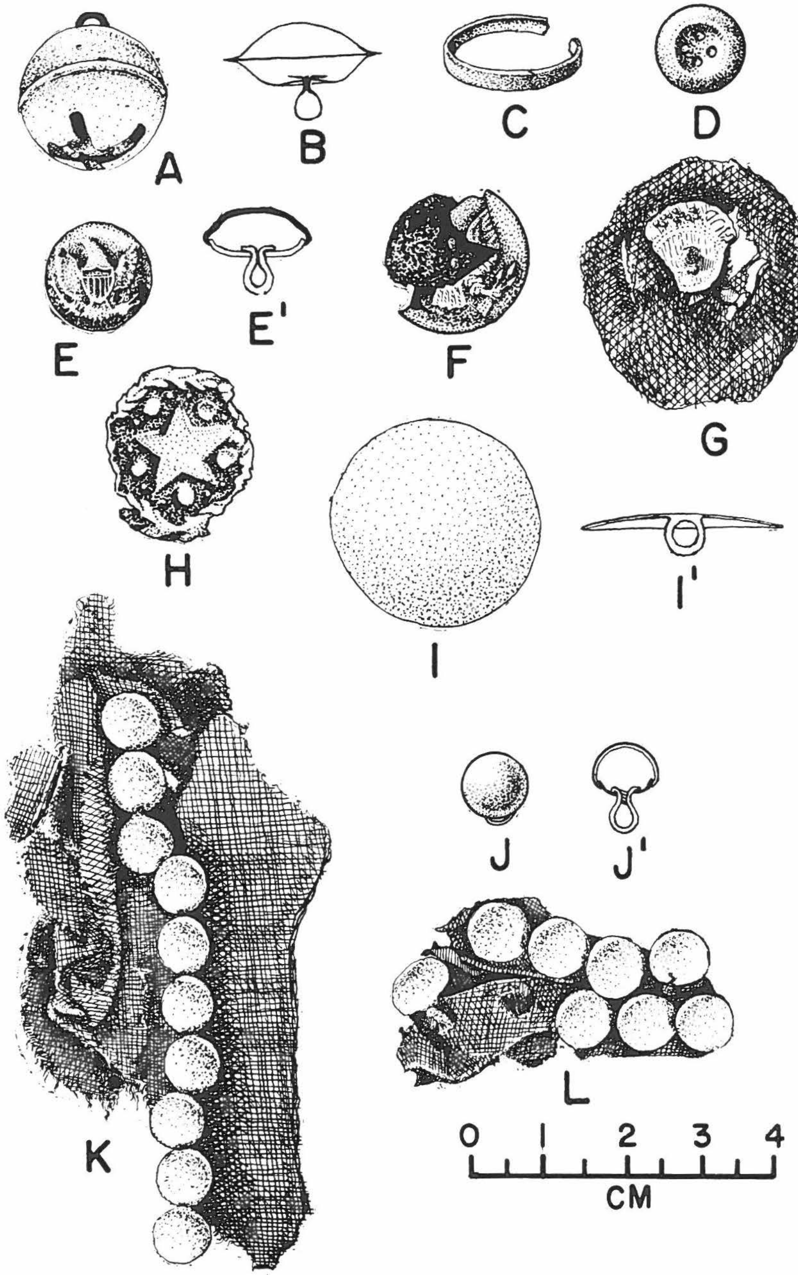


Fig. 1. A, brass bell, type I; B, brass bell, reconstructed, type II; C, finger ring; D, glass button; E, E', Army button, type I; F, Army button, type II; G, brass button back still attached to cloth fragment; H, embossed copper disc; I, I' undecorated copper button; J, J', copper (?) jingles; K, jingles attached to cloth fragment; L, jingles attached to leather fragment.

bells from the White Site could not; since they are of sheet brass, they may not date much before the beginning of the 19th century (Lathrop, 1936; Ford, 1943). There are suggestions (Newcomb, 1955; Wedel, 1959: 126–127; Woolworth and Wood, 1960: 282) that those of type I are characteristic of the first part of the 19th century, while those of type II appear in the latter half of that century.

Copper finger ring (Fig. 1, C). Only one ring was recovered from the site. It is a simple undecorated band of copper which measures 2.5 mm. in width and 12 mm. in diameter. The ends of the band do not join and, although considerable adjustment in the diameter is possible, the ring seems much too large to have been worn on the finger of the young child represented by the human skeletal remains.

Buttons (Fig. 1, D–G, I, I′). Although fairly numerous, the 27 buttons from the White Site can readily be sorted into three distinct kinds: glass, copper, and brass. The two milk white glass buttons (Fig. 1, D) are mold-made, and are indistinguishable from those that can be purchased in stores today. They are, consequently, impossible to date. Both are plain, have four attachment holes, are biconvex, and have a slight depression in one face. They measure 11 mm. in diameter, and 3 and 4 mm. in thickness. Identical buttons were found with the Yellowhouse Canyon burial (Newcomb, 1955).

Undecorated copper, or possibly copper alloy, buttons (Fig. 1, I, I′) are represented by 11 specimens, most of which are complete. They are of uniform diameter, 26 mm., and thickness, .05 mm. A simple ring-shaped brass shank (Fig. 1, I′) brazed onto the back provided a means of attachment. None bears a maker's mark, nor any indication of having once been covered with some other material, such as cloth. In general they have the appearance of having been cheaply made: they were punched from thin sheet metal and the edges of the buttons are not well smoothed. This, coupled with the large diameters, suggests that they may have been expressly manufactured for Indian trade, and that they may have been valued more as ornaments than as buttons *per se*.

Although a precise date, or range of dates cannot be assigned to the copper buttons, the manner in which they were manufactured (i.e., stamped from sheets of metal) was not utilized in the United States until about the beginning of the 19th century (Ford, 1943: 205–206). The stamping or punching of buttons depended upon the rolling of a metal, a process first tried in Waterbury, Connecticut, in 1790 (*ibid.*). Previously all one-piece metal buttons (apart from the shank) were cast.

Of the 14 brass buttons (Fig. 1, E–F) eight are complete, or nearly so, and five are small back fragments with shanks still intact. Although two kinds can be distinguished, all are identifiable as Army uniform buttons, probably types worn on the dress blouse (E. H. Davis, personal communication; Smith, 1960: 212). One type (Fig. 1, F), perhaps characterized solely by a larger diameter (19 mm.), is represented by two very poorly preserved specimens. Other features which might differentiate this type from that described in more detail below are—because of the condition of the two specimens—impossible to observe.

Each of the 12 brass buttons of the second type (Fig. 1, E, E′) bears on the back or shank face the manufacture's name: "Scovills & Co. Extra." This company and the Horstmann Bros. & Co. were, during the 19th century, the principal manufacturers of such objects. These, like the first type, are two part buttons—a kind first developed in the early 1820's (Ford, 1943: 206). The front faces bear die-stamped national emblems: a spread eagle clutching arrows in the right foot and an olive or laurel (?) branch in the left foot. (There are indications that the first type had a similar or identical design.) Both front and back pieces are made from thin sheet brass. The shanks, also of brass, extend through the back faces and are bent backward (Fig. 1, E′), as well as brazed, to insure firm attachment. Somewhat smaller than the first type, these buttons measure 15 mm. in diameter and 6 mm. in thickness. The shanks are 4 mm. across and extend out 5 mm. from the back face.

Several coarse textile fragments, one with a back fragment still attached and four with impressions that match the brass buttons, indicate that these buttons were sewed onto a garment (Fig. 1, G). Unfortunately, not enough remains of the garment to identify it more precisely.

Similar Army buttons are common and have been reported from late 19th century military sites (Smith, 1960: 212). Two-part buttons, on the other hand, could date as early as 1830 (E. H. Davis, personal communication; Ford, 1943: 206).

Embossed disc (Fig. 1, H). A thin copper disc—23 mm. in diameter—bears on the upper surface an embossed design which resembles the seal of the State of Texas. In the center is a five-pointed star, and between each point of the star are three embosses or dots: a large one (3 mm. in diameter) flanked by two smaller ones. About the edges of the disc is a wreath apparently composed of olive branches. The negative design is visible on the reverse side. In addition, the back center has traces of iron, perhaps remnants of a shank or a disc. A thick and badly rusted iron disc, 20 mm. in diameter, found at the site fits fairly well onto the back side. Thus, it is possible that the copper piece was screwed on, or in some way attached to the iron disc.

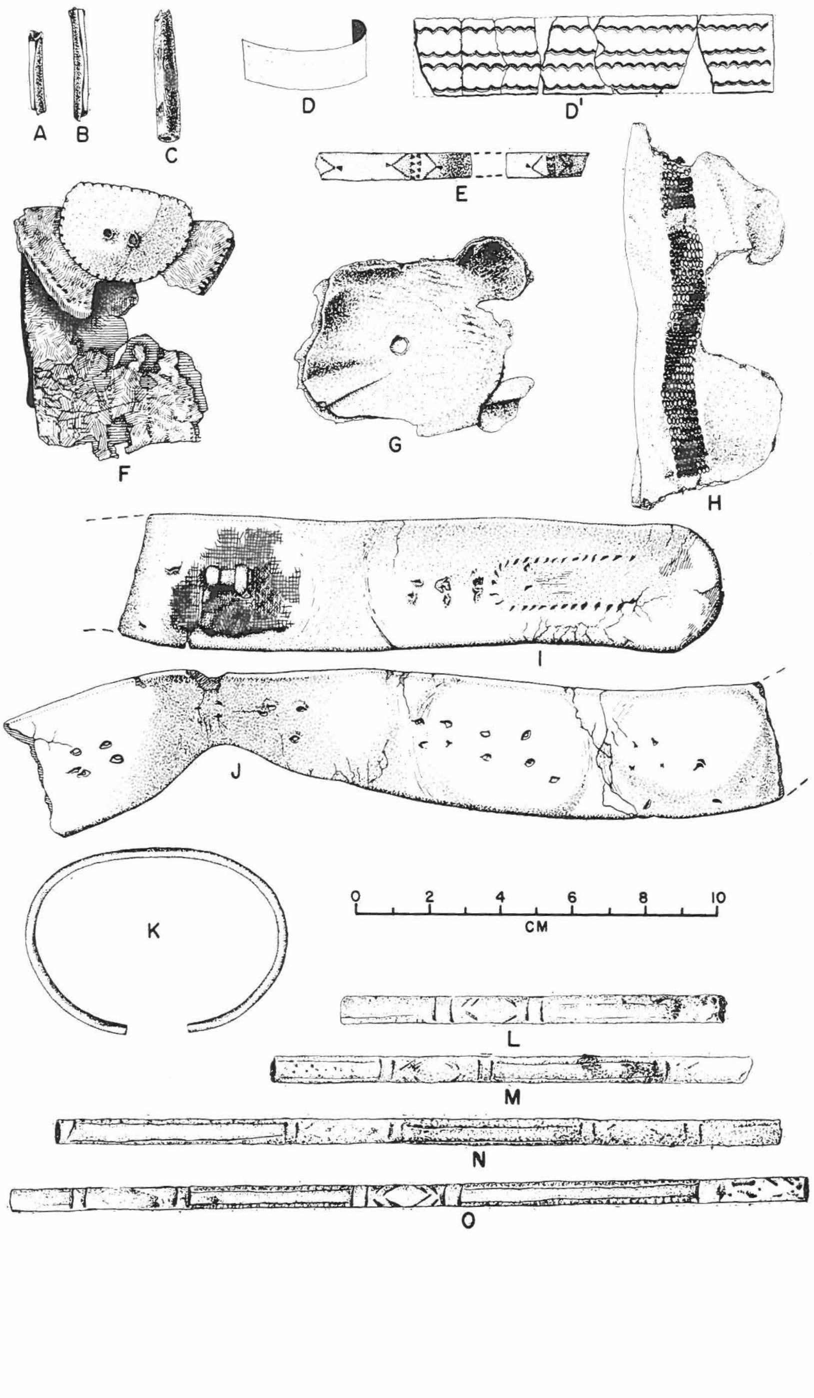
Since the copper piece bears no maker's mark and appears to be a very cheap product, it may have been designed for use as an insignia on a Texas Republic or state militia uniform, or perhaps made specifically for trade to the Indians. At any rate, the close similarity to the Texas seal suggests a connection with some phase of the Republic or state government. Although there have been changes in the official seal, the lack of comparative material makes it presently impossible to precisely date this specimen. However, it was probably made after 1836, when the five-pointed star was first adopted as the seal of the Republic of Texas.

Copper (or brass?) jingles (Fig. 1, J–L). Small, spheroidal jingles number 106, including 26 still secured to cloth and leather fragments. They are of uniform size: 9 mm. in maximum diameter and 7 mm. in height. Each consists of two components, a spherical-shaped front and a disc-shaped back to which the shank is attached. The shanks or eyelets are small oval loops (5 mm. in diameter) of thin brass wire. The ends of the shanks extend through the back faces and are bent backward to prevent them from being pulled out. None of the jingles bears any decoration.

Those specimens still in place (Fig. 1, K, L) provide interesting data on modes of attachment and use. All are arranged in either single (4 instances) or double (1 case) rows. Mounted in this fashion the jingles served both as ornaments and as noisemakers. That they were not solely desired as ornaments is further suggested by the looseness of attachment. Instead of simply sewing them on with thread (as is indicated for the buttons), small slits were made, at intervals of 6 to 11 mm., into textile (1 example) or leather (4 examples) garments (?). The shanks of the jingles were then extended through the slits and a long, narrow piece of leather was passed through each shank.

Copper bangles or tinklers (Fig. 2, A, B). Each of the 20 bangles is made from a narrow sheet of copper rolled into a cylinder or tube. Edges of all bangles are flush rather than overlapping. Lengths of the complete specimens range from 20 to 31 mm., diameters from 3 to 4 mm. Traces of leather within a number of the bangles suggest that they were formed around ends of thongs which dangled as fringes.

Shell hair pipes (Fig. 2, C). Fragments of 19 rather long, tubular beads, which have come to be known as hair pipes or wampum hair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pipes, were recovered from the site. None is complete, but most, if not all, were probably at least 20 or 40 mm. long. Outside diameters range from 5 to 8 mm.; diameters of the longitudinal perforation, or fenestration, are about 3 mm. Exterior surfaces are badly weathered, but once must have had a glossy polish.

In an extensive and most useful study of Indian hair pipes, John Ewers (1957) notes that those of shell were first commercially manufactured for the Indian trade in the latter part of the 18th century, probably between the years 1776 and 1798. Earlier forms were made of either silver or glass. However, the development of the shell hair pipes, which perhaps can be traced to John W. Campbell of Pascack (now Park Ridge), New Jersey (Ewers, 1957: 42), provided less expensive and more durable trade items. Thus, between the years *ca.* 1800 and 1880—when the shell hair pipes began to be replaced by the even more durable bone ones—these ornaments gained widespread popularity among the Indians. Throughout most of this period, the Campbell family nearly succeeded in controlling the manufacture of shell hair pipes. Since the most common type was made from the lip of the West Indian conch (*Strombus gigas*), it is probable that those from the White Site are from the same type of shell. Perhaps they were even made by members of the Campbell family.

Shell hair pipes probably did not reach the southern Plains in any appreciable number until about 1830. They did not, in fact, truly become common in that area until after about 1850, when hair-pipe manufacturing shifted from a hand to a mechanized operation (Ewers, 1957: 74). In keeping with the relative ease of acquisition, earlier uses emphasized ear and hair ornaments, and necklaces and chokers; while in the post-1850 period more extravagant ornaments appeared, especially breastplates.

The hair pipes from the White Site, if the sample collected is reasonably complete, are hardly numerous enough to account for the presence of a breastplate. Rather, a simple necklace, choker, or hair ornament seems more likely. Since most of these uses continued up to, or beyond 1880, a wide range of dates, *ca.* 1830 to at least 1880, is possible.

Fig. 2. A, B, copper bangles; C, fragment of shell hair pipe; D, D′, wide, stamped bracelet; E, narrow, fragmentary stamped bracelet; F, leather pouch; G, dressed skin fragment with concha (?) and brass bell impressions; H, dressed skin with beads still intact; I, J, portions of concha belt; K, undecorated brass wire bracelet; L-O, designs on brass wire bracelets. Scale of D ½ that of other objects; L-O, twice that of other objects.

Glass beads (Fig. 2, H). These are characteristic of middle to late nineteenth century trade beads in the southern Plains. Four forms are present: (1) tiny, simple seed beads in a variety of colors; (2) tiny, compound seed beads; (3) simple, hexagonal tubular beads; (4) one simple, cylindrical tubular bead.[1] The dimensions, colors, and frequency of the glass beads are given in Table 1. The seed beads were undoubtedly sewn on clothing, containers, and the like to form designs, while the tubular beads were probably strung into necklaces.

A small fragment of dressed skin (deer)—evidently part of a moccasin, coat, or other item of clothing—has a group of tiny, simple seed beads still in their original alignment as part of a beadwork design (Fig. 2, H). The beads are sewn on with fine sinew (?) by means of a technique known as the lazy stitch; i.e., the beads are strung on threads which are fastened to the hide of cloth at the ends of short parallel rows (Douglas, 1951: 90). The design consists of a band made by placing rows of beads side-by-side, each row containing eight beads. The beads are arranged by colors to create alternating, diagonal, colored stripes that slant across the band: first a stripe composed of opaque white beads, then a stripe of translucent dark blue beads, next another stripe of opaque white, then a stripe of translucent red, after which the same sequence was apparently repeated. Traces of vermilion—probably stain from the spilled contents of a small leather pouch (see below)—are visible at one end of the fragment beside the beadwork.

In addition to the dressed animal skin, there are two fragmentary leather scabbards (one may be an awl case) which have parallel rows of tiny impressions unquestionably made by the seed beads (Fig. 5, D). The beadwork design on these was probably similar to that in Fig. 2, H.

Wire bracelets (Fig. 2, K-O). More or less oval-shaped, heavy (2 to 3 mm. in diameter) brass wire bracelets are well represented (70) and include both decorated and undecorated specimens. Of the more numerous (64) undecorated ones, 34 are complete, eight are about three-quarters complete, and 22 are less than half complete. All six of the decorated bracelets are incomplete. Most specimens measure approximately 75 mm. across, although the extreme range

[1] The terms used here for classifying bead structure are those devised by Duffield and Jelks (1961; 40–41). Beads made from one kind of glass are designated as *simple;* beads made from two kinds of glass are termed *compound.* "Translucent Red/Opaque White" refers to a bead that has a core of opaque white glass, over which is a veneer of translucent red glass.

TABLE 1

Glass Beads

Form	No.	Remarks
Tiny simple seed beads (diameter: 2–2½ mm.; length: from slightly less than 1 mm. to 1½ mm.; diameter of perforation: less than 1 mm.), in various colors:		Glass is smooth, with no visible bubbles; some specimens are frosted on the exterior, probably due to weathering.
Opaque white	449	
Opaque yellow	178	
Translucent red	507	
Translucent green	12	
Translucent milky	3	
Opaque ultramarine	14	
Translucent turquoise	17	
Translucent pale blue-green	3	
Opaque chartreuse	2	
Translucent medium to dark blue	178	
Translucent light blue	21	
Tiny compound seed beads, Translucent Red/Opaque White (diameter: 2–2½ mm.; length: from slightly less than 1 mm. to 1½ mm.; diameter of perforation: less than 1 mm.).	4	Glass is smooth, with no visible bubbles; surfaces are unfrosted.
Simple hexagonal tubular beads (diameter: approximately 5 mm.; length: 4–6 mm.; diameter of perforation: 2–3 mm.) in two colors:		Ends were broken irregularly, then lightly smoothed.
Translucent amber	35	These are patinated heavily on the surface and appear purplish-black to the naked eye. They must be broken and held before a strong light before the amber color can be discerned.
Translucent blue	1	
Simple cylindrical tubular bead, pale powder blue, fragmentary (diameter: 8 mm.; length: indeterminate; diameter of perforation: 2 mm.)	1	
TOTAL	11,425	

extends from 39 to 85 mm. With a few exceptions, the wire bracelets, like the finger ring, are too large to have been worn by a child.

The decorated specimens bear simple, geometric designs (typical examples are shown in Fig. 2, L-O) apparently made with a chisel and a fine rasp. The layout of the decorations suggest that they were produced before the wire was bent to form bracelets. Edges of both the decorated and the plain bracelets were sometimes filed.

Since large rolls of heavy brass wire, as well as an assortment of tools, were often traded to Indians (see Winfrey, 1950a, b), it is probable that the bracelets from the White Site are of native manufacture. Certainly, it would have been easy to cut an appropriate strip of wire and to bend it into shape. Likewise, the simple decorations which appear on several of the specimens are probably of Indian origin. Although easily made, the wire bracelets, especially when large numbers were worn, made striking ornaments (see, for example, the Comanche woman pictured by Wallace and Hoebel, 1952: 110).

As these bracelets enjoyed long—at least 18th through 19th century—popularity among a variety of Indians, they cannot be precisely dated, nor identified with any one tribe.

Stamped bracelets (Fig. 2, D, E). The most complete of the two stamped bracelets is a handsomely decorated specimen made from a wide (22 mm.) strip of metal, possibly copper or a copper alloy. Four rows of continuous, but individually stamped crescents or arches adorn the entire outside surface (Fig. 2, D′). These rows are grouped into two parallel sets with the arches which make up each set facing one another. A single die stamp, which measured 3 mm. across, was used to make the design.

The second bracelet (Fig. 2, E) is about two-thirds complete. It is made from a narrow (8 mm.) strip of metal which appears to taper very slightly toward the ends. Although badly damaged, traces of a design can be detected on the exterior surface. Elements visible include small, engraved (?) dots and small, stamped triangles. These are arranged into clusters, each one of which consists of two vertical rows of stamped triangles (apexes facing one another), flanked on each side by two converging dotted lines. A single triangle appears at the point of convergence of the dotted lines.

Although the origin of these bracelets remains uncertain, it is possible that they were made by Indians utilizing tools and metals obtained from whites. According to Frederic Douglas (1941: 15) some of the Plains Indians have been manufacturing metal jewelry since about 1830. He also notes that:

Engraving is the old basic method of decoration. Among the Navajo almost entirely and to some extent on the Plains it has been replaced by stamping with dies. Stamping began in the latter region about 1870 (Douglas, 1941: 14).

Thus, if correctly identified as being of native origin, these bracelets —and some or all of the other stamped metal ornaments described below—may provide one of the latest dates (*ca.* 1870) for the burial. Such an age seems more in keeping with the number of perishable objects recovered and, more importantly, with the degree of white influence. However, the possibility that the bracelets were traded to the Indians, or even made by a Mexican captive, cannot be denied or ignored.

Metal conchas (Figs. 3, 4). A striking array—42 more or less complete and 55 unrestorable and unclassifiable fragments—of circular metal plates or conchas, as they are broadly termed herein, was recovered from the site. Perforations, or fairly wide metal shanks brazed onto the backs provided means of attachment. Most are of copper or brass; three, however, are of silver, and several may be of German silver. The latter metal is an alloy of copper, zinc, and nickel which from about 1865 on was frequently worked by Plains Indians (Woodward, 1938: 7; Feder, 1962: 66–68). When the complete or nearly complete conchas are examined in detail, a variety of forms, which may in part reflect different uses, can be recognized. These are:

1) The most numerous group (Fig. 3, A, B) consists of 19 undecorated specimens which are pronouncedly convex (Fig. 3, A′) and which have two small perforations along opposing edeges of the concha. The perforations were made by driving a sharp implement, an awl or nail, through the metal from the underneath side. Jagged edges of the perforations are still visible on the exterior surfaces. Diameters of these conchas vary considerably, from 24 to 65 mm. One is of silver (Fig. 3, A, A′); the remainder are of copper or copper alloys. The copper conchas are of sheet metal, generally less than 1 mm. thick; the silver one is slightly thicker and could have been made from a silver coin. The latter is distinctive in another respect: it has a third perforation. This third hole is much smaller in diameter (1.5 versus 3 mm.) and is placed next to one of the larger perforations.

2) A second, less numerous group—four nearly complete specimens and fragments of at least another two—are distinguished by one, or perhaps two centrally placed perforations and by rims bent downward (Fig. 3, C). With one exception (Fig. 3, D) they are undecorated. Diameters are more uniform than for the first group with

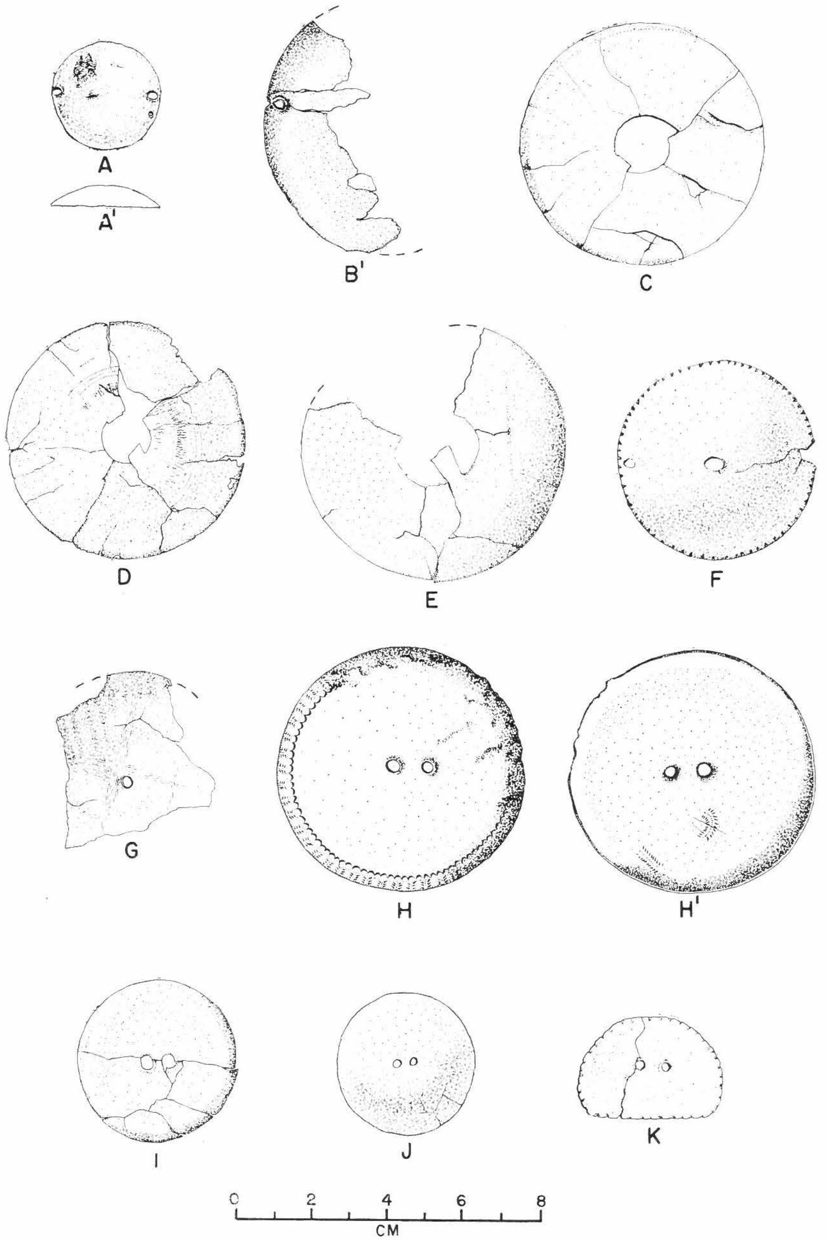


Fig. 3. Metal conchas. A, A', small silver conchas, type I; B, fragment of large concha, type I; C, undecorated conchas, type II; D, decorated concha, type II; E, concha, type III; F, G, conchas, type IV; H-K, conchas, type V.

a range of only 65 to 70 mm. The perforations are cut rather than punched. Since none of these conchas is complete, the shape of the large central perforations remains somewhat conjectural. However, it can be narrowed down to two possibilities: (1) a single more or less cresent-shaped perforation partially divided by a narrow projection; or (2) two hemispherical-shaped slits separated from one another by a narrow strip or tongue 5 to 6 mm. wide. Either way, a projection or a tongue provided, as in the case of modern saddle conchas, for attachment. The one decorated specimen (Fig. 3, D) bears a very faint engraved design which consists of three to four concentric circles of minute dots. This design is placed about midway between the central perforation and the rim of the concha.

3) Two, possibly three, fragmentary conchas, like the above, are made from thin sheet metal and have either a single large, somewhat crescent-shaped hole, or two hemispherical-shaped perforations. However, unlike the above, the rims were not bent downward. The most complete example (Fig. 3, E) measures 70 mm. in diameter. None is decorated.

4) Three conchas have three small attachment holes placed in a line across the diameter: one in the center and one on each edge. All three specimens are decorated. Two have shallow notches, either engraved or filed, around the rims (Fig. 3, F). The third, and least complete, has a sloppily executed engraved design consisting of numerous short dashes. Groups of these dashed lines are arranged into more or less straight lines which intersect one another at right angles (Fig. 3, G).

5) Six conchas have two small, centrally placed perforations (Fig. 3, H-K). Apart from this they exhibit considerable variation. Three are rather small, about 36 mm. in diameter, are of sheet metal, and are undecorated (Fig. 3, J). A fourth is somewhat larger in diameter, 43 mm., is made of thicker metal (German silver?), and has faint traces of a stamped design around portions of the rim (Fig. 3, I). The largest of the six, 65 mm. in diameter, is also of heavy metal, perhaps brass or German silver. The edges of the rim are bent downward and bear a stamped design dominated by crescents and feather-like elements (Fig. 3, H). The back side of this concha (Fig. 3, H′) has two, apparently randomly-placed, stamped designs. Since the same design appears on the exterior surface, it is probable that the impressions on the back side are experiments. Except for the nature of the attachment holes, this concha is much like those of the second group. The last example of this group (Fig. 3, K) is actually more semilunar than disc-shaped. It measures 37 mm. long and 22 mm.

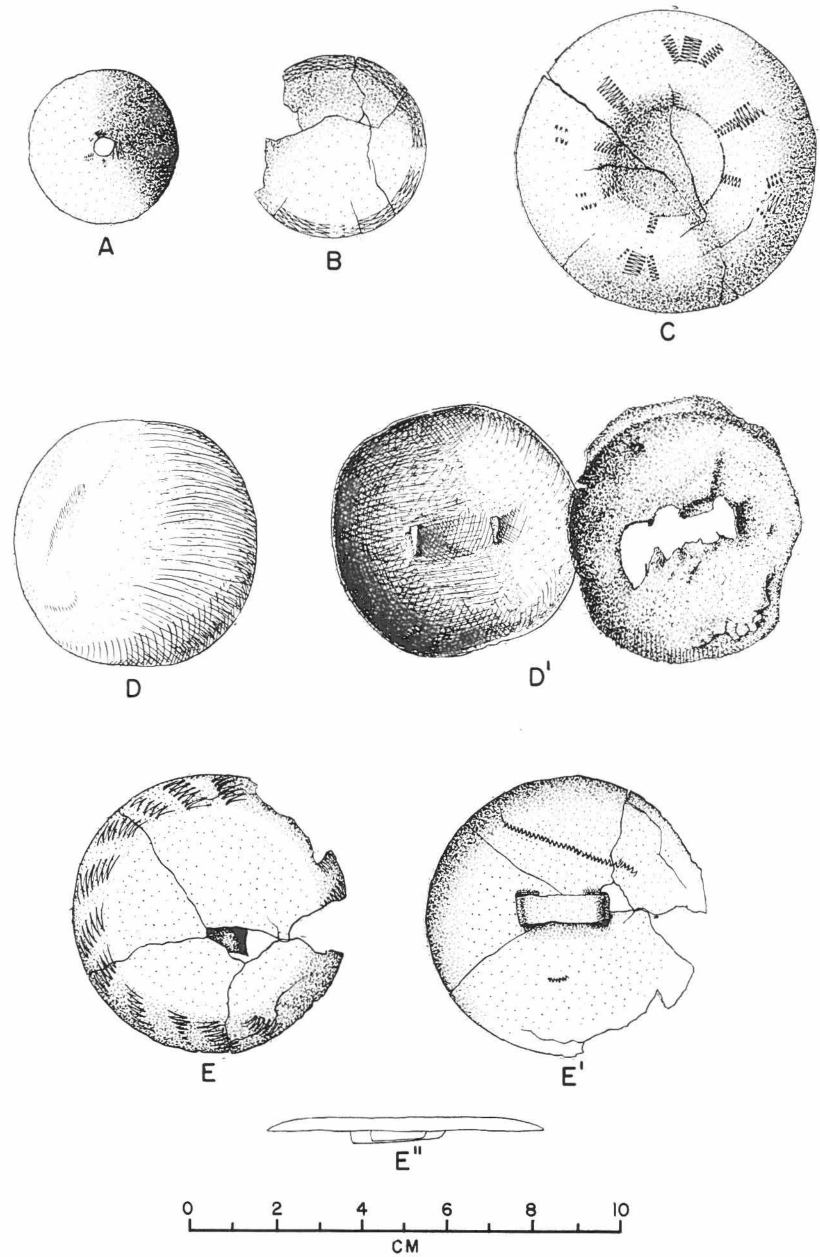


Fig. 4. Metal conchas. A, presumed interior surface of concha, type VI; B-E, conchas, type VII.

wide. Shallow notches along the edges constitute the only decoration. There is some evidence to suggest that this specimen was mounted on the flap of a small leather pouch (Fig. 2, F).

6) The remaining three conchas with attachment holes cannot be assigned to any of the above groups, nor do they have features which link them closely to one another. Consequently, they are described individually. The only complete one (Fig. 4, A) has a fairly large (5 mm. in diameter), centrally-placed perforation. The presumed exterior surface is slightly convex, although not as pronouncedly so as the first group of conchas. The exterior surface is undecorated, but, curiously enough, the back side bears die-stamped impressions immediately about the perforation (Fig. 4, A). Since these would hardly be of decorative value, they probably represent experiments with stamps, perhaps even before the metal was fashioned into a concha. The second concha, like the first, has a centrally-placed perforation. However, the perforation is smaller, 3 mm. across, and was clearly punched out by a sharp implement. The exact diameter cannot be determined, but it was probably in the neighborhood of 60 mm. The third and last of the miscellaneous conchas has a faint zigzag design, which simulates rocker-stamping, about the rim. Because of the fragmentary condition of this specimen the exact placement of the attachment hole is uncertain. This specimen probably measured about 40 mm. in diameter.

7) The remaining six conchas have (or had), in place of attachment holes, sheet metal shanks brazed onto the backsides. Shanks are still intact on two of the conchas, and are clearly indicated by solder scars on the other four. Two conchas are of silver, three of copper, and one possibly of German silver. The two silver ones are virtually identical to one another. They are undecorated, but bear many striations from use or manufacture, and are 57 mm. in diameter and 1 mm. in thickness. One (Fig. 4, D, D′) still has portions of the shank—two strips of metal 6 mm. wide and 22 mm. apart—soldered onto the back. In addition, a piece of cloth to which the shank was attached has been preserved (Fig. 4, D′). This, coupled with shank and textile fragments still secured to a leather strap (Fig. 2, I), strongly suggest that both of the silver conchas were worn on a belt.

The two smallest conchas in this group are 43 and 50 mm. in diameter. Both are made of thin copper; one is undecorated, the other has a zigzag design about the rim (Fig. 4, E), is larger in diameter, 65 mm., has decorations on both the exterior and interior surface, and has a well-preserved, continuous shank. The exterior has diagonal rows of zigzags. These begin at the rim and continue for a distance of about 7 mm. They are placed about 4 mm. across and 7 mm. in length. The decoration on the back—probably the result of an experiment—consists of a single row, 23 mm. long and 1 mm. wide, of another zigzag design. The individual stamp impression, clearly recognizable in this case, measures 5 mm. long and 1 mm. wide. The shank is made from a strip of metal 33 mm. long and 6 mm. wide. The ends of the shank are bent back for a distance of 6 mm.; it is these bent portions that are soldered onto the back. The resultant loop is 5 mm. high and 20 mm. wide (Fig. 4, E″).

The German silver (?) concha (Fig. 4, C) is 70 mm. in diameter and 1.5 mm. in thickness. The back side bears two solder scars, probably remnants of a shank much like the above. On the exterior surface is a decoration consisting of a centrally-placed circle from which radiate rows of zigzags. The circle is made of dots, perhaps engraved, and is 25 mm. in diameter. The zigzag rows were made with at least two different sized stamps, one being 3 mm. wide and 6 mm. long, the other 4.5 mm. wide and 6 mm. long.

Although popularly thought of as being typically Navajo, circular metal plates have long been known to southern Plains Indians, particularly the Kiowa and Comanche, who preferred to wear them as hair ornaments and to fasten them onto leather belts (Woodward, 1938: 5–7; Adair, 1946: 29–32; Feder, 1962: 55–71). Less frequently, and perhaps later they appear as bridle ornaments (see section below). The latter use may reflect Mexican or Spanish influence.

The Kiowa and Comanche are reported to have learned the art of working metals from displaced Shawnee and Delaware Indians in the 1830's (Woodward, 1938: 5–7). Feder (1962), however, has presented data to the contrary. Along these lines it is interesting to note that the Kiowa calendar records 1866 as the year of "flat metal (i.e., German silver) sun dance" (Mooney, 1898: 318). According to Mooney:

> It was so called because a trader brought them at this time a quantity of German silver, from which they made headdresses, belts for women, bracelets, and other ornaments. German silver is known to the Kiowa as "flat metal," because it is furnished to them in sheets, which they cut and hammer into the desired shapes. On both calendars the event is recorded in the same way, by the figure of a head pendant with silver disks placed near the medicine lodge. Such pendants were attached to the head of the scalplock, and consisted of a strip of buffalo hide reaching nearly to the ground and covered along the whole length with a row of silver, copper,

or German silver disks, gradually decreasing in size toward the bottom, which was usually finished off with a tuft of bright-colored horsehair. . . . This was not the first time the Kiowa had obtained German silver. In the old days these ornaments were made for them, of genuine silver, by Mexican silversmiths near the present Silver City, New Mexico (1898: 318–319).

Conchas belt (Fig. 2, I, J). Four leather fragments which represent approximately two-thirds of a wide (37 mm.) strap or belt have vestiges and impressions of conchas. The best preserved example (Fig. 2, I) has part of a metal shank still lashed onto the belt. Curiously, a piece of cloth was placed between the concha and the belt. This suggests that the large silver conchas of type VII were worn on this belt. The strap fragments have numerous perforations as well as circular impressions evidently made by conchas (Fig. 2, J).

Textiles (Figs. 1, G, H; 5, E-G). With one exception (Fig. 5, G), the 98 textile fragments are of weaves and fabrics (Table 2) which indicate a commercial origin. Most are badly stained, and all are so fragmentary that it is impossible to reconstruct the kinds of garments represented.

TABLE 2

Textiles

No. of pieces	Fabric	Weave	Decoration	Remarks
1	cotton	plain	none	. . . .
4	cotton	plain	none	1 with jingles attached; 3 copper stained.
3	cotton	twill	none	1 copper stained; 1 with stitching.
1	cotton	plain	possibly printed	Attached to dressed animal skin fragment.
6	cotton	plain	none	Stitching present
6	cotton	plain	printed	1 stitched
2	wool	twill	none	. . . .
24	wool	plain	none	1 has leather strip attached, possibly used to secure an ornament.
2	wool	twill	none	. . . .
5	wool	twill	none	Have traces or impressions of buttons
7	wool	twill	uncertain	. . . .
36	wool	twill	none	. . . .
1	cotton, wool, bast fiber	twill	cotton dyed	Probably of native manufacture

Although obtained from whites, presumably by trade, several pieces show native modification. These include three pieces sewed onto dressed animal skin, one fragment with jingles attached (Fig. 1, K), and five pieces with traces or impressions of buttons (Fig. 1, G).

The one fragment evidently of native manufacture (Fig. 5, G) consists of a narrow band, blue and white striped, from which dangles a fringe (the warp elements). The weft (horizontal elements) is of a coarse cotton, while the warp (vertical elements) is of an unidentified bast fiber. Only the weft has been dyed. Sewed onto the upper part of this piece are bits of cotton and wool cloth, possibly indicating that it was once attached to the base of a coat.

Leather pouch (Fig. 2, F). Thirty-one pieces of leather can be identified as parts of a small pouch. Although it cannot be completely restored, the larger pieces indicate that it was approximately 75 mm. long and 60 mm. wide. Stitch holes around the edges of the pouch and the flap vary somewhat in size and spacing, suggesting that it was hand-sewn. On the flap are two perforations which contain traces of a narrow strip of metal and which were evidently for the attachment of a concha. In addition to these perforations, there are two holes in the crease of the flap, probably for a piece of cordage or strip of leather which was used to lash the pouch to a belt. Heavy vermilion stains on the interior surfaces clearly indicate the former contents of the pouch.

Scabbards or leather cases (Fig. 5, C, D). Remains of four small leather scabbards, one of which is nearly complete, were recovered. Two are covered with parallel rows of impressions undoubtedly made by tiny seed beads (Fig. 5, D). The others apparently were undecorated. One specimen (Fig. 5, D) still has intact portions of a wooden handle and iron blade of a small, narrow knife or stiletto. The nearly complete scabbard is 22 mm. wide and 65 mm. long. The others range from 15 to 32 mm. wide; lengths could not be determined.

Dressed animal skin (Fig. 2, G, H). Besides the many textile fragments from the site, there are 24 pieces of dressed hide, possibly deer. Seven pieces are large enough to suggest that they were moccasin or garment fragments. One of these (Fig. 2, H), which is more fully described above, still has attached a band of tiny, simple seed beads. A second fragment (Fig. 2, G) has impressions made by a brass hawk bell and, less certainly, a concha.

In addition to these fragments, there are 18 narrow, fragmentary strips of dressed skin. Some may be from a fringe, while others may have been used in securing objects to clothing and horse paraphernalia.

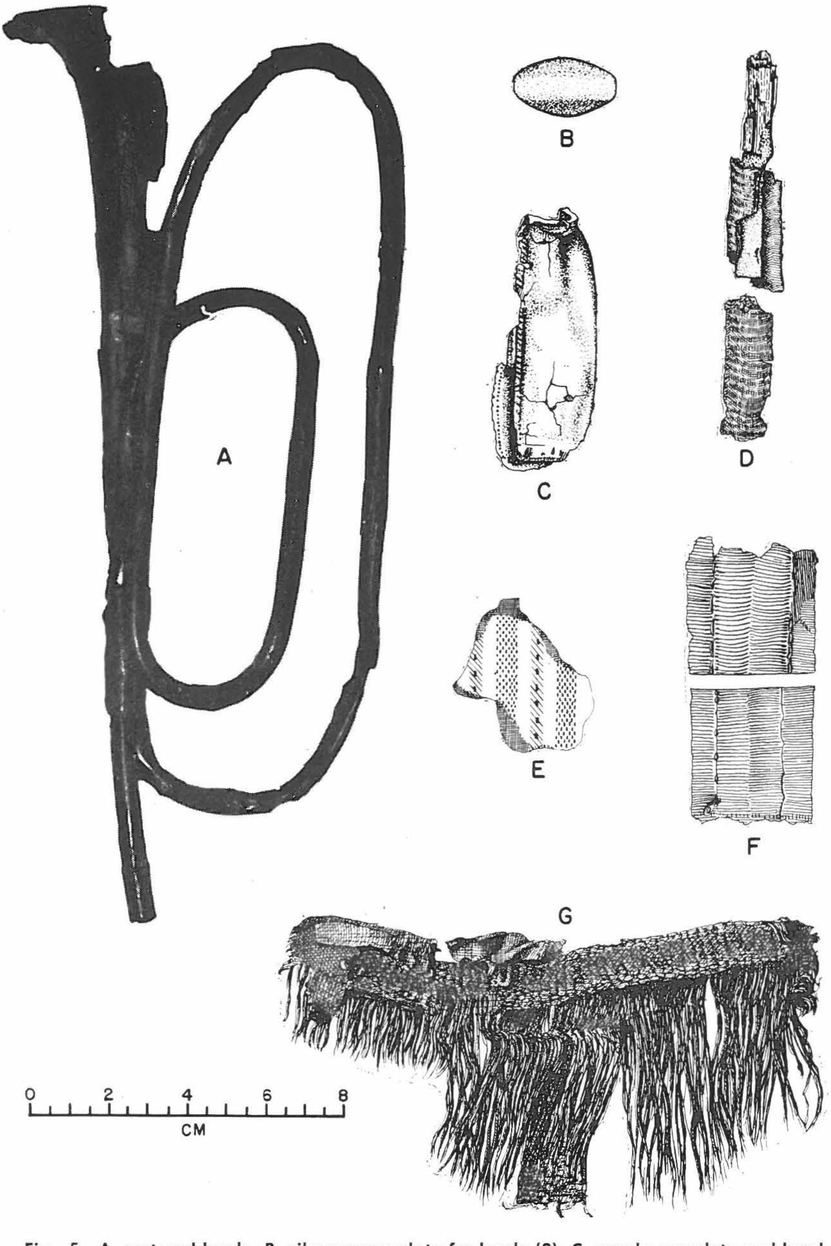


Fig. 5. A, restored bugle; B, silver name plate for bugle (?); C, nearly complete scabbard; D, scabbard and stiletto fragment; E-G, textile fragments. Scale of *A* ½ that of other objects.

Cordage. Three differents kinds of cordage are in the collection. Most numerous—16 pieces—is two-ply, S-spun, Z-twist fiber cordage. The other two types are both one-ply. One, represented by two fragments, is of fine hair, possibly human. It is S-spun. The other one-ply cordage, also represented by two fragments, is S-spun and is made from a soft fiber (cotton?).

Bugle (Fig. 5, A). Probably a late 19th century military (infantry?) instrument, this restored bugle, or more strictly speaking trumpet, is made of light sheet brass. The mouthpiece is missing and the bell is only partially complete. Without the mouthpiece, the bugle is 83 cm. long. The tube, which curves twice, varies in diameter from 11 mm. to an estimated 120 mm. across the bell. Tiny bits of cloth still adhering to the edges of the bell, as well as textile impressions visible on the surface of the tube, suggest that the bugle was wrapped in a blanket or piece of cloth when placed in the grave.

In addition to the bugle there is a small, curved silver plate (Fig. 5, B) which fits the contours of the tube and which may have been intended as a name plate. However, it has no marking on it. Perhaps the bugle was issued directly from a military store to an Indian.

Of the Southern Plains Indians, the Kiowa appear to have made most effective use of the bugle. During one battle, for instance, a Kiowa is reputed to have befuddled attacking soldiers by blowing calls opposite from those of the troop bugler (Mooney, 1898: 316–317).

Faunal Remains

Since the White Site is primarily a burial site it is not surprising that animal bones are not numerous. Only two forms, deer (or possibly antelope) and horse, can be recognized (Gerald Raun, personal communication). The deer (?) bones are few—at the most four—and may be intrusive, or may be remains of a food offering. Horse bones, largely vertebrate and rib fragments, are more common; none the less, the skeleton is far from complete.

Although the horse is a contemporary species, there can be little doubt that it was associated with the burial. Strong evidence for such is derived from the many pieces of riding gear, especially saddle and bridle fragments, found at the site. Sacrificing of horses and horse trappings at the time of inhumation was a widespread Plains Indians custom (Ewers, 1955: 286). Specifically, in the southern Plains it is reported for the Comanche, Kiowa, and Wichita (*ibid.*). It is interesting to note that the horse was fairly young, probably between 2 and 3 years of age at the time of death. Perhaps a young animal, one similar in age to the child, was intentionally selected for sacrifice.

Horse Trappings

Bit (Fig. 6, C). Although badly rusted and only partially complete, this iron bit can easily be recognized. It is of the curb type; i.e., the mouthpiece is unjoined and has in the center a high port or curve. The cheek-bars are not complete, but still have attached fragments of the curb chain—the strap which passed under the horse's lower jaw.

A similar, though not identical bit in the Texas Memorial Museum collections (TMM–1–362–36) is identified as being of an Army style. It is possible, perhaps even likely, that this one is also a military bit. Other military items recognized in the White Site collection include brass buttons and, less certainly, a bugle.

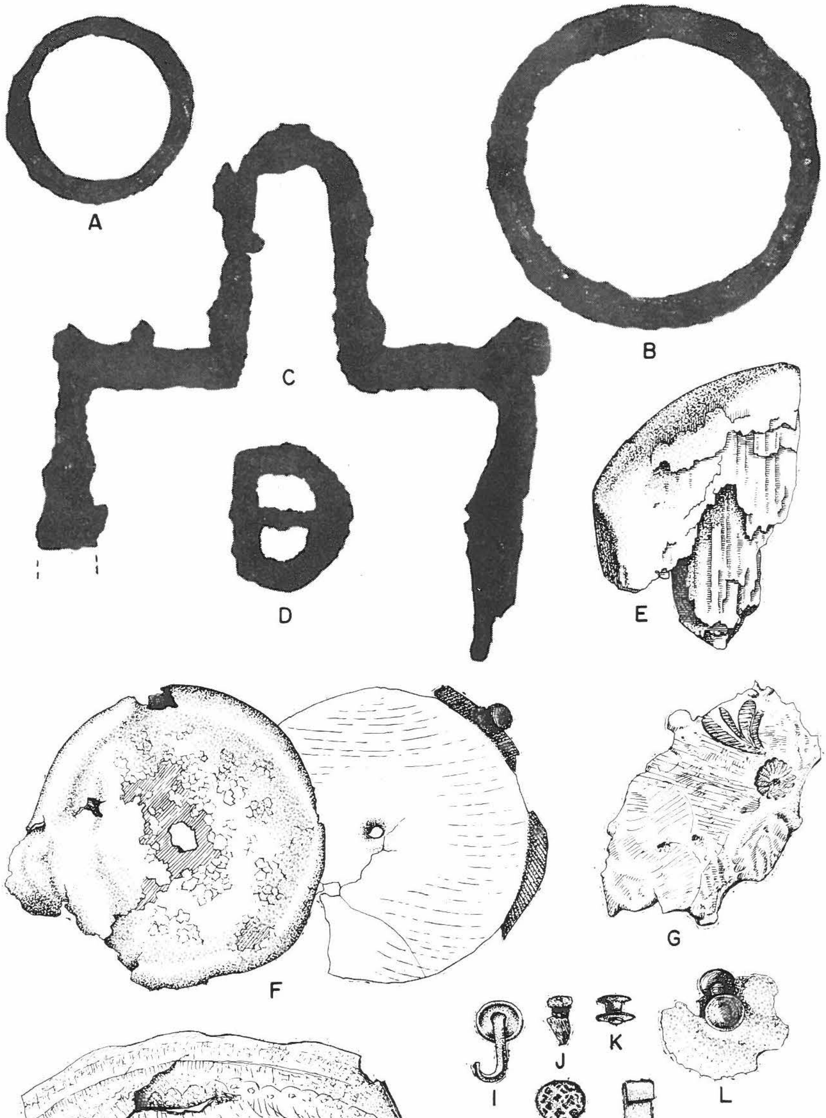
Metal rings (Fig. 6, A, B). Nine, heavy iron rings, varying in diameters from 35 to about 100 mm., are very likely saddle and bridle parts. Three smaller ones, 35 to 52 mm. in diameter, are probably rein and cheek-strap rings from the bridle. The larger ones, on the other hand, may be from riggings on the saddle.

Metal buckles (Fig. 6, D). Three complete, but badly rusted iron buckles were recovered. One is rectangular-shaped and two are nearly D-shaped. The tongue in each case is attached to one end. Inside measurements vary from 15 to 20 mm., to 16 by 26 mm. These buckles were probably attached to straps between 20 and 26 mm. wide. They could have been part of the bridle, but, admittedly, could also have come from a belt.

Saddle (Fig. 6, E-H). Although far from complete, a saddle is indicated by a number of leather and wood fragments. Specifically, those parts which can be recognized include the horn, wood from the tree, bits—including tooled fragments—of leather from the saddle covering. Other, less confidently identified parts, such as iron rings and strap fragments, have been listed and described separately.

The horn is especially interesting, as it is capped with a thin sheet of copper (Fig. 6, F). Edges of the copper sheet are bent down for a distance of about 6 mm. around the horn. The copper cap was secured by means of nails, one in the center and an undetermined number (only one is still intact) along the bent sides. The horn itself, which consists of a poorly preserved wooden piece covered with leather, is 83 mm. in diameter.

All 5 pieces of wood from the tree are in poor condition, and none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can be assigned to a specific part of the saddle. The largest fragment is illustrated in Fig. 6, E. The wood has not been identified, but it is very soft. The more numerous leather fragments (47 pieces) from the saddle are also difficult to relate to specific parts. However, the 22 tooled pieces may be from the skirt or sweat guards. Undecorated ones are more likely from the pommel and cantle. The tooled designs are, in general, floral patterns. Typical examples are shown in Fig. 6, G, H. In addition to the leather fragments there are two upholstery tacks—one apparently of iron, the other of brass—and 12 small iron nails. Both the tacks and the nails were probably used to attach the leather padding and covering to the saddle tree. One nail (Fig. 6, J), in fact, still has bits of wood adhering to the shaft.

Rivets (Fig. 6, K, L). The six copper rivets range from 7 to 10 mm. in length and from 10 to 12 mm. in diameter across the head. The shafts are uniformly 5 mm. in diameter. Three rivets are still attached to leather fragments, two of which are probable saddle straps (Fig. 7, A). The third piece (Fig. 6, L) is more fragmentary, but may also be from the saddle.

Nail and/or rivet ornaments (Fig. 6, M). Seven disc-shaped specimens, all of lead, appear to have been hammered onto rivet or nail heads and intended as ornaments. They are small in diameter, 11 to 13 mm., and generally about 3 mm. in thickness. The upper surfaces have stamped checkerboard-like decorations apparently produced by a blunt implement. Impressions of rivet or nail heads appear as shallow, more or less circular depressions (about 8 mm. in diameter) on the underneath sides.

Metal shank fragments (Fig. 6, N). Thirty-six fragmentary strips of sheet metal are remains of shanks or attachment loops which were once soldered onto the back sides of conchas and strap ornaments. They agree in every detail with the few found intact (Fig. 4, E′, E″). Most are of copper, although a few appear to be of brass. Ends are always bent down and back so that the complete shank was rectangular-shaped. The sheet metal varies from 5 to 12 mm. in width.

Leather straps (Fig. 7, A-C, F, H). The numerous (68) pieces of leather straps can be sorted into two groups. One group consisting of 45 specimens is narrow in width, 15 to 19 mm., and probably repre-

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Fig. 6. Horse trappings. A, B, iron rings; C, bridle bit; D, iron buckle; E, wood fragment from saddle tree; F, saddle horn and copper cap; G, H, tooled leather from saddle; I, upholstery tack; J, iron nail; K, rivet; L, rivet still attached to leather fragment; M, rivet or nail ornament; N, shank fragment.

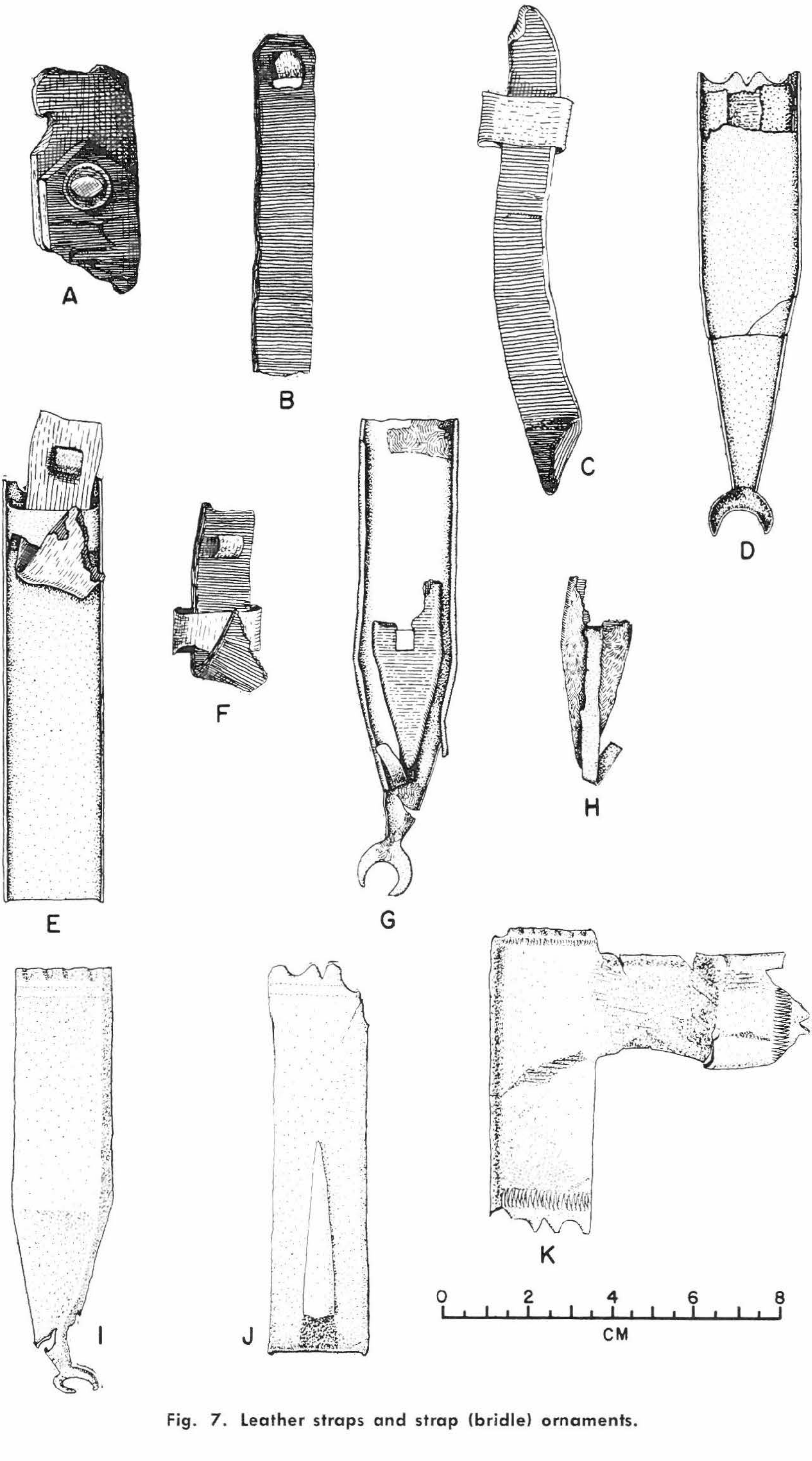

Fig. 7. Leather straps and strap (bridle) ornaments.

sents bridle and rein fragments. A second type, varying in width from 25 to 35 mm., is more likely from the saddle girth and rigging straps. Four specimens of the latter type are riveted together (Fig. 7, A); this would seem to identify them further with the saddle. In addition, four of the narrow straps have attached shanks or metal strips (Fig. 7, 6, F, H) which were used to affix them to metal strap ornaments.

Strap ornaments (Figs. 7, 8). Among the most interesting and elaborate objects recovered from the site are 22 metal, probably German silver, strap ornaments. Although quite varied in form, each one has, on the underneath side, solder scars to which shanks and/or strips of metal were attached. All but two of the ornaments bear simple, presumably stamped decorations. On the basis of form, two major types can be recognized. Twelve are narrow, about 25 mm. wide, and have bent down lateral edges (Fig. 7, D, E, G, I-K). The remaining 11 are more difficult to characterize as a group, but, in general, they are nearly flat and more or less rectangular in outline (Fig. 8, A-H). The latter type, however, varies considerably in size.

The narrow strap ornaments can be further subdivided into three groups, with four examples of each group:

1) L-shaped pieces with notched ends. These specimens are 74 to 76 mm. long and 65 to 75 mm. wide across the "L." In size and decoration they can be further sorted into two closely matched pairs. Decoration in all cases is restricted to the ends, with stamped zigzags and dots predominating (Fig. 7, K).

2) Slender, rectangular-shaped pieces which are notched and, with one exception, decorated on only one end. In each case, the end opposite the notched one has soldered onto the exterior surface a narrow, tapered strip of metal, apparently intended only as adornment (Fig. 7, J). These four, like the ones above, can be divided into two pairs. One pair is 101 mm. long and 22 mm. wide, and has two parallel rows of vertically-placed zigzags on one end. The second pair is somewhat shorter, 98 mm. long, and has two rows of horizontally-arranged zigzags on one end. In addition, one member of the first pair has a series of small, stamped zigzags around the metal strip.

3) Four specimens taper toward the presumed distal end, finally terminating in a small crescent (Fig. 7, D, G, I). Unlike the above, these cannot be divided into pairs. All are similar in size: total length of 115 mm., maximum width of 25 to 27 mm., and minimum width (just above the crescent) of 4 to 6 mm. The crescents measure from 8 to 11 mm. across. The band-like decorations, usually confined to the proximal ends, are unique in each case. One consists of two parallel

rows of dots, another of two vertically-placed rows of zigzags, a third of a single row of contiguous circles, and the last of two rows of dots between which is a row of circles.

Two pieces of narrow leather straps, one of which still has attached a metal loop and another which has affixed a narrow metal strip, fit perfectly into these strap ornaments. The manner in which the loops were used is quite evident. The strips, however, are somewhat more complicated, but were critical in attaching the strap to the ornament because they prevented up and down movement. Both modes of attachment (see Fig. 7, E-H) strongly suggest that the narrow ornaments were used on a bridle, probably on the cheek straps.

Unlike the first type, the remaining 11 strap ornaments are more or less rectangular-shaped plates. They are differentiated, perhaps arbitrarily, from the conchas largely on the basis of outline form. Metal shanks, indicated by solder scars, were brazed onto the back sides and provided the only means of attachment. All but two are decorated, with stamped zigzags and dots being the most common elements. In addition, most are partially or entirely notched around the edges. With the exception of the two undecorated specimens (Fig. 8, G, H) they can also be divided into pairs. One pair (Fig. 8, A, B) is much longer (112 mm.) than it is wide (maximum of 41 mm.), is tapered slightly toward the ends, and is notched along all edges. Another two specimens are somewhat similar to the above in outline, but are much smaller (45 mm. long and 26 mm. wide), and have shallow notching only along the lateral edges (Fig. 8, C). A third, very closely matched pair has rounded corners and a deep notch in the center of each edge (Fig. 8, D). Less clearly paired are two specimens, one of which is a rectangular plate with deeply notched ends (Fig. 8, E); the other one (Fig. 8, F) tapers slightly toward the ends, and has a single deep notch in the upper and lower margin, as well as numerous shallow notches on both ends. One of the undecorated specimens (Fig. 8, G) is almost cross-shaped, with two wide (7 mm.) but short (2 mm.) projections extending from opposing edges. The other undecorated specimen (Fig. 8, H) is small, 44 mm. long and 26 mm. wide, and is tapered toward the ends.

It seems probable that both types of strap ornaments were used on a bridle. Similarly adorned Plains Indians (especially Comanche and Kiowa) and Navajo bridles are well documented (Woodward, 1938: 36; Adair, 1946: 41–43; Ewers, 1955: Plate 6 a; Newcomb, 1955: Plate 27; Feder, 1962: 71–73). However, when an attempt is made to fit all 22 ornaments from the site onto a single bridle it becomes clear

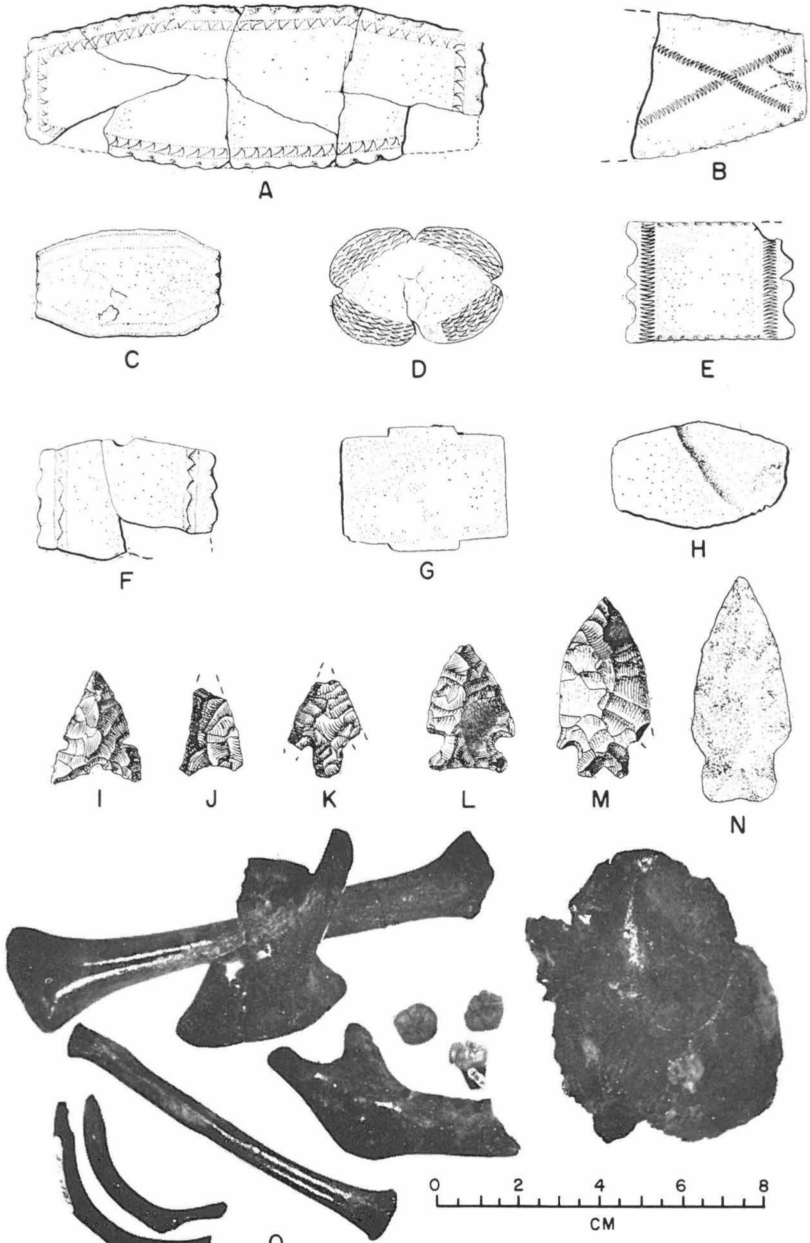

Fig. 8. A-H, metal strap (bridle) ornaments, type II; J-K, arrow points; L-N, dart points; O, portions of human skeleton.

that at least two complete sets are represented—a duplication not observed in other horse paraphernalia. Careful matching of pairs even permits a reasonably good sorting of the two sets. Thus, while the precise arrangement is somewhat speculative, it is possible to reconstruct the general appearance of one bridle (Fig. 9).

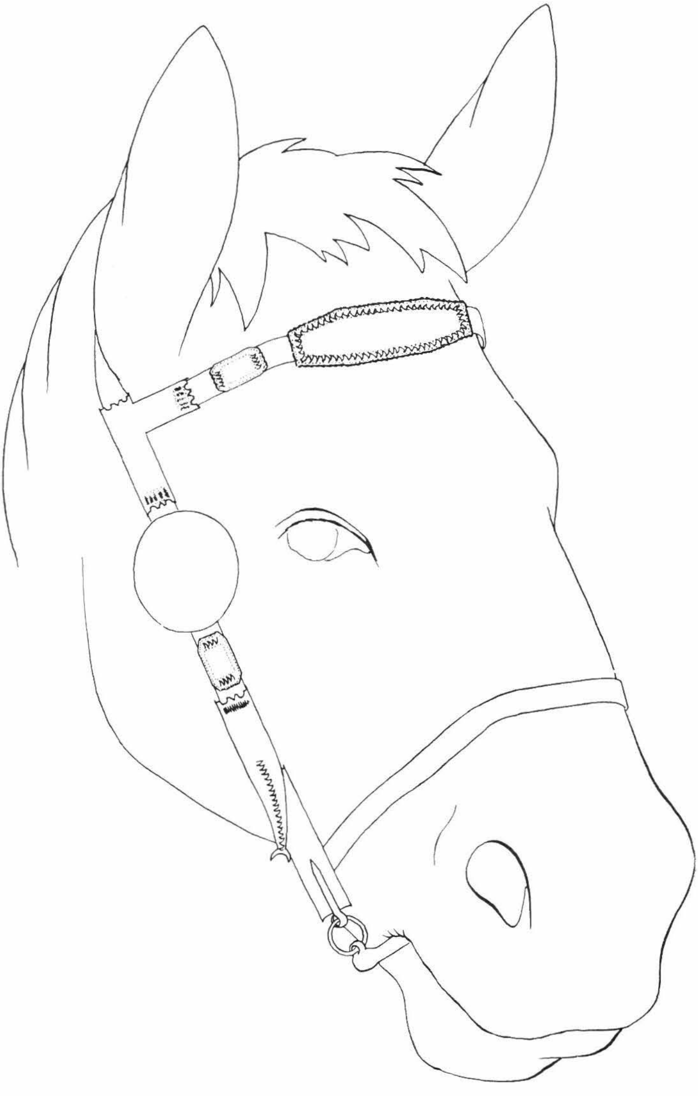

Fig. 9. Reconstruction of bridle ornament.

Chipped Stone Artifacts

The seven flint artifacts and 21 flakes recovered from the site are of unquestionable Indian origin. While they may have been intended as burial offerings, it seems more likely, especially in view of the presence of flakes, that they are derived from a nearby—and probably older—campsite. Most of the types represented, since they most often occur in prehistoric sites, support this interpretation.

Arrow points (Fig. 8, I-K). The three arrow points are identifiable as types *Perdiz*, *Harrell*, and *Fresno*. Only the *Harrell* point (Fig. 8, I) is complete; however, fresher flake scars along the marginal edges indicate that it was rechipped, possibly from the distal end of a dart point or knife. It is triangular in outline form, has two side notches, and a notched, concave base. It measures 29 mm. in length and 22 mm. in maximum width. The *Fresno* point (Fig. 8, J)—an unnotched triangular form—has a pronounced concave base. It is 11 mm. wide across the base. The distal end is missing, but the point must have been approximately 30 mm. long. Least complete of the three is the *Perdiz* (Fig. 8, K) which lacks both barbs and the distal end. It probably measured about 28 mm. in length and 20 mm. across the shoulders. The stem is 8 mm. long and 6 mm. wide.

Dart points (Fig. 8, L-N). Only one of the three dart points, an *Edgewood* (Fig. 8, L) can confidently be identified with a previously established type. It has a slightly concave base, a triangular, convex-edged blade, and an expanded stem. It measures 33 mm. in length and 21 mm. across the shoulders. The markedly expanded stem is almost flush with the shoulders. One of the untyped dart points (Fig. 8, M) has a convex-edged blade, barbed shoulders, and a parallel-edged, indented base stem. It resembles *Pedernales* points, but is perhaps distinctive enough to reserve positive identification with that type. It is 44 mm. long and 24 mm. wide. The other unclassified dart point (Fig. 8, N) is a large specimen, 55 mm. in length and 25 mm. across the shoulders, chipped from quartzite. Edges of the blade are straight, the shoulders lack barbs, the stem is faintly expanded, and the base is slightly concave.

Flake scraper. The only other chipped stone artifact is a flake scraper which has steep marginal retouching along both lateral edges. It is 35 mm. long and 22 mm. wide.

Interpretation

The White Site, in spite of having been severely damaged by plowing, is among the richest nineteenth century Indian burials yet reported in Texas. In this respect it compares favorably with the Yellowhouse Canyon Site, a possible Comanche burial found near Lubbock, Texas (Newcomb, 1955). All objects recovered from the White Site, with the probable exception of the chipped stone artifacts, are identifiable as personal possessions. They include a wide assortment of jewelry, clothing, a horse, and horse trappings. Camp debris and everyday domestic implements are conspicuous by their absence. This, coupled with the concentration of material (within an area approximately 15 to 20 feet square), leaves little doubt as to the basic nature of the site. The details of burial, however, are absent.

In view of the richness of the offerings, it is surprising and somewhat puzzling that the only human skeletal remains in the collection represent a child, probably between one and three years of age at the time of death. While it is possible that other human remains from the site are still in the hands of a private collector, the available evidence—especially, the success achieved in the restoration of broken specimens—suggests that the child was the only individual buried at the site. Since it was a common custom among Plains Indians for relatives and friends to make offerings to a burial, all the objects recovered need not have belonged to the child.

Almost all of the artifacts point to a middle to late nineteenth century date for the burial. And, although specimens indicative of a more specific age are lacking, it seems probable that the range can be narrowed down to between 1860 and 1875. At least, the generally excellent condition of perishable objects and marked extent of white influence would seem to argue for a relatively late date, but one which precedes the confinement of southern Plains Indians to reservations.

In the latter part of the 19th century, the Panhandle region was dominated by the Comanche and the Kiowa, including their close associates, the Kiowa-Apache. Either tribe could have made the burial. The personal ornaments and horse trappings found at the site are of types used by both groups (Fig. 10; Woodward, 1938; Wallace and Hoebel, 1952; Newcomb, 1955; 1961). Both also frequently sacrificed one or more horses over the grave of a deceased (Yarrow, 1881: 99–100; Wallace and Hoebel, 1952: 149–154; Newcomb, 1961: 172–174, 206). On the other hand, the Comanche, as well as the Kiowa, preferred to bury their dead in high, inaccessible places, such as natural caves or crevices. Perhaps in this case the urgency of disposing of the body and the distance to the nearest relief in topography outweighed tradition. At least, it does not seem sufficient evidence to indicate that it was not a Comanche or Kiowa burial.

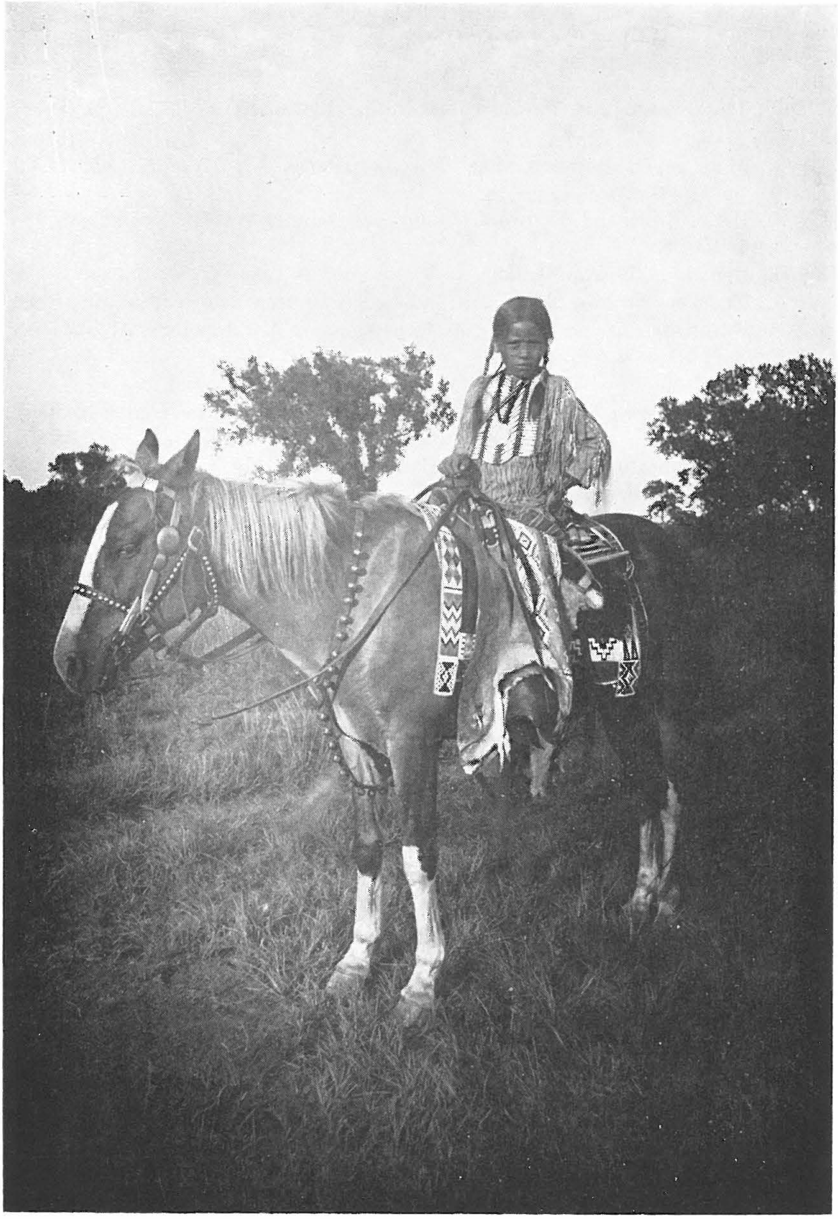

Fig. 10. Photograph of young Kiowa boy, son of A'piatan, shows many of the personal ornaments and horse trappings found at the White Site. Taken on the Kiowa Reservation in Oklahoma in 1893 by James Mooney. Photograph reproduced from Smithsonian Institution, Bureau of American Ethnology Neg. 1393.

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Texas Memorial Museum
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The Utilization of Archeological and Ethnohistorical Data In Estimating Aboriginal Population[1]

HERBERT C. TAYLOR, JR.

Reliable estimates for most aboriginal North American groups are difficult to achieve because the first governmental censuses were normally performed after a radical though indeterminate populational decline had occurred. In this article it is proposed to examine the Mooney population estimates for the southern Northwest Coast (the figures utilized by Kroeber in his *Cultural and Natural Areas of Native North America*, 1939) in the light of a combination of available archaeological and ethnohistorical data.

The area under discussion and termed, rather unfortunately, the "southern Northwest Coast" (the only reasonable alternative seems to be the lower Northwest Coast which is equally unfortunate) is meant by the author to include the lower Columbia area, the Puget Sound area, Coastal Washington, the Gulf of Georgia area and Vancouver Island. Not included are: the Coast of Oregon below the mouth of the Columbia, the Williamette Valley, and the mainland coast of British Columbia above the Straits of Georgia. The delineation may seem rather arbitrary. North of this region, however, Mooney, and hence Kroeber, go in for rather large block estimates of territory; and while there is some ethnohistorical material bearing upon these populations, there is virtually no archaeological material. To the south one encounters a rather vexed question of where the long limp tail of the

[1] The writer desires to express his gratitude to the Canadian Social Science Research Council, the University of British Colombia, and Messrs. Crawford, McLeod, and Vance for financing the archeological and ethnological field trips incident to this study. Research in the archives of the Hudson's Bay Company at Beaver House, London, and the provincial archives in Victoria, British Columbia, and in the Bancroft Collection of the University of California was made possible by Sabbatical leave from Western Washington State College.

The author is indebted to the Governor and Committee of the Hudson's Company for permission to reproduce material from their archives.

Northwest Coast cultural dog ceases to exist and the California area begins. In this connection it should be remembered that Kroeber, while utilizing Mooney's estimates in all other areas of America north of Mexico, used his own estimates for the population of California area and discarded Mooney's. From a "tribal" or linguistic point of view, therefore, this article is concerned with the aboriginal population of the Kwakuitl, Nutka, Coast Salish (with the exception of the Bella Coola north of this area and the Tillamook south of this area) the Chinook and those two intrusive enclaves of Athabascan-speakers, the Tlatskanai and the Willapa.

Chart 1 shows Mooney's population figures for the base year 1780 adapted to Kroeber's cultural sub-areas. This chart is taken directly from *Cultural and Natural Areas of Native North-America*, (Kroeber, 1939: 135–136) except that under the heading of Gulf of Georgia, the term "Cowichan" has been substituted for the word "Cowlitz" (which must have been what Kroeber meant).

Before beginning a critique of these population estimates in the light of archeological and ethnohistorical data, a few paragraphs would appear to be in order concerning the origin of estimates which Kroeber employed in his monumental study and which have subsequently approximated demographic Holy Writ to many anthropologists.

In 1910 James Mooney published a very short article under the title, "Population," in Frederick Webb Hodge's compendious *Handbook of American Indians* (Hodge, 1910: 286–287). Evidently a longer article had originally been planned, but size and scope made separate publication mandatory. The *Handbook* article notes (p. 287) that a separate issue of the *Bulletin* would be devoted to such a topic.

Mooney died in 1921 without completing his task. Only the section on New England was entirely complete together with the textual (but not the tabular) material on New York, New Jersey, and Pennsylvania. However, in the years 1908–1909, Mooney had prepared a briefer statement giving a set of tables of population for all of America north of Mexico. It is this brief statement and accompanying tables which Swanton edited and published in 1928 (Swanton, in Mooney, 1928: 1, 2).

In the course of his prefatory remarks, Swanton does not make clear why this article was not published in Mooney's lifetime—one may infer that Mooney wished instead to publish the longer definitive study upon which he was at work. Nor does Swanton explain why seven years elapsed after Mooney's death before the briefer completed article

CHART 1

CULTURE AREAS (Kroeber's 1939 numbering system	TRIBES (Kroeber's 1939 system)	POPULATION (Mooney's est. for 1780 adapted by Kroeber)
2a	CENTRAL MARITIME, NORTHERN	
	. . . .	
	. . . .	
	Kwakiutl	4,500[1]
2b	CENTRAL MARITIME, SOUTHERN	
	Nutka	6,000
	Makah, Quileute, Quinault	4,000
3	GULF OF GEORGIA SALISH	
	Comox, Pentlatch, Cowichan, LKung'en, Seshelt, Squamish Lower Fraser	20,500[2]
	Nutsak, Lummi	800
	Klallam, Chimakum	2,400
4	PUGET SOUND SALISH	
	Skokomish, Nisqualli, Twana, Puyallup, Snoqualmi, Snohomish, Skagit	6,000
5	LOWER COLUMBIA	
	Tlatskanai	1,600
	Lower, Upper Chehalis, Owilapash, Cowlitz	1,200
	Chinook	22,000
	. . . .	
	. . . .	

[1] Does not include Haisla.
[2] Of this figure, Mooney allots to southeastern Vancouver Island 8,900.

was published. In any event, the net effect was that the article was twenty years old when it first saw print. Even by today's publishing standards this was a noteworthy delay. It goes without saying that those same twenty years saw a rapid burgeoning of publications in American ethnology whose utilization might have materially altered population estimates.

Recognizing Mooney's charts as the first scholarly attempt to establish order where there had been demographic chaos before, A. L. Kroeber determined to utilize Mooney's figures in his own study on natural and cultural areas (with the aforenoted exception of California). Kroeber's manuscript was ready for publication in 1931, but the Great Depression delayed publication until 1939. A reduction of the population section was published in the *American Anthropologist* in 1934. In the 1939 publication Kroeber (pp. 171–181) includes a review of literature concerned with aboriginal North American demography from 1931 to 1939, and in his earlier publication (1934) he cited a number of works to which Mooney had not had access when he prepared his tables. However, it must be stressed that these later publications did not (save in the instance of California) affect the population figures employed by Kroeber in 1939. He utilized the tables which Mooney had prepared in 1908–1909.

The population estimates of Mooney were regarded by Kroeber and by Mooney's posthumous editor, J. R. Swanton, as provisional in character. It was anticipated that periodic changes would be made in these estimates as more data were accumulated and more sophisticated demographers addressed themselves to the problem of aboriginal population.

In fact, nothing of the sort occurred. Mooney's estimates, and more particularly Kroeber's population density studies employing Mooney's estimates, almost universally are utilized to this day when questions of aboriginal demography in America north of Mexico arise. (Thus Mooney's figures are continually cited as the pre-contact population data by Swanton, in his *The Indian Tribes of North America*, published in 1952.)

Archeological Data Bearing on Aboriginal Southern Northwest Coast Population Estimates

While it is true that Kroeber utilized Mooney's estimates in formulating his own population density figures, he expressed considerable reservations about the accuracy of Mooney's figures for the southern Northwest Coast:

In the Oregon-Washington region, the Salish seem underweighted as against the Sahaptin and Chinook. Thus, United States Salish on coast, 6,200; on Puget Sound, 6,800; in the interior, including Idaho and Montana, 8,700; total, 21,700; Sahaptin, 18,100; Chinook, 22,000; Yaquina, Alsea, Sinuslaw, Kus, 8,000. The definitely greater heaviness of population on the lower Columbia is indubitable, but perhaps not quite to the degree implied. Also, the Sahaptin, with a smaller territory, are given more than twice the population of the interior Salish in the United States.

In British Columbia, on the contrary, the Salish are favored: on the coast, including 1,400 Bella Coola, 21,900; in the interior, 16,500; total, 38,400; all Nutka, Kwakiutl, Tsimshian, Haida, 30,000. This makes 20,500 coast Salish in modern British territory fronting on the Gulf of Georgia, as against only 31,400 population on all the remainder of the coast of British Columbia. Such a distribution would expectably have produced some superior florescence of culture on the Gulf of Georgia. However, as discussed below, Mooney's estimates pretty consistently put the great densities in the southern half of the Northwest Coast, which is not incompatible with the view developed above a relatively recent seaward and northward shift of the climax of this culture (Kroeber, 1939: 133–134).

And later in his text Kroeber adds:

Even if Mooney's computations for the Chinook and Gulf of Georgia Salish are taken as somewhat high, the generally greater density of the south as against the north remains fundamentally unimpaired. On this point, too, shore-line density would not invert the situation, the northerly areas having the more irregular, indented shore, the ratio of which to the already lighter population would go up faster even than their land areas. The difference seems to lie in this: The northern groups were essentially maritime, mostly lived fronting the beach, and made little use of the land which they owned. The southern groups lived on river and tributary as well as on the shore, perhaps more largely so, in fact, and often made genuine use of their land holdings. Their habitat utilization and culture remained more generalized and simpler; those of the northern groups were more specialized and extreme. As in the Southwest, on comparison of Gila-California with Pueblo sphere, the more generalized method in the long run permitted of a heavier aggregate population (Kroeber, 1939: 156).

Kroeber in these passages advances three views which recent archeological survey work has tended to substantiate:

1. That Mooney underestimated relatively the coastal Salish population in the Puget Sound area and on Washington's coast.
2. That quite possibly the Nutka, Kwakiutl, Tsimshian, and Haida have been underestimated relative to estimates for the Gulf of Georgia Salish.
3. That even allowing for possible error in the above, Mooney is certainly correct in assigning a much heavier populational density to the southern portion of the Northwest Coast, since this was the area of more generalized ecological adjustment emphasizing hunting, as well as dependence upon the sea.

The last of these three assertions is the most easily verified. From the southern entrance to the Gulf of Georgia, that is to say from a point just south of the Canadian line and north of Bellingham Bay on the mainland and from the southern tip of Vancouver Island, going north to the northern extremity of the Gulf of Georgia at Cape Mudge, there is a remarkably impressive proliferation of giant midden heaps. Virtually every bay or inlet which possesses or had possessed a fresh water stream has one or more such archeological sites. In the main, however, these sites are relatively small. Ruling out the seasonal or sporadically occupied sites and dealing only with those sites which would appear to have contained permanent villages, the surveyor is left with the impression that the median population of the villages would have been well below 50.

North of Cape Mudge, on Quadra Island, and north of Campbell River on Vancouver Island (that is to say, leaving coast Salish territory and going into what was circa 1840 Kwakiutl territory) one encounters far fewer villages. On the other hand, the villages which are encountered are much larger, some of them surely housing as many as 300 people (Taylor, 1956: 53–55; Taylor and Duff, 1956: 56, 57, 60–65). Thus Kroeber's view that a greater population density could occur in the south because of a more general or less specialized ecological adjustment and *au contraire*, that to the north, in the "climax area," there were fewer people, more highly specialized, more truly committed to a maritime way of life, and with a more complex social organization, would seem to be substantiated by archeological evidence.

Further buttressing Kroeber's view that Puget Sound, coastal Washington, and the area about the mouth of the Columbia represented a more generalized and older ecological adjustment, is the presence of heavy concentrations of large land mammal bone in a number of the archeological sites excavated and/or tested in this region. In some instances, notably in the San Juan Islands and in coastal Oregon immediately to the south of the Columbia, large land mammals evidently supplied almost as much of the total caloric supply as did fish. (Living ethnological informants and some ethnologists to the contrary notwithstanding, no salt-water aboriginal group in this area relied nearly as heavily on fish as on shell fish. The aboriginal groups about Cape Flattery seem, on the basis of one test excavation undertaken there in 1955, to have relied very heavily upon whaling.)

Perhaps even more significantly, a number of test excavations have indicated that the incidence of heavy land mammal bone goes up relative to the incidence of fish bone and *heavy wood-working equipment*, as one goes back in time.[2] This, of course, dovetails beautifully with Kroeber's hypothesis that the southern area represented an older, more generalized hunting tradition that had gradually adapted to a mari-

[2] This phenomenon, so far as the writer is aware, has not been reported in print heretofore. It was first observed by Warren Caldwell, then teaching assistant at the University of Washington, and the author in the course of excavations on Lopez Island (1952–1953). It was subsequently observed in a test excavation at Tillamook in 1953. Our paper discussing the phenomenon was read by Taylor to the Northwest Anthropological Association in 1954.

time environment, while the northern area represented an highly specialized maritime adjustment.

Turning to Kroeber's first assertion that Mooney underestimated relatively the coastal Salish population in the Puget Sound area and in the Pacific Coast of Washington, the following points may be noted:

a. The pattern of occupation, as revealed by archeological survey, noted for the Gulf of Georgia area, ends abruptly at the northern end of the Gulf of Georgia. However, there is no such break to the south. The Puget Sound area, the Strait of Juan de Fuca area, and coastal Washington have a very high incidence of relatively small permanent villages and an even higher incidence of seasonal or sporadically occupied sites.
b. While the writer conducted no excavations in this survey of eastern Vancouver Island, inspection of natural and artificial cuts in the midden deposits indicated about the same frequency and distribution of large land mammal bone as had been previously noted for western Washington.

The Gulf of Georgia and the Puget Sound area were both occupied, during the contact period, by coastal Salish groups who were remarkably similar in socio-political organization and in economy. Furthermore, these groups appeared to early investigators, and appear to ethnologists today, to have been in possession of the area for a relatively long period of time. The physical environment of the two areas is strikingly similar and they are contiguous. However, Mooney's population estimates for the year 1780 show 23,700 inhabitants of the Gulf of Georgia area and 6,000 inhabitants of the Puget Sound area. Kroeber (1939: 142) computes that this yields a population density of 32.60 in the Gulf of Georgia area and 16.80 in the Puget Sound area per one hundred square kilometers. The evidence of archeological survey and test excavation strongly supports Kroeber's objection that the Puget Sound Salish have been underestimated.

Finally we turn to Kroeber's suggestion that the Nutka, Kwakiutl, Tsimshian, and Haida have, perhaps, been underestimated relative to population estimates for the Gulf of Georgia Salish. Here the author has relatively little comment to make. He has done no field work in the Tsimshian and Haida areas. An archeological survey of eastern Vancouver Island in 1954 (Taylor, 1956; Taylor and Duff, 1956) and a trip round the west coast of Vancouver Island in 1959 (Taylor, 1961), leads him to the view that Kroeber was right—at least for the Nutka and Kwakiutl areas. While the incidence of village sites is much lower, it is also true that northern villages appear to be much larger.

Ethnohistorical Data Bearing on Aboriginal Southern Northwest Coast Population Estimates

Kwakiutl. The total of 9,376 for the Kwakiutl population of Vancouver Island and adjacent small islands in and around Johnstone Strait is taken from two censuses (one for the west coast of Vancouver Island and one for the east coast) in the papers of Sir James Douglas.[3]

Sir James lists a population of 920 for the Quatsino on the west coast of Vancouver Island, 4,454 for the "Quakeeolth," and 4,002 for the "Lay-'coolaach at Point Mudge and other parts of Johnstone Straits" (slave population included in each case).

Neither census is dated. The east coast census must have been taken after 1840, since the Lekwiltok are shown in possession of Cape Mudge and a Salishan-speaking group held that spot until that time (Taylor and Duff, 1956). It is unlikely that this series of censuses was undertaken after 1846 for a variety of reasons. It seems probable that the west coast census dates from about the same time as the east coast census. The writer is therefore inclined to set the dates 1840–6 for this population figure.

Thus the censuses of the mid-nineteenth century show more than twice as many Kwakiutl as Mooney estimated for 1780. Both figures exclude the Haisla; however, the Hudson's Bay census rolls, evidently, also do not include the Heiltsuk of the adjacent British Columbia mainland.

The three most ready explanations for this discrepancy would appear to be:

a. The Kwakiutl population doubled or even tripled, in the space of two generations, between 1780 and 1845.
b. The censuses of Sir James Douglas are wildly inaccurate.
c. Mooney vastly underestimated the Kwakiutl population c. 1780.

The first explanation is quite unsatisfactory for several reasons. We

[3] Douglas, Sir James, C. 1855 (Bancroft Collection), *Second Series*, pp. 8 and 16. The library catalog card notes that the *First Series* of *Papers* were copied from the Victoria (British Columbia) Provincial Archives; the whereabouts of the originals of the *Second Series* are unknown. To this the present writer would note that at least several of the papers of the "*Second Series*" are in the archives in Victoria. In at least one instance a clerical (?) error on a census in the Victoria collection appears also in the Bancroft Collection census but does not appear on the copy in Beaver House, London. The writer therefore suspects that the *Second Series* was also copied from the Victoria Archives. In truth, the *Second Series* is not a series but a hodgepodge of Sir James' papers covering almost two decades.

CHART 2

CULTURE AREAS (Kroeber's 1939 numbering system)	TRIBES (Kroeber's 1939 system)	POPULATION (Mooney's est. for 1780 adapted by Kroeber)	POPULATION (Censuses from Hudson's Bay Papers)
2a	CENTRAL MARITIME, NORTHERN		
	. . . .		
	. . . .		
	Kwakiutl	4,500[1]	9,376[2]
2b	CENTRAL MARITIME, SOUTHERN		
	Nutka	6,000	7,093
	Makah, Quileute, Quinault	4,000	Lack data
3	GULF OF GEORGIA		
	Comox, Pentlatch, Cowichan, LKung'en, Seshelt, Squamish, Lower Fraser	20,500[3]	9,414[4]
	Nutsak, Lummi	800	855
	Klallam, Chimakum	2,400	1,485[5]
4	PUGET SOUND		
	Skokomish, Nisqualli, Twana, Puyallup, Snoqualmi, Snohomish, Skagit	6,000	5,175
5	LOWER COLUMBIA		
	Tlatskanai	1,600	175
	Lower, Upper Chehalis, Owilapash, Cowlitz	1,200	Lack data
	Chinook	22,000	2,585
	. . . .		
	. . . .		

[1] Does not include Haisla.
[2] Does not include Haisla or Heiltsuk.
[3] Of this figure, Mooney allots to southeastern Vancouver Island 8,900.
[4] Southeastern Vancouver Island only.
[5] Excludes the Chimakum and two Klallam tribes.

do not know of a North American Indian group which increased in population during the first two or three generations after white contact. (Mooney, himself [in Hodge, 1910, Pt. 2: 286], makes this point quite emphatically.) In any event, smallpox and syphilis had begun their work among the Kwakiutl by the end of the eighteenth century—albeit somewhat less virulently, one may assume from the documentary evidence, than the ravages of these diseases to the south. It is quite likely that the territorial expansion of the Kwakiutl (at least the Lekwiltok), together with their increasingly aggressive and successful slave raids, had led to a rapid rise of the slave population. Since Hudson's Bay officials always enumerated slaves (usually separately, but in this instance, in lump) this factor probably caused "Kwakiutl" population figures to decline less rapidly than their neighbors, but it can scarcely have given rise to a phenomenal population increase. In order to assume that an increase in slaves accounts for the discrepancy in the two sets of figures we would be forced to the hypothesis that the Kwakiutl had more slaves than freemen. No case is known in which much more than a quarter of the population of any tribe on the Northwest Coast was slave. The Northwest Coast economy could have supported no such distribution of population.

The contest then becomes one between acceptance of Mooney's estimates made from secondary sources three generations after the event and the Hudson's Bay Company head count made on the scene. Unless evidence can be adduced proving inaccuracy, willful or careless, on the part of the Hudson's Bay enumerators, it would appear necessary to accept the third explanation—viz., Mooney vastly underestimated the Kwakiutl population c. 1780.

Southern Central Maritime. The Nutkan population figure of 7,093 is taken from the previously mentioned west coast Vancouver Island census and thus probably dates from the early 1840's.[4] The census figures give breakdowns for men, women, boys, and girls. While the Kwakiutl have a nearly normal distribution, the children's figures, of both sexes, among the Nutka are very low—arguing, inferentially, that in preceding generations the total Nutkan population figure must have been much higher.

The discrepancy between Mooney's figures and those of Douglas are not as great as the discrepancy in Kwakiutl figures (amounting to less than twenty per cent). However, it must be remembered that Mooney's estimates date from nearly three generations earlier than the Hudson's Bay census. Since the child-adult ratio of the census constitutes mute evidence to the rapid decline of Nutkan population and since the Nutka were the first groups in contact with the white man on the Northwest Coast, we probably must multiply the census figures by a factor of two or three to arrive at a valid extrapolation based upon Douglas' 1840–46 figure. This would indicate a Nutka population on the order of 17,700 c. 1780.

If the Hudson's Bay census is assumed accurate, then Mooney's estimate for 1780 must be much too low.

Gulf of Georgia Salish. Unfortunately, the writer cannot compare all of the Gulf of Georgia Salish figures of Mooney with those of Hudson's Bay figures. Complete figures were only located for the Salishan

[4] Douglas, 1853: 16. Sir James lists the Quatsinio in the west coast census with the Nutkan tribes. The figure for the Quatsinio has been deducted from the Nutkan total here presented and added to the Kwakiutl total.

of Vancouver Island. The figure 8,900 was not taken from Kroeber, since he does not break down population for mainland and Vancouver Island British Columbia Salishan. This 8,900 represents the total of all the Vancouver Island Salish groups listed in Mooney's 1928 article.[5]

Mooney's (1928: 28) estimate and the Hudson's Bay count are at this point strikingly similar. However, it must, once again, be remembered that Mooney's figures are for 1780. The Hudson's Bay censuses for this group were probably made c. 1840. Since the northern Coast Salish had suffered population loss from at least three sources during this period (disease, slave raids, and Kwakiutl [Lekwiltok] territorial aggrandizement in the north), it is scarcely reasonable to assume that population in 1780 on eastern Vancouver Island should be slightly lower than for 1840. Once again, Mooney's estimate for 1780 would appear to be low, although, in this instance, somewhat nearer the mark.

Nutsak, Lummi. At this point, there is a curious difference between Mooney's figures and those of Kroeber. Mooney gives a total of 1,000 for Nooksak, Lummi and Samish. Kroeber gives a total of 800 for the "Nutsak" and Lummi alone. Since Kroeber's total figure for the Gulf of Georgia group is 200 below that of Mooney and his total figure for the Puget Sound area is 200 above Mooney's estimate, the writer has assumed that Kroeber allowed a population of 200 for the Samish and arbitrarily assigned them to the Puget Sound area—which is something of a geographic *tour de force.* Possibly Kroeber decided to lump the Samish with the Skagit—a reasonably defensible position.

The figure 855 for the Nooksack and Lummi in the Hudson's Bay census column is taken from the papers of Sir James Douglas (in which the tribal designations are given as "Eusakk" and "Nholumie"). This census (Douglas, 1853: 10–11) was very likely made after 1840—possibly as late as 1846 or 1847. Chart 3 is a section of this report and is given here to illustrate the manner in which Hudson's Bay censuses were returned on the Northwest Coast.

Once again, the actual count for a year in the 1840's is higher (in this case by only about six per cent) than Mooney's estimate for 1780. And, therefore, we must once more conclude that if the Hudson's Bay census is correct, then Mooney's estimate is too low.

Klallam, Chimakum. The estimate of 2,400 for the 1780 population of the Klallam and Chimakum contrasts with the Hudson's Bay census

[5] Douglas, 1853: 7. Douglas actually shows a total of 9,404 Salishan Indians on eastern Vancouver Island; however, he (or a clerk) made an error of 10 in adding the adult female column. When corrected, the total is 9,414.

CHART 3[1]

	Heads of families	Canoes	Guns	Women	Sons	Daughters	Slaves
Skagit	76	127	65	132	133	111	422
Nholumie	69	85	113	185	185	155	137
Eusaak	25	24	12	26	36	37	22
Sanayamio	10	16	9	12	14	11	9

[1] A portion of a census from the private papers of Sir James Douglas (*Second Series*), Bancroft copy, pp. 10–11.

report of c. 1845.[6] This report seems to have been prepared at Fort Victoria and therefore must have been done in the middle or late 1840's. Granted the notation that two "tribes" are missing from this return and also granted that the Hudson's Bay reports make no mention of Chimakum (who were probably absorbed by the Klallam—Hudson's Bay reports note the Klallam around Port Townsend), the two figures appear reasonably compatible. Smallpox had been reported on the south coast of the Strait of Juan de Fuca as early as 1792—on the other hand, contemporary accounts do not appear to justify an assumption that their population decline was extraordinary for the Northwest Coast. If we assume a population decrease of fifty per cent from 1780 to 1845, then Mooney's estimate would appear to be quite accurate.

Puget Sound Salish. The figure 5,175 in the Hudson's Bay census column was obtained by subtracting from the Fort Nisqualli District census of 1838–1839, the total for the Klallam and adding to the remainder the total for the Skagit (drawn from the HBC census mentioned in the section on the Nutsak and Lummi).[7]

In another manuscript (Taylor, 1961) the writer has given his opinion that the population of the Puget Sound area declined about fifty per cent in the period from 1780 to 1840. He therefore thinks that the figure for 1780 should be approximately 10,300 rather than Mooney's estimate of 6,000. In any event, it is difficult to reconcile a figure of

[6] Douglas, 1853: 14–15. The Hudson's Bay census for the Fort Nisqualli District for the year 1838–1839 showed a population of only 1262 Klallam. However, it is relatively unlikely that this census included the westernmost Klallam groups.

[7] The Fort Nisqualli census of 1838–39 here employed was furnished the writer by the Governor and Committee of the Hudson's Bay Company from the archives in Beaver House, London. A copy is to be found on pp. 19–20 of the *Private Papers of Sir James Douglas*, Ms., (*Second Series*), Victoria, B.C. A probable copy of this copy is to be found on p. 23 of Douglas, *op. cit.* Both of the latter copies contain the identical clerical error.

6,000 for 1780 with an actual head count of 5,175 in 1839, when we know that the Puget Sound natives had been repeatedly visited by smallpox and syphilis was rampant among them. Evidently, the "intermitting fever" did not reach Puget Sound (Tolmie, 1883, under date of Thursday, Nov. 14).

Tlatskanai. Of all the contrasted figures in Chart 2 the greatest proportional discrepancy is that between Mooney's estimate of 1,600 Tlatskanai for the year 1780 and Sir George Simpson's (in Merk, 1931: 170) estimate of 175 "Clatskaneyes" extant in 1825. It is quite difficult to understand why Mooney gave such a large figure for the Tlatskanai. After all they were an hunting and gathering Athabascan-speaking people, comparable in every way to their relatives the Owilapash. Each group was essentially alien to the Northwest Coast cultural pattern; each group occupied a bloc of rough hill country (the two areas were quite comparable in size) that was non-utilizable to the Chinookan and Salishan groups around them. Yet Mooney lumps the Owilapash together with three much larger Salishan tribes and assigns them a combined weight of 1,200 in contrast to the Tlatskanai's 1,600!

Probably, Mooney relied upon the Lewis and Clark estimate of 1,200 "Clack-star Nation" in 1805, and added one-third for presumed population decrease in the quarter century between 1780 and the Lewis and Clark visits. However, as Thwaites points out, this estimate was "considerably enlarged" by William Clark *after* the Lewis and Clark expedition had returned from the West Coast. In general, the Lewis and Clark estimates for the areas they did not reside in are suspiciously large compared to their conservative estimates for the bands they knew well (such as the Clatsop and Chinook.)[8]

The Hudson's Bay report (Sir George calls it a rough estimate, although it includes a breakdown by sex for freemen and slaves) is for the year 1824–25 and thus predates the great "intermittent fever" epidemics which began either in 1829 or 1830.

Granted that the Tlatskanai, along with the Chinook and Owilapash, were to all but vanish before the middle of the nineteenth century, there does not seem to be much evidence that they had suffered much more than other southern Northwest Coast Indians prior to 1825, and probably had not suffered as much as the Nutka.

The writer thinks an estimate of 400 for the Tlatskanai in 1780 more realistic than Mooney's 1,600.

[8] Thwaites, 1905, Vol. VI: 116, 113–114. Also, see Coues, 1893, Vol. III: 1244–45 and 1249.

Lower, Upper Chehalis, Owilapash, Cowlitz. The writer was unable to locate Hudson's Bay census data for the Lower Chehalis, Upper Chehalis and Cowlitz. It can be observed, however, that Mooney's composite estimate of 1,000 for 1780 is amazingly low compared to his estimate of 22,000 for the Chinook and 1,600 for the Tlatskanai. (Mooney estimates the Athabascan Owilapash [Willapa] at 200, Kroeber lumps them with the Chehalis and Cowlitz for his figure of 1,200.)

Before the intermittent fever epidemic, the Cowlitz were reckoned a large tribe by Hudson's Bay Company officials. For example, Sir George Simpson says:

> When I descended the Cowlitz, in 1828, there was a large population along its banks; but since then the intermittent fever, which commenced its ravages in the following year, had left but few to mourn for those that fell. During the whole of our day's course, till we came upon a small camp in the evening, the shores were silent and solitary, the deserted villages forming melancholy monuments of the generation that had passed away.[9]

Merk, 1931: 331. Letter from John McLoughlin to the Governor and Committee of the Hudson's Bay Company dated 11 Oct. 1830. "The Intermitting Fever (for the first time since the trade of this Department was established) has appeared at this place (Ft. Vancouver) . . ." Douglas also gives 1830 as the first "Ague Summer." *Private Papers, Second Series*, under date of April 24, 1840.

Sir James Douglas noted:

> The inhabitants of the Cowlitz River were at one time numerous; but are now reduced to something less than 60 men principally occupied in fishing: few of them evincing a desire to become hunters by courting the noble elevating and more arduous exercises of the chase.
>
> The decrease of population cannot be clearly traced to any one cause in particular—it with more probability proceeds from a union of evils. The whites best acquainted with the former and present state of the River and the Natives themselves, however, ascribe it with one voice to the *Ague*. As it is only since the appearance of that incredibly destructive visitation among them that they have wasted away to a shadow of their former numbers.
>
> Plomondo says that in 1830 the first ague summer, the living sufficed not to bury the dead. But fled in terror to the sea coast abandoning the dead and dying to the birds and beasts of prey.[10]

[9] Simpson, 1847: 176. It is not entirely clear whether 1829 or 1830 was the first year of the epidemic:

[10] Douglas, April 24, 1840 (under marginal notation *Cowelitz Statisticks*), in *Private Papers, Second Series* (Bancroft Collection). The Plomondo here cited is probably Simon Plomondon or Plomondeaux, Hudson's Bay Company voyageur.

Counting women and children, the population of the Cowlitz c. 1840 may, therefore, be reckoned at 150 to 200. In fact, most reports of the late 1840's and early 1850's written by British and American officials other than Hudson's Bay Company show a larger population for the Cowlitz. Sterling's estimate for 1852 was 200. Warre and Vavaseur's report (returned in the House of Commons in the spring of 1849) showed a population of 500—but this probably included Taidnapam.

Assuming the death toll in the preceding decade to have amounted to three-quarters of the population (a conservative estimate in the light of the foregoing statements and John McLoughlin's estimate that in the first fever year of 1830, three-quarters of the Chinook in the vicinity of Fort Vancouver died in one summer), then the Cowlitz population of 1830 was on the order of 600 to 800. Assuming about the same decrease for the Cowlitz for the period 1780–1830 as that adopted for the Puget Sound tribes, then the population in 1780 would have been on the order of 900–1200 in that latter year.

This checks rather well with Edward Curtis' description of eleven villages of Cowlitz on the Cowlitz River. It should be remembered that permanent villages became more numerous and individually smaller as one proceeds south on the Northwest Coast, and that riverine economy would not support so large a village as would a maritime economy.

The Owilapash would have been a much smaller group—as an Athabascan hunting and gathering people occupying about the same type and amount of land as the Tlatskanai, it would appear likely that they had approximately the same population—about 400 c. 1780.

The Upper Chehalis were probably a smaller group than the Cowlitz in 1780. Dart shows a population of 204 for the year 1851—but he evidently added the livestock into the total population figure (and added wrongly to boot). The writer thinks that an estimate of 500 Upper Chehalis for the year 1780 would not be too wide of the mark.

Concerning the Lower Chehalis (including the Copalis and the Humptulips) it need only be noted that they were not enumerated at all before the epidemics of the 1830's hit them and that they occupied the shores of Gray's Harbor and northern Willapa Bay. This area includes some of the largest archaeological sites south of the Gulf of Georgia—the population was reported to be numerous by John Work on his original exploratory expedition of 1824. The writer is inclined to estimate a population on the order of 1,800–2,400 for 1780.

Adding these estimates together, 4,000 is suggested as a more reliable estimate for the total group than Mooney's 1,200.

Chinook. Mooney gives a population of 22,000 for the Chinook on the lower Columbia in the year 1780. It will be noted that this figure is a little larger than Mooney's estimate for the population of the whole of the Gulf of Georgia region and represents approximately one-fifth of his total for the Northwest Coast.[11] Sir George Simpson (in Merk, 1931: 170) gave a "rough estimate of the population on the Columbia River from the Coast to the Cascade Portage as far as the influence of the Tide is felt" for the year 1824–5. He listed 1,140 free males, 950 free females, 395 male slaves and 275 female slaves for a total population of 2,760. This figure included 175 "Clatskaneyes." If we deduct the Tlatskanais from the total, we have an estimated 2,585 Chinooks resident on the lower Columbia in 1824–5. The discrepancy is, of course, remarkable. Now a whole host of commentators, British, French, and American, have remarked upon the rapid depopulation of the Chinook in the 1830's due primarily to the ravages of "intermittent fever."[12] Captain Wilkes' (in Gibbs, 1855: 435) estimate of population of the lower Columbia in 1841 comes to only 519 and doubtless includes some non-Chinook groups. He lists only 219 under the heading Chinook. Gibbs (1855: 435) shows for 1854 a total Chinook population below the Cowlitz, and including the Chinook of Shoalwater Bay (Willapa Bay), of 116, noting that they are intermingled with the Cowlitz and Chehalis.

The conclusion is inescapable from contemporary accounts and from censuses that the Chinook virtually ceased to exist in the two decades following the first appearance of "intermitent fever" at Fort Vancouver in 1830 (it is an almost overpowering temptation to observe in modern vernacular that they were "decimated by over nine-tenths"). However, this demonstrable population reduction occurred *after* Simpson's estimate of 2,585 in 1824–25. It does not, at least at first blush, aid us in understanding why Mooney gives a population figure nine times greater than Sir George's 1824–25 estimate for the year 1780. Normally, Sir George Simpson, in common with other west coast Hudson's Bay officials, was careful to note any sudden change in population figures. He makes no mention of a marked population decrease precedent to his 1824–25 estimate.

If the reader will consult the bibliography of Mooney appended to his 1928 publication he will note that only published standard works on early Northwest Coast settlement printed before 1910 were cited.

[11] Kroeber, 1934: 4. Chinook is used throughout this article to mean Chinookan-speaking peoples of the Lower Columbia. This conforms to Kroeber's 1940 usage.

[12] Merk, 1931: 331; Dunn, 1844: 114–115; Tolmie, *Diary*, British Columbia Archives, under date May 19, 1833.

Several of these works estimate Chinook population decrease at between nine-tenths and eleven-twelfths without being very specific about the base from whence they extrapolated.

Smallpox and syphilis had almost certainly appeared at the mouth of the Columbia before the end of the eighteenth century.[13] However, we know, or may infer, that smallpox had appeared at various other points on the Northwest Coast at about this same time.

To sum up: the writer doubts that population decrease on the lower Columbia was too much greater than that elsewhere on the Northwest Coast before the mouth of the Columbia became the locus of western European contact. The term "too much greater" is here used advisedly. The Columbia and the Fraser served as aboriginal trade arteries and it is quite probable that epidemics in advance of western European contact reached such areas with greater frequency than they did such backwaters as the Puget Sound area or the Willamette Valley. Certainly, however, there is no evidence to support the view that the population of the Chinook area decreased by ten times while the population of the Puget Sound area remained constant and the population of the west coast of Vancouver Island increased between 1780 and 1830. Most of the observers who wrote the works Mooney consulted visited Fort Vancouver in the late 1830's or during the 1840's and were regaled with tales of depopulation in that area due to the current intermittent fever epidemics. These they printed and did not mention the population in other areas from the Northwest Coast because they did not have contact with these areas. Mooney therefore assumed an enormously greater rate of depopulation in the late eighteenth century and early nineteenth century for this region than for others on the Northwest Coast.

If we accept Simpson's estimate for 1824–25 and assume a population decrease twice as great for the lower Columbia area than that assumed for Puget Sound from 1780 to 1840, we may estimate the Chinook population at 5,000 circa 1780.[14]

Conclusions

On the following page the writer presents his own estimates based

[13] Dunn, 1844: 114–115; Lewis and Clark, 1893, Vol. 2: 711–712; Mooney, 1928: 13–14.

[14] The writer discusses population changes among the Cowlitz and Chinook at greater length in an article entitled "The 'Intermittent Fever' Epidemic on the Lower Columbia" by Taylor and Hoaglin, to be published in *Ethnohistory*, Spring, 1962.

upon the material, here presented, as contrasted with those of Mooney, for the year 1780 (Chart 4).

In 1939, Kroeber observed in the course of his population density studies that:

> What is needed is, first a generally accepted classification of tribes or ethnic groups; second, a more precise determination of their territories; and third, a new series of estimates, both by local specialists and by those interested in demographic problems as such, of the size of tribal populations. These studies will probably involve a number of workers and a number of years. Only then can anything like reasonable reliability in detail be expected.

The present writer would not pretend that this paper represents such a step for the southern Northwest Coast, but does venture the hope that it is a way-station toward reliable estimates.

In conclusion, the writer wishes to observe, that while Mooney's figures for the southern Northwest Coast were in many instances quite wide of the mark, considering the time at which he wrote, the preliminary character of his study, and the scanty materials available to him, he did a remarkably creditable job.

Even more remarkable were Kroeber's trenchant comments upon Mooney's figures for the southern Northwest Coast—which would seem in most instances to be admirably borne out by the data.

CHART 4

Tribe or group	Mooney's estimate c. 1780	Taylor's estimate c. 1780	Hudson's Bay Co. census or estimate 1825–1846
Kwakiutl	4,500[1]	14,500[2]	9,376[3]
Nutka	6,000	14,000	7,093
Vancouver Island Samish	8,900	15,500	9,414
Nooksack and Lummi	1,000[4]	1,200	855
Klallam and Chimakum	2,400	2,400	1,485[5]
Puget Sound Salish	6,000	10,300	5,175
Makah, Quileute and Quinault	4,000	5,000	Lack data
Tlatskanai	1,600	400	175
Lower, Upper Chehalis, Willapa and Cowlitz	1,200	4,000	Lack data
Chinook	22,000	5,000	2,585
TOTAL	57,600	72,300	....

[1] Excludes Haisla.
[2] Excludes Haisla.
[3] Excludes Haisla and Heiltsuk.
[4] Includes Samish.
[5] Excludes Chimakum and two Klallam tribes.

While pausing to admire, however, we should not lose sight of the fact that Mooney's estimates, at least for this region, are not the best in the light of available data—and Kroeber's population density figures are based upon Mooney's estimates.

Finally, the writer ventures to point out that it might be fruitful if regional experts undertook to examine Mooney's estimates and Kroeber's density figures for other culture areas.

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The Yarbrough and Miller Sites of Northeastern Texas, With a Preliminary Definition of the La Harpe Aspect

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Introduction

The primary purpose of this work is to report upon the archeological remains recovered from the Fred Yarbrough and Manton Miller sites, located on the western frontier of the eastern woodlands in northern Texas. Both of these important sites contain early ceramic and preceramic components. A second purpose is to compare these two sites with related archeological materials from early sites in the eastern parts of Oklahoma and Texas, and to define tentatively an archeological complex of the Archaic Stage to be known as the "La Harpe Aspect." The third purpose is to draw from several new developments in the field of artifact classification and nomenclature, and to attempt an application of "variety," "tradition," and other concepts to the analysis of lithic materials.

Only partial success has been attained in the present paper, and a great deal remains to be done, even with the archeological data reported upon here. For one thing, the paucity of site reports in the area under consideration precludes any full definition of the La Harpe Aspect. Also, the attempted use of the variety, tradition, and other constructs in analyzing lithic materials encountered difficulties, primarily since related archeological materials have not been studied in a similar fashion. Hence comparisons with extant site reports yielded somewhat limited returns. In the long run, it is felt that the primary value of the present paper will be as a source of comparative material for future investigators. On the other hand, it is hoped that the present definition of the La Harpe Aspect will stand the test of time and new data—with some modifications, to be sure—and, furthermore, that valid varieties, traditions, or similar classificatory units will be recognized in typologies of lithic materials.

The writer wishes to express his thanks and appreciation to two individuals in particular: Mr. Edward B. Jelks, Executive-Director of the Texas Archeological Salvage Project, and Dr. T. N. Campbell, Chairman of the Department of Anthropology, The University of Texas. It is these two persons, more than any others, to whom the writer is indebted for his foundation in archeology. Both have given encouragement and assistance in the present study, as well as in many other instances. In addition, Mr. Jelks worked with the writer to a considerable extent on the problem of artifact typology, and aided appreciably in applying the variety concept to the artifacts described in this paper. Mr. L. F. Duffield and Dr. E. M. Davis, of The University of Texas, also gave useful suggestions and assistance during the writing of this paper.

Preliminary Statements. The Yarbrough site is located in Van Zandt County, Texas (Fig. 1), and was excavated some 20 years ago by The University of Texas and the Works Progress Administration, but not reported upon in detail. This site contained materials representing both preceramic and early ceramic occupations. Dr. Alex D. Krieger examined the artifacts from the site and made several initial observations, noting that a number of distinct cultural components were represented (Krieger, 1946: 172; Suhm *et al.*, 1954: 177, 186). With Krieger's observations in mind the writer decided to undertake an analysis of the site and to report upon the materials found there.

Many difficulties were encountered while doing the study. The original field notes and the artifacts themselves had become scattered through the years. The field notes were frequently scanty and incomplete, and few maps and profiles had been made. Yet it was felt that whatever information could be gleaned from these data would be of some value, irrespective of the incomplete nature of the field records, especially since until the past three years almost no archeological research has been carried on in the immediate region of the Yarbrough site. Also, the large numbers of lithic artifacts which had been recovered seemed to promise an excellent opportunity to try out new theoretical achievements made in the field of artifact typology, but heretofore employed exclusively in the analysis of ceramic collections.

The Miller site is located within the proposed Cooper Reservoir in Delta County, Texas (Fig. 1), and was excavated in 1959 by the Texas Archeological Salvage Project of The University of Texas. Like the Yarbrough site, the Manton Miller site contained archeological materials representing both ceramic and preceramic components. Although differing from the Yarbrough site in several significant ways,

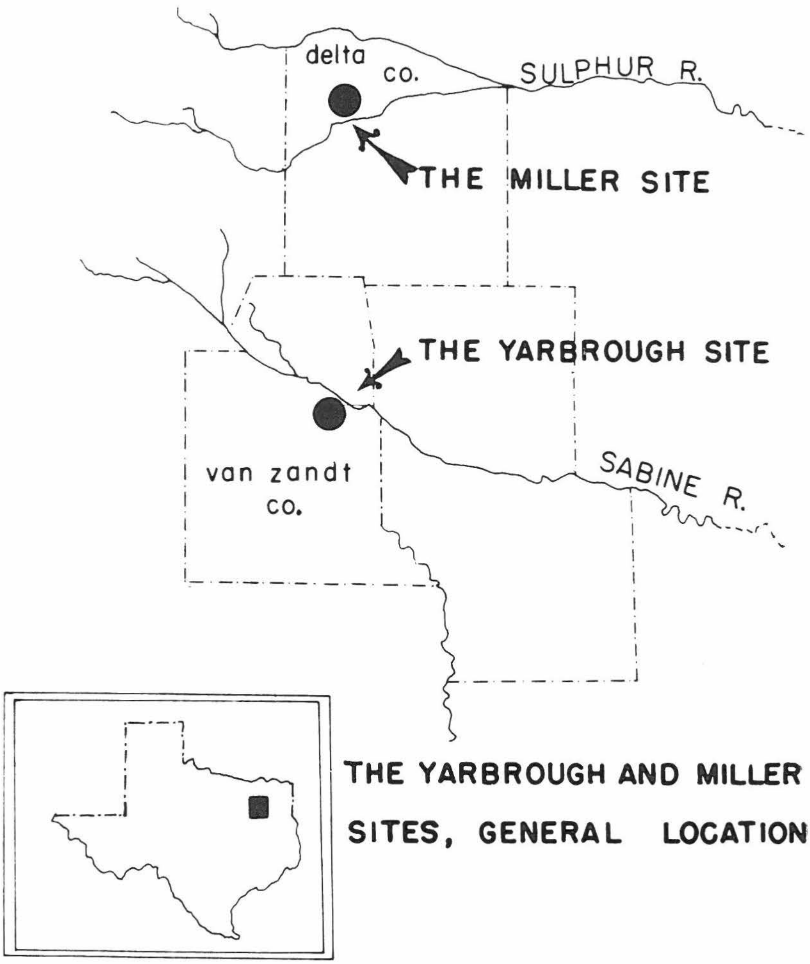


Fig. 1.

the Miller site nevertheless relates to the former, and belongs in part to the La Harpe Aspect. In spite of its small size and the rather limited amount of material obtained from it, some important information relating to the La Harpe Aspect was acquired through the analysis of the Miller site.

The La Harpe Aspect is defined for the first time in the present paper, and represents an Archaic Stage culture, or closely related groups of cultures, which existed over a broad geographic area and which underwent a uniform historic development from early Archaic times into the early ceramic period. It is characterized by an early phase with expanding stem dart points, a later phase with contracting stem dart points, and finally, simple, plain-ware ceramics of various types. The La Harpe Aspect ended with the introduction into the area of abundant arrow points and decorated pottery, heralds of a more sedentary mode of existence. Sites belonging to this complex can be traced, in a belt, from the vicinity of Houston, Texas, northward into central Oklahoma. The Yarbrough and Miller sites are included in this series of sites.

Environment. The Yarbrough and Miller sites are only 55 miles apart and are in very similar natural environments.

The Fred Yarbrough farm is situated on the flood plain of the Sabine River on the south side of the stream channel. This river flows in a southeastern direction across northern Texas, bending southward just below the city of Marshall, thence flowing more or less due south until it empties into the Gulf of Mexico below Port Arthur, Texas. Near its disemboguement the Sabine is a large and important river. In the region of its headwaters—the region directly northwest of the Yarbrough site—it is a much smaller stream which often becomes dry or nearly dry during periods of prolonged drought. Its flood plain, which provides a considerable amount of arable land, is somewhat entrenched and is bounded in all directions by rolling terrain.

The Manton Miller site is located on the flood plain of the South Sulphur River, on the north side of the stream channel. This river is one of the headwater branches of the larger Sulphur River, which flows in an eastern direction across northeastern Texas into southwestern Arkansas, where it empties into the Red River. In the vicinity of the Miller site the river channel is rather deep, and its banks are bordered by an irregular flood plain dotted with low erosional remnants of the uplands and a considerable amount of underbrush and small trees. Beyond the flood plain are the uplands, which are sculptured into gently rolling hills.

The Sabine and Sulphur drainages are confined to the Western Coastal Plain physiographic province (Atwood, 1940: 25), a region characterized by a system of low, undulating hills composed of sands, gravels, clays, and marls. Geologically speaking, this plain is a vast lowland which, throughout past ages, has been alternately above and below sea level. Structurally the area forms a large homoclinal plain composed of overlapping formations which dip gently toward the Gulf of Mexico, outcropping as a series of belts or low *cuestas* generally parallel to the coast.

The Yarbrough site is located over the Rockdale formation of the Eocene Wilcox group and is approximately 11 miles east of the contact area between the Wilcox and the younger Midway group. The average elevation of northern Van Zandt County is 500 feet above sea level.

The Miller site is located approximately at the contact zone between the Cretaceous Navarro group and the Midway group of the Eocene. The average elevation of southern Delta County is 520 feet above sea level.

A humid climate with high temperatures characterizes the Western Gulf Coastal Plain physiographic province (Blair, 1950), in which are located the two archeological sites in question. In the summer months the humidity averages approximately 70 per cent for the entire province, with long intervals in which the temperature is over 100° F. The summer winds are usually from the south, but they change frequently to northerly during the winter months, bringing cold interior currents with them.

For the area around Van Zandt County and the Yarbrough site the rainfall averages slightly over 40 inches. For instance, the weather station at Wills Point, in Van Zandt County, reported an average annual rainfall of 40.8 inches for the period of 24 years ending July 1, 1957.

Although no permanent weather stations are maintained in Delta County (in which the Miller site is located), the average rainfall—judging from the adjacent counties of Hopkins and Hunt—should be about 40 inches (U. S. Weather Bureau records, n. d., from the office of the Weather Bureau Climatologist for Texas, in Austin).

The Yarbrough and Miller sites fall within the confines of the Texan biotic province (Dice, 1943: 23–24) which extends from northern Oklahoma southward across Texas to the Gulf of Mexico. It is bounded on the west by the more arid Kansan and Comanchean provinces and on the east by the humid Austroriparian province.

Rolling plains spotted with growths of hardwood trees are common in the Texan province, and many grasses and perennial flowering plants are to be found therein. The trees are, for the most part, hickories and oaks, the most common examples being the Texas hickory (*Carya buckleyi*), the post oak (*Quercus stellata*), and the blackjack oak (*Q. marilandica*).

Mixed pine-oak forests occur along the eastern margin of the province. Among the dominant species along this eastern region are the shortleaf pine (*Pinus echinata*), the post oak (*Quercus stellata*), blackjack oak (*Q. marilandica*), and the sweetgum (*Liquidambar styraciflua*).

In recent years much of the timber has disappeared. The Eocene soils on which the pine-oak vegetation grows are generally very infertile, and as a result the farms in the region tend to be located along fertile creeks and upon the best of the uplands. Since ample fresh land has previously always been available for clearing and farming, it has been the practice not to conserve the fertility of the fields. Heretofore the farmers cultivated their land as long as it was profitable to do so, and when their old fields became exhausted, they were abandoned for new ones. At the present time, however, the practice of agriculture is declining sharply in the region, and many old fields have been overgrown with dense thickets of young pines, persimmon, and sassafras.

The animal life of the area is quite diversified. Many reptiles and amphibians can be found along the drainage ways. The raccoon (*Procyon lotor*), and the opossum (*Didelphis* sp.) are among the most common mammals, while the Texas red wolf (*Canis rufus*), the fox (*Vulpes* sp.), and the Texas lynx or bobcat (*Lynx rufus*), the armadillo (*Tolypeutes* sp.), and the cottontail (*Lepus sylvaticus*) may be found in some numbers. Once hunted nearly to the point of extermination in the area, the white-tailed deer (*Odocoileus virginianus*) is now quite common.

Ducks and geese enter the area from the north along with the first "northers" in the fall of the year, congregating around the small lakes and streams, then gradually moving southward as winter progresses. Among permanent or nonmigratory birds are the turkey and numerous doves and quail.

Fish are common in most of the streams, as are several fresh-water mollusks.

Ethnohistory of the Area. The Yarbrough and Miller sites lie on the western fringe of the area which was inhabited at the time of European contact by various Caddoan tribes, and on the eastern margin of the region held by several groups of Wichita-speaking Indians.

The first Europeans to come anywhere near this area were the members of the De Soto expedition, who in 1541 entered eastern Texas under the leadership of Moscoso, the successor of the ill-fated De Soto. Although the party entered eastern Texas, it is not known for certain how deeply they penetrated the area. It was not until 1800 that close contact was made with the area around the two sites, although by shortly after 1700 strong European influencc had been established in southeastern and extreme northeastern Texas, where the Europeans found many tribes of aborigines who can be classified as sedentary horticulturalists. In the region of present-day Cherokee and Nacogdoches counties, on the Neches River and its principal tributaries, were found the Nabedache, Neche, Nacanish, Anadarko, Nacogdoche, Nacono, Nasoni (Lower), Nacachau, and Hainai, all members of the loosely-formed Hasinai Confederacy (Swanton, 1942: 8–15). To the east of these were two independent Caddoan tribes, the Ayish and the Adai. On Red River in Louisiana dwelt the Doustioni, Natchitoches (Lower), Washita, and the Yatasi (Lower) of the Natchitoches Confederacy. Along the Red River in Arkansas and Texas were villages of Cahinnio, Kadohadacho, Nanatsoho, Nasoni (Upper), Natchitoches (Upper), and Yatasi (Upper) of the Caddo Confederacy (*ibid.*: 8–25).

To the west of the sites, along the headwater area of the Sabine, the upper Trinity, and the middle course of the Brazos, there lived less sedentary tribes—the Taovayas, Tawakoni, Waco, Wichita proper, Kichai, and Yscani—all referred to in early historic documents as the *norteños*. All of these groups, excepting the Kichai (who used a related language), spoke Wichita, a language akin to the Texas Caddoan dialects, all belonging to the Caddoan family of the Iroquois-Caddoan stock of the Hokan-Siouan phylum (Sapir, 1929: 138–141). Swadesh (1959: 16) classifies the Caddo, on the basis of lexicostatistical studies, as a secondary group of the Iroquois primary group.

There is good documentary evidence that many of the Wichita-speaking groups migrated southward from the vicinity of the Arkansas River into Texas in 1757, and that they soon took up friendly relations with their distant kinsmen to the east, the Caddo (Harper, 1953: 268). Recent archeological and documentary investigations, however, have suggested the possibility that Wichita groups inhabited north-central Texas long before the first half of the 18th century (Duffield and Jelks, 1960; Duffield, personal communication). There is also some evidence to suggest that the prehistoric archeological complex known as the Henrietta Focus may be partially ancestral to the historic Wichita (Wedel, 1959: 583, 587). In spite of recent research, the problem has not yet been resolved, and there remains the possibility that this western area was occupied before 1720 by the Tonkawa, a nomadic group of hunters and food-gatherers found in the central portion of Texas in later historic times. Data on this group are quite scarce, however, and we can not be certain about their early history.

On the headwaters of the Sabine River in Rains County, twenty miles to the west of the Yarbrough farm and thirty miles southwest of the Miller site, the Tawakoni and Yscani maintained a village for a short while which was visited by the Spanish in 1760 and 1761 (Johnson and Jelks, 1958). Farther to the northwest on Red River was the large Taovayas town, the remains of which are known today as Spanish Fort, which was unsuccessfully attacked by the Spanish under Colonel Parilla in 1759 (Allen, 1939). Yet Spanish influence among the Wichita groups was slight, and most of the trade which these peoples carried on was with the French who operated out of Louisiana. The nucleus of Spanish missionary activity centered primarily in the area some distance to the southeast of our two sites, where Christian missions were maintained for the Hasinai from 1690 to 1693, 1716 to 1719, and again from 1721 to 1773.

In the year 1859, the remaining Caddo, decimated by war and disease, were removed from Texas; that same year the Wichita proper (including the Taovayas), the Waco, and the pitiful remnants of the Tawakoni and Kichai moved to a reservation near Anadarko, Indian Territory. However, for all practical considerations, Indian activities in north-central and northeastern Texas came to an end four years earlier, in 1855.

In summary, we can say that near the sites in question were the Hasinai to the southeast, the members of the Caddo Confederacy to the north and east, and not far to the west the Wichita tribes. There were some important cultural resemblances between these groups, particularly in an economic and material sense. All constructed thatched oval houses, lived in more or less permanent villages, were moderately sedentary (the Caddo more so than the Wichita), farmed and cultivated maize, beans, and squash, and even shared common features in language and social organization. It may be concluded, then, that a rather consistent cultural pattern, although with a certain amount of regional variation, existed for the area under study in late historic times.

The Problem of Artifact Analysis and Typology. In the past few years considerable progress has been made toward a more thorough definition of typological concepts and their application to artifact analysis. The major portion of this endeavor, understandably, has been directed toward ceramic materials, and almost no attempt has been undertaken to apply the new concepts and ideas to the classification of non-ceramic artifacts. As stated earlier, one of the goals of this paper is to classify the large sample of lithic artifacts from the Yarbrough and Miller sites (referring here primarily to the projectile points) and to try to carry over into the realm of stone material certain concepts developed by other workers in pottery analysis. Needless to say, the usual descriptions and analyses included in site reports will also be presented.

The main trend in typological theory has been toward a more intensive systematization so as to place artifacts in classificatory units which can help to define archeological assemblages as precisely as possible. The most valuable result of this recent work, in the United States and elsewhere, has been a drive toward crystallization and application of the variety concept as well as several more inclusive concepts. In the American Southwest, Wheat, Gifford, and Wasley (1958) defined the variety and several broader concepts as they might be applied to the ceramics of their region, and in eastern North America Phillips (1958) has set forth his ideas on the type-variety problem and has also attempted to apply the concept to pottery in that region. Still more recent studies(Smith, Willey, and Gifford, 1960; Gifford, 1960) have combined concepts from the theoretical taxonomic and typological systems as proposed for southwestern and eastern United States—making certain significant modifications and additions—and have redefined them so as to apply to pottery collections from the Mayan area, apparently with considerable initial success. In the light of these recent advances in the realm of theory, the time seems ripe to broaden the field of attack in typology and to place lithic materials on the list of objectives. The Yarbrough site, with more than 1,300 projectile points, offers a made-to-order test case for these new ideas, and to a lesser extent the lithic material from the Miller site can be used. The amount of variation in the artifact collections from these sites is high, while the projectile point sample is large enough to provide some sort of statistical security.

As a first step in the analysis, consideration must be given to the different attributes or traits which go to make up an artifact. The term "attribute" is used here to mean a basic element of form which, associated in one artifact with other elements, combines with these others to provide the artifact with its characteristic appearance. Thus various shapes or form variations in the stem, shoulders, base, blade, etc., of dart points are their attributes, and as such are the essence of any larger classificatory grouping of artifacts. An attribute, the smallest unit of study, need not be a purely functional trait, but can be artistic or stylistic as well.

"Mode" is another extremely useful term, developed and elaborated by Rouse in his study of Haitian archeological materials (1939) and in his recent paper on artifact classification (1960). To quote from Rouse (1960: 313):

By the term "mode" is meant any standard concept, or custom which governs the behavior of the artisans of a community, and which they hand down from generation to generation, and which may spread from community to community over considerable distances.

In this sense, then, a mode can be represented by a particular attribute of an artifact, or closely related group of attributes, which have culturally or historically demonstrable meaning. To quote again from Rouse (1960: 313):

Not all the attributes of the artifact are indicative of modes. Some attributes will instead express personal idiosyncracies of the artisans. A unique design, which occurs only once, may be cited as an example. Other attributes fall within the realm of biology, chemistry, or physics rather than culture.

In summation, an attribute which has been observed to occur consistently in a number of artifacts, and which seemingly represents the embodiment of a style concept which existed in the minds of the manufacturers, can be called a mode or, speaking in more abstract terms, the result of product of a cultural mode.

Let us turn now to the actual analysis as carried out in the laboratory. To begin with, all the artifacts of different classes (use categories: scrapers, projectile points, and so forth) were placed into separate groups. Then a small card was prepared for each artifact, on which was written the field catalogue number, the appropriate excavation square designation, and the depth at which the specimen was found. These cards could then be assorted easily and arranged in any desired order, and the technique lent itself very well to distribution studies within the site, both of a vertical and horizontal nature.

In the typological study itself, attention was fixed on the various attributes of the particular artifacts and they were segregated into as many small groups as possible. This was done in accordance with the procedure recommended by Krieger (1944), using care to include together only those specimens which were almost identical in form, i.e., only those which showed essentially the same combination of attributes. This small number of attributes consistently occurring in all the varieties constitutes the primary traits or attributes of a type, whereas the secondary attributes are those which serve to distinguish the varieties from each other. Related groups or varieties go to make the type, and the generally small number of attributes held in common by all the varieties serve to set the limits of the type.

To summarize, if clusters (consistent combinations of attributes) occur within a given type, resulting in discrete groupings within it, we may assume that varieties are represented. Inter- and intra-site distributional data may serve to corroborate the validity of the varieties, but these are not at all necessary in setting them up.

In certain instances experience has shown that some difficulty may be encountered in the use of the variety concept. The *Alba* arrow point type at the Miller site, to give one example, shows a wide range of variation in blade form and size, shoulder and base form, etc., within certain limits. Yet the various attributes representative of the type do not combine consistently with each other into clusters of homogeneous small groups, that is, varieties. On the contrary, the attributes appear to combine quite randomly with each other throughout the sample at hand, and do not form consistent units within the *Alba* type. In cases such as this, the division of the material into varieties is not feasible, thereby illustrating that the nature of the cultural material itself must determine whether types are divisible into varieties. In this example, the *Alba* type can not be defined from the primary attributes held by the varieties of the type, since no varieties could be established, but must be defined on the basis of a comparison of the variation within the group of points viewed as a whole.

The variety concept should be an important tool for the archeologist, both on an intra- and an inter-site level of study. For accurate comparisons between the artifacts from different sites and diverse areas, work on the variety level of organization is necessary if one wants to do more than establish only general artifact resemblances and obtain general conclusions. For example, a carfeul comparison of strictly-defined, tightly-knit varieties from two different archeological sites can reveal a more exact picture of the proximity or distance, taxonomically speaking, between the two collections under consideration, and in more concrete terms, than can the usual comparison of types. In the present paper very little comparison could be done on the variety level, since no published reports exist which have used the variety concept in describing lithic materials. Intensive comparative work will have to await more site reports.

To summarize at this point, a type may be defined as a combination of the most significant attributes which are held in common by the related varieties grouped together under it. Individual points, or artifacts not recognizable as belonging to any particular variety, but nevertheless possessing a sufficient number of the major traits of the type in question, should also be included within the type. In a case in which almost no variation has been allowed in the manufacturing technique, a type may be represented by only one variety. Yet determining that the particular variety has no close relatives, and that it by itself constitutes a complete type, is a significant accomplishment.

Above and beyond the type level of organization it is also possible to see very general resemblances between artifact types, but here the number of attributes which they hold in common—the number of cultural modes—is reduced to a very few. When resemblances are recognized on this level in analysis, usually only one or two important traits or attributes can be emphasized. The typological or taxonomic term employed for this stage of classification is "tradition;" thus we have the "cord-marking tradition," "shell-tempering tradition," and so on in the field of ceramics. At the Yarbrough and Miller sites it seems that the "contracting stem" dart points form one specific tradition, the "expanding stem" points another, and the "straight stem" points yet a third. Comparison shows that these three traditions are represented at other sites and in other areas, and comparative studies can be made easily on this level of interpretation, although the dangers inherent are much greater because of the larger personal or subjective element involved in definition, particularly in respect to the selection of the attributes which go to make up the group. Through the study of traditions much of the data used in establishing uniform historic changes within the La Harpe Aspect have been acquired. The concept of tradition is derived from that of Willey and Phillips (1958: 37):

> An archeological tradition is a (primarily) temporal continuity represented by persistent configurations in single technologies or other systems of related forms. The lack of specification in respect to the spatial dimension may be supplied by the use of qualifying terms, as in "regional tradition," "areal tradition," and so on.

The use of this term in the present paper, in respect to projectile point stemming traditions, is more limited or specific, in a certain sense, than that quoted above, yet it falls within the Willey and Phillips definition of a historical continuity, and is not a departure from their original idea. These stem forms are only one possible kind of tradition, and it is not intended to limit the usefulness of the term to this specific case. Its uses and applications should be many.

In presenting the descriptions of artifacts which follow, under their respective site headings, the order followed in the laboratory analysis will be reversed. A tradition will be presented first, then its types, and after each type its respective varieties, if any. This is looking at the problem from the top down, hierarchically speaking, but gives the reader the advantage that the conclusions of the analysis (in the form of the resultant traditions and types) are given before the bulk of the raw data (the varieties). Thus the reader has the opportunity to review the conclusions as the report progresses, and is not immediately presented with an overwhelming body of data in the form of minute variety descriptions outside their types and traditions.

One important problem of typology has not yet been touched upon, the nomenclature to be followed in designating the traditions, types, and varieties. On the tradition level of designation it seems best to employ a simple, descriptive term or simple combination of terms in order to identify unmistakably the salient features or attributes which have been selected to define the group of artifacts. Since, at this point in the interpretation, the artifacts possess only a very small number of commonly held attributes, which because of their cross-type occurrence we can safely say represent "modes," a descriptive term is quite in order if it accurately pictures the important feature, or traits, involved. The terms "contracting stem" and "expanding stem" for the projectile point categories aptly depict the important features which were used to define these groupings.

On the type level of interpretation the nomenclatural problem is not so simple. Because of the larger number of important attributes which have been used to group together the sundry varieties into one type, the selection of a single feature such as "expanding stem" to be used in the type name is completely unrealistic. I am in agreement with Suhm, Krieger, and Jelks (1954: 16) when they explain the procedure used in their study:

> All qualifying terms have been dropped from projectile-point names, even those which have previously been published. Thus, they are simply "Nolan points," "Gary points," "Folsom points," etc. Qualifying terms give too restrictive an idea of what variation may occur within a type.

Of course this is a departure from what is considered proper procedure in ceramic analysis, where such terms as "engraved," "plain," etc., are suffixed to type names. In ceramics, however, the problem is somewhat different. These terms, with ceramics, can serve to stress technique and technological traditions. Other workers, however, still insist upon the qualifying suffixes in type names for projectile points; at any rate, either method is workable and the difference in the two practices should not be emphasized out of proper proportions.

In conclusion, then, a single name, printed in italics and beginning with an upper case letter* for ease in identification and recognition, should be chosen for the type. This use of a single name is well established in most parts of North America and consists of selecting and employing the name of a locality in the area of occurrence of the artifact. The procedure has been quite satisfactory in the past, but it should be realized that the selection of a name—taken, for example, from a nearby city, village, or stream—is not meant to imply that this particular city, village, etc., is the focal point of distribution for the type. It is simply a convenient method for type designation which should not carry unintended and undesirable implications.

Certain kinds of names should definitely be avoided in type designations. This point has been precisely put forth by Smith *et al.* (1960: 336) in reference to the ceramics of the Mayan region.

> No two types or varieties should ever share the same place name as a taxonomic label. In other words, once a geographical name has been assigned as a type or variety name it should never be affixed to any other type or variety. . . . No phase name should ever be used as a type or variety name.

To illustrate a confusing practice, the characteristic ceramic type of the Caddoan area Sanders Focus, *Sanders Plain*, has the same primary name as its focus, and as a result some confusion has resulted because it has been shown to occur in the Bryan, Wylie, and other foci as well.

The really big problem to be dealt with here is that of providing workable designations for the varieties. A simple designation of varieties such as A, B, C, or 1, 2, 3, within a certain type, is certainly functional, but it is difficult to work with such designations on a comparative, site-to-site basis. A better procedure is to provide names for the varieties, as has been the practice with the types. The objection to this procedure is that one type may end up with twenty varieties, each with a different name, and that the resulting accumulation of names might be somewhat bewildering. Fixed names should, however, exist for ease of reference and to facilitate and standardize inter-site comparisons. It is further recommended that they be presented in italics and begin with a lower case letter to distinguish them from type names (*e.g.*, the *mabank* variety of the *Yarbrough* type). To quote again at length from Smith *et al.* (1960: 339).

> On the face of it, and during the first applications of this method, there may be those who are inclined to consider a large number of varieties,

* This procedure was recommended to the writer by E. B. Jelks, who is using a similar printing style in his report on the Kyle site of Central Texas.

each with a different name, as a disadvantage. But it will soon be observed that by allowing all the variety units to be distinguished and named individually, the number of named type units is not in any way erroneously increased (in fact this method tends to prevent the erroneous multiplication of named *types*). The types are the units most clearly reflecting cultural phenomena; these are the units of cross-cultural comparison, the units of synthesis, the units that are of greatest use to interested parties in general (teachers and researchers alike). Types are most likely to be committed to memory as the elements diagnostic of a ceramic complex [or lithic complex, in the case of the present study] within a phase. The varieties are, by contrast, the units of basic laboratory analysis. Even though they are meaningful units, they are tools of the specialist; they are the fine breakdowns necessary at a certain level of research analysis. But, and this is most important, it is not at all necessary for all workers or for persons in allied fields to have them at tongue tip or even be familiar with them. Varieties are of maximum use to the specialist. As a consequence there should be no limitation on their number or on the proliferation of variety names on this level of analysis.

The typological approach employed here is, then, different from that heretofore used in Texas and adjacent areas; the older, and for that time quite admirable, procedure consisted in delimiting the types in an impressionistic manner without specific description of their respective variations.

It should be pointed out here that the concept which proved most fruitful in the present study was the tradition. It was relatively easy to do inter-site comparisons using the various dart point stemming traditions, and much useful information was acquired. It is hoped that in the future the variety and other constructs will be of equal value. Their extensive application, unfortunately, will have to await the publication of detailed site reports, of which, at the present date, there is a great lack.

THE FRED YARBROUGH SITE

The Fred Yarbrough farm is located approximately four miles northeast of the town of Grand Saline, in Van Zandt County, Texas (Fig. 1). In the files of The University of Texas the Yarbrough finds have been designated as site 41VN6. In truth, however, two adjacent occupation areas have been grouped under this label: a primarily prepottery knoll located some 50 yards south of the Sabine River, and an early ceramic site which was situated 300 yards to the south of the knoll. In this paper the first will be called Area A, the latter Area B. They and their artifacts will be described separately.

The Works Progress Administration, in conjunction with the Department of Anthropology of The University of Texas, began excavations at the Fred Yarbrough farm on April 1, 1940. This excavation was known as Work Project 15409. The field party consisted of a crew of local laborers, ranging in number from 17 to 20 men, and was under the immediate direction of archeological foreman William A. Duffen. Work at the site was terminated in September of the same year.

Before the knoll, Area A, was staked out in a grid system to be excavated, an extensive surface collection of artifacts was made and each artifact recovered was labeled with an "S" to indicate its superficial provenience. The knoll was then measured out in a 10-foot grid pattern and was prepared for excavation in the following manner. A wooden stake was driven down near the east end of the knoll and was designated "primary datum, stake '0' " (Fig. 3). Rows of stakes were then run north and south from this stake, and another row was run westward across the long axis of the knoll. The entire rise was then staked out in 10-foot squares which were numbered as follows. Each square was given a two-part designation: the first number indicated the distance of the square westward along the east-west line from the primary datum point, stake "0," numbering consecutively from "0" toward the west; the second part of the designation contained an "R" or "L" to indicate location either to the right (north) or left (south) of the east-west line, and a numerical appendage to show the correct distance right or left, beginning at the "0" stake and numbering 1 to 11 northward, and from 1 to 11 southward. Thus a typical designation might read "11R7," a combination indicating that this square was the 11th 10-foot square west of "0" and the 7th to the north, the right ("R").

The vertical control methods used during the excavation of the knoll were poor, to say the least. No attempt seems to have been made to record the vertical provenience of artifacts in relation to any particular fixed reference point. Rather, the depth of both features and artifacts was measured in inches from the surface of the soil, and since no contour map exists for the site, the problem of determining stratigraphic relationships in the occurrence of particular artifact types has been rather tedious, to minimize the difficulty.

Excavation with shovels was begun along the north-south line at the eastern margin of the knoll and the entire eminence was excavated, with work moving from the north-south line toward the west along the whole structure. Each square, as it was reached, was dug down to the clayey, sterile subsoil, and all of the artifacts recovered were labeled with the appropriate square designations and their depth, in inches, below the surface.

No excavating was done on the level area immediately around the knoll, except for that at Area B, the area of charcoal-stained soil and concentrated midden detritus which was approximately 300 yards south of the knoll. In this area many potsherds and bone fragments were recovered. At Area B neither vertical nor horizontal controls were used during the excavations.

I. Area A (the Knoll) at the Yarbrough Site

Area A, the knoll or "mound," was a low, naturally-formed rise on the Sabine flood plain capped with a midden deposit containing numerous lithic artifacts and a few potsherds (Fig. 2). It lay 50 yards south of the stream channel. The structure was slightly elongate, the long axis running east and west for a distance of 350 feet, the shorter running north and south 220 feet. It stood, before excavation, approximately 10 feet above the flood plain. According to the owner of the land, Mr. Fred Yarbrough, the knoll was overgrown with timber when first seen by him, and originally stood taller than at the time of excavation. Thirty years of cultivation had eroded and lowered it somewhat.

According to the local inhabitants, the area around the knoll is flooded during periods of excessive rainfall, generally several times each year. These informants did mention, however, that the top of the structure was never completely covered by these inundations.

The knoll was composed of three members: (1) a basal, mottled brown and gray sand—the flood plain soil; on this (2) a sterile, yellow-buff clay which rose above the flood plain level; and upon this (3) a surface midden deposit of dark sand, stained by humus (Fig. 3). The midden zone was approximately 3.3 feet thick, but had been eroded to a considerable extent on the slopes of the knoll so that the clay member was visible on the surface in several spots. The yellow-buff clay member averaged 6.3 feet in thickness, and the basal sand extended downward for an undetermined depth below the base of the clay. Soil samples were not taken by the W. P. A. crew at Area A, and no grain-size, mineralogical, palynological, or other analyses could be attempted. It was likewise impossible to revisit the site for purposes of collecting soil samples because the entire eminence was dug away.

A total of 2,696 artifacts, was recovered from the knoll (Area A) of the Yarbrough site. This includes chipped stone material, ground stone artifacts, ceramics, and bone and shell artifacts.

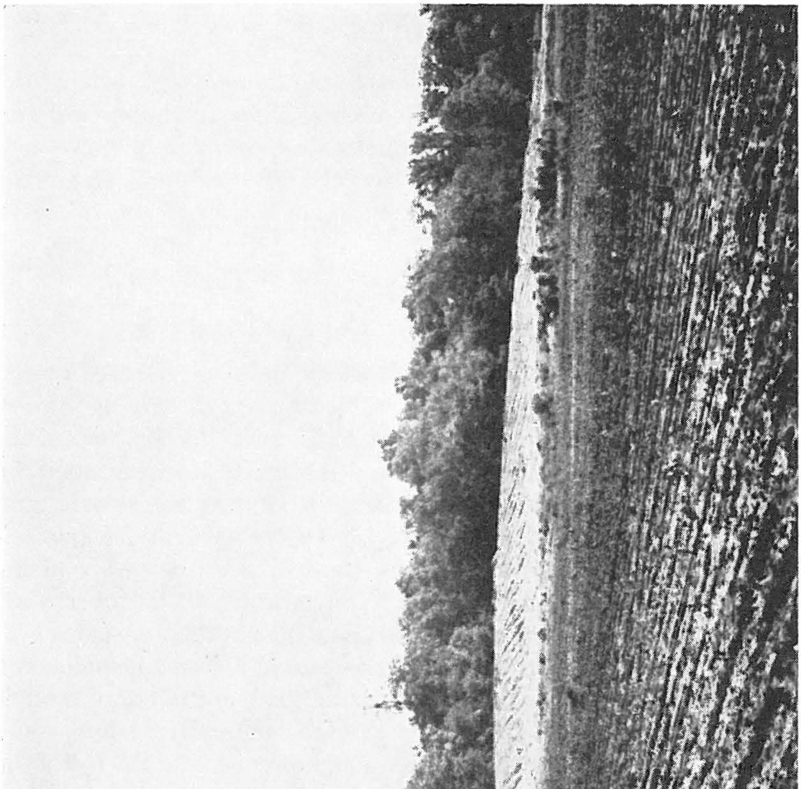


Fig. 2. The Knoll, Area A at the Yarbrough Site (looking northeast; note automobile at extreme left for scale).

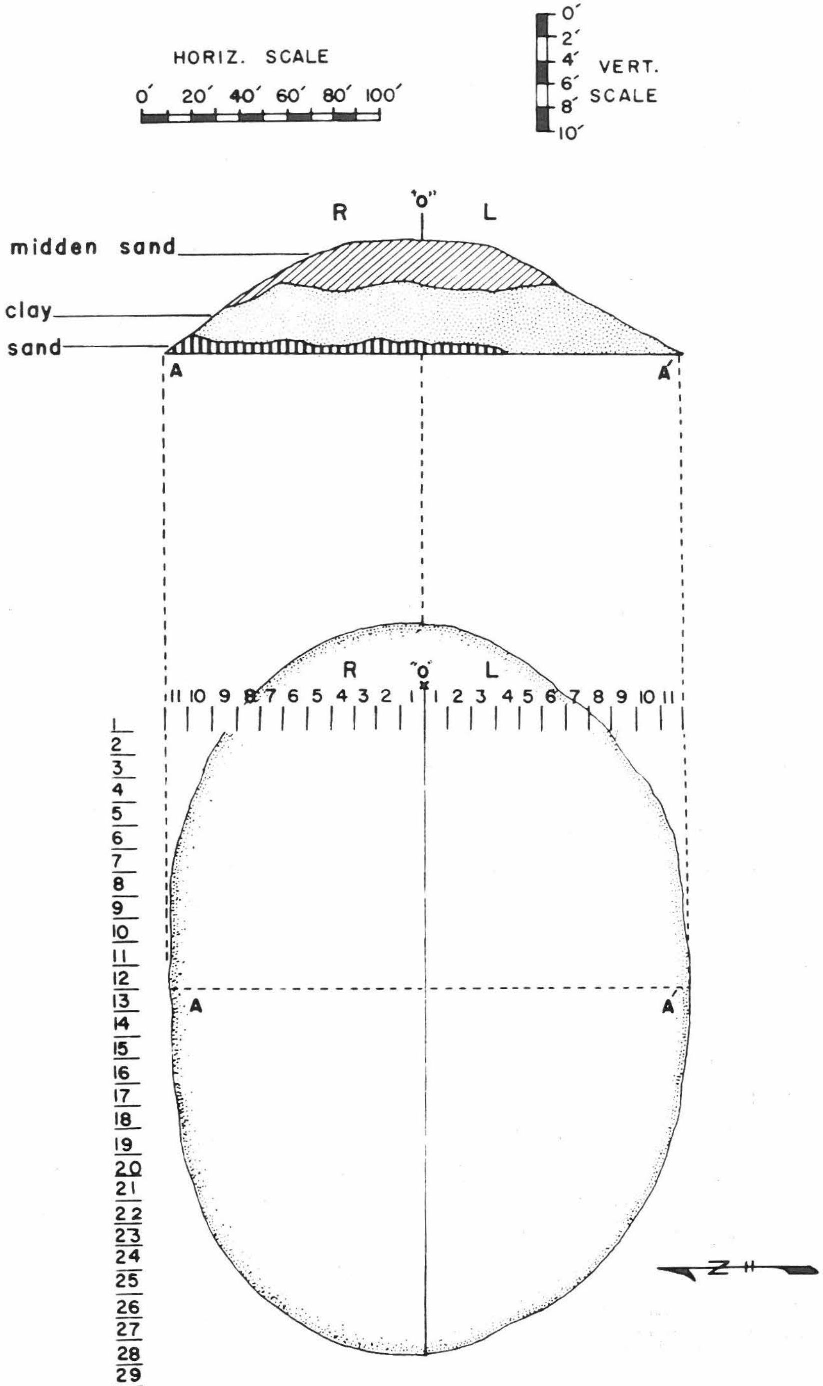


Fig. 3. Plan and cross section of the Knoll, Area A, Yarbrough Site.

1. Projectile Points

The projectile points at the Yarbrough site, Area A, fall into two rather distinct categories. The first of these is a group of large, thick, often quite heavy points, which because of their size and weight are thought to have been employed on atlatl-propelled darts. Artifacts of similar size and proportions have been recovered affixed to such implements in areas where perishable organic materials have been preserved, particularly in the dry caves of the American Southwest.

That the use of the atlatl was known throughout the southeastern United States has been inferred primarily from the presence of atlatl hooks in prehistoric archeological sites (W. S. Webb, 1939: Pl. 14 b; W. S. Webb and DeJarnette, 1942: Pl. 224 1., 306 1.; Bell and Baerreis, 1951: Pl. 3) and the assumption that the group of large points from Area A was used on such implements is therefore probably quite correct. There are also some historic data to support this supposition (Krieger, 1956: 195–207).

The other kind of projectile point is the arrowhead. It is distinguishable from the dart point in that it is lighter in weight and usually thinner—characteristics advantageous for the tip of the light arrow shaft. There is so much long-accepted evidence to support this definition, both of an archeological and ethnographic nature, that it hardly merits repetition here.

These two use-categories furnish an extremely helpful archeological tool, both for the establishment of types and for the hypothetical reconstruction of the life-way of the makers. Yet a word of caution is in order regarding the rigid application of the function appellations. Primarily, these are intended to be classificatory, descriptive tools for the archeologist, and one of their purposes is to assist him in "pigeonholing" artifacts for typological studies and comparisons; the uses to which these specimens were put by the original possessors may, in some cases, be a different matter. By way of example, several rather small points (the *hobson* and *colfax* varieties of the *Gary* type) from this site have been treated under the dart point heading because of their resemblance to larger points in quality of workmanship, overall proportions, crudeness of manufacture, or even the general outline or shape. Yet many of them, functionally speaking, would have served equally well as arrow points.

The terminology to be used in describing the parts or sections of the projectile points will be that suggested by Suhm *et al.* (1954: Fig. 7 opposite p. 531).

Dart Points

The dart points from Area A, including 1,342 specimens, belong for the most part to three stemming traditions—the contracting stem, straight stem, and expanding stem traditions. A few types, however, represent stemless forms or intermediate forms which fall between the major traditions. The W. P. A. field catalogue lists 74 projectile points which were recovered from the excavations and which could not later be found; these have been lost, discarded, or, more probably, were originally mislabeled.

THE CONTRACTING STEM TRADITION. Of the 1,342 dart points and dart point fragments found in Area A of the Yarbrough site, 548 belong to the contracting stem tradition, representatives of which occur in many parts of North America. Another five point fragments probably represent this tradition, but because of their fragmentary nature could not be described or properly classified. They do not appear in the tabulations for the contracting stem tradition. The Yarbrough site contracting stem specimens all represent the *Gary* type.

The Gary Type. The *Gary* dart point type (originally defined by Newell and Krieger, 1949: 164–165, Fig. 57; see also Suhm *et al.*, 1954: 430, Pl. 94) is represented by 328 relatively complete specimens which show a wide range of variation within certain specific limits. In addition to the complete specimens mentioned above, 211 dart point fragments probably belong to the *Gary* type, but because of their fragmentary nature could not be assigned to any of the varieties. They do not appear in the tabulations for the type. The diagnostic traits of the type are a contracting stem, a roughly triangular blade, and (at this site), fair, but not excellent workmanship—a trait governed probably by the poor quality of the chert which was used in manufacture. Most of the varieties also have well developed shoulders, but lack true barbs.

The most common varieties are the *kaufman* and *hobson*, which, taken together, form the "norm" for *Gary* at the Yarbrough site. The minor varieties include *alsa*, *runge*, *panna maria*, *kenedy*, *colfax*, *emory*, and *kemp*.

The *kaufman* variety—76 specimens (Fig. 4, A-C)

Blade: triangular, broad; edges straight or very slightly concave; shoulders prominent, four examples exhibiting true barbs.

Stem: one-third to one-half the length of the entire point; contracting; edges straight or slightly convex, frequently ground smooth; base pointed or very slightly rounded.

Dimensions: length—average 42 mm., range of variation 34 to 77 mm.; width at shoulders—average 32 mm., range 23 to 38 mm.; thickness—average 7 mm., range 5 to 13 mm.

Workmanship: generally good, with some amount of secondary pressure flaking.

Materials: reddish-gray chert with sand inclusions (64), gray chert with sand inclusions (9), homogeneous gray chert (2), and petrified wood (1).

Remarks: The diagnostic attributes of the *kaufman* variety are its medium size; wide, triangular blade; prominent shoulders; triangular stem; pointed base; and rather careful workmanship. This variety shows close affinity with the *alsa*

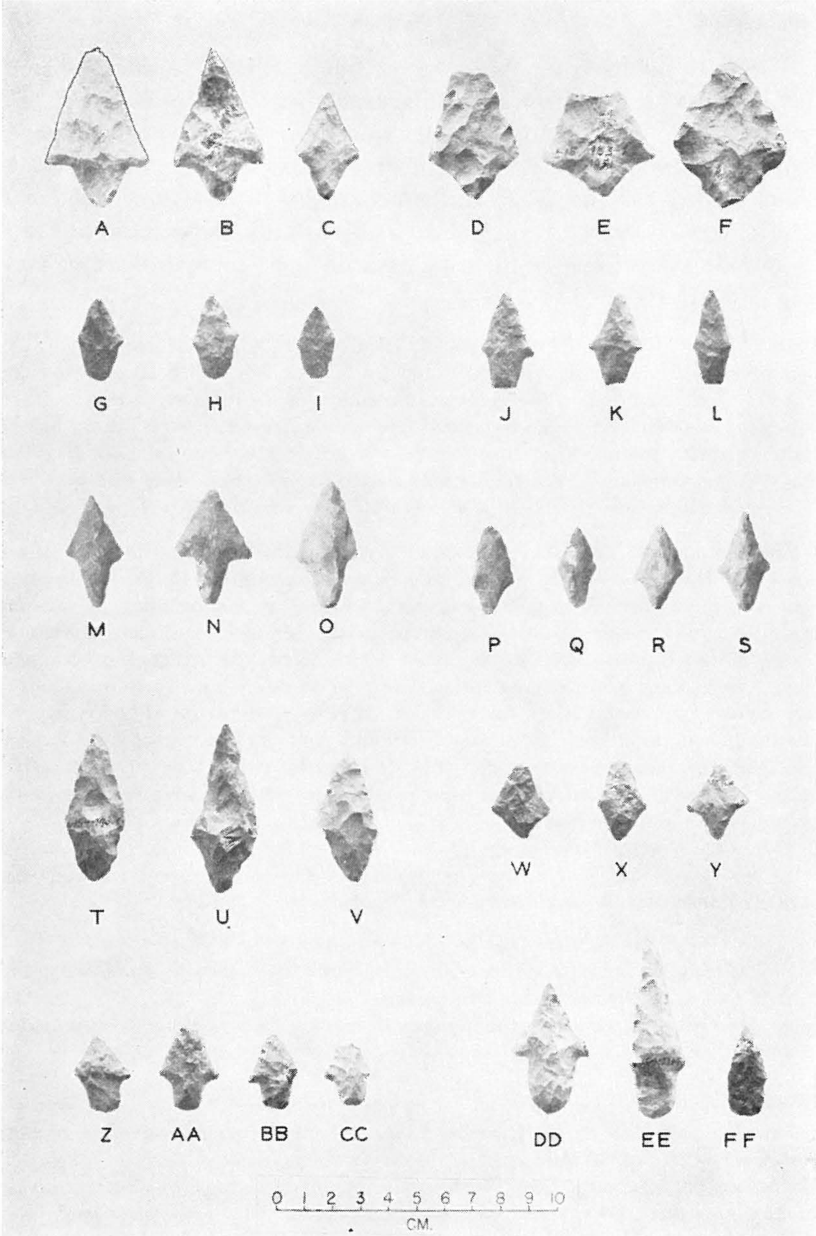


Fig. 4. Dart points of the *Gary* type. A-C, *kaufman* variety; D-F, *alsa* variety; G-I, *hobson* variety; J-L, *emory* variety; M-O, *runge* variety; P-S, *kemp* variety; T-V, *panna maria* variety; W-Y, *kenedy* variety; Z-CC, *colfax* variety; DD-FF, miscellaneous *Gary* points.

variety, although the *alsa* is heavier, cruder, and lacks the well developed shoulders of the *kaufman* variety. It strongly resembles the *runge* variety, particularly in triangular blade form. The *kenedy* variety is practically a miniature reproduction of *kaufman* with, however, a proportionately longer stem.

Known distribution: Limerick (Duffield, 1961); Martin (Davis and Davis, 1960: Fig. 4, Q); Scott (Bell, 1953: Fig. 95, No. 4 from left in line 5); and Harroun (Jelks and Tunnell, 1959: Fig. 15, A) sites.

The *alsa* variety—17 specimens (Fig. 4, D-F)

Blade: roughly triangular; edges straight, slightly convex, or (rarely) slightly concave; shoulders well developed, without barbs, but somewhat out-flaring or out-turned.

Stem: approximately one-third the length of the entire point; short and contracting; edges straight or slightly concave; base pointed.

Dimensions: length—average 50 mm., range of variation 30 to 55 mm.; width at shoulders—average 35 mm., range 30 to 42 mm.; thickness—average 10 mm., range 9 to 12 mm.

Workmanship: extremely crude; large flakes removed by percussion.

Materials: reddish-gray chert with sand inclusions.

Remarks: The diagnostic attributes of the *alsa* variety are its medium size, crude workmanship, short, triangular stem, triangular blade, heavy weight, and great thickness. The *alsa* points are similar in outline to the *kaufman* specimens, but are cruder, heavier, and have a somewhat shorter stem.

Known distribution: undetermined.

The *hobson* variety—144 specimens (Fig. 4, G-I)

Blade: roughly triangular; edges straight to slightly concave or slightly convex; shoulders fairly prominent, lacking barbs.

Stem: about one-third to over one-half the length of the entire point; contracting, tending to be rounded; edges slightly convex to almost straight; base somewhat rounded.

Dimensions: length—average 35 mm., range of variation 22 to 58 mm.; width at the shoulders—average 20 mm., range 13 to 30 mm.; thickness—average 8 mm., range 5 to 11 mm.

Workmanship: crude, although some examples show evidence of secondary pressure flaking.

Materials: reddish-gray chert with sand inclusions (107), homogeneous gray chert (4), gray chert with sand inclusions (3), pink quartzite (14), homogeneous gray-brown chert (11), novaculite (2), petrified wood (2), and jasper (1).

Remarks: The diagnostic, definitive characteristics of the *hobson* pionts are small to medium size, short triangular blade, large and wide contracting stem, and rounded base. The *hobson* variety resembles the *kenedy* variety. The latter, however, has a narrower, more pointed stem. *Hobson* also resembles the *kemp* variety. The *kemp* points, however, can be distinguished by their sharply pointed bases. Likewise, a certain affinity can be discerned between the *hobson* and the *emory* varieties, although the latter has a distinctively flat base which serves to separate it from all others.

Known distribution: Limerick (Duffield, 1961); Harroun (Jelks and Tunnell, 1959: Fig. 15, D); Martin (Davis and Davis, 1960: Fig. 4, H, R, S); Boat Dock (Bell, 1958: Pl. 11, E); Sam (Proctor, 1957: Pl. 14, No. 8); and Hogge Bridge (Stephenson, 1952: Fig. 95, Nos. 3 and 4 from left on line A) sites.

The *runge* variety—20 specimens (Fig. 4, M-O)

Blade: triangular, moderately short; edges straight or slightly concave, sometimes out-flaring at the shoulders; shoulders prominent, with slight barbs on a few specimens.

Stem: approximately one-half the length of the entire point; long, narrow, and contracting toward the base; edges straight or slightly convex, a very few specimens have ground edges; base pointed or somewhat rounded.

Dimensions: length—average 44 mm., range of variation 31 to 52 mm.; width at the shoulders—average 28 mm., range 18 to 34 mm.; thickness—average 7 mm., range 6 to 10 mm.

Workmanship: generally quite good, although a few specimens show a poor quality of flaking; many show secondary pressure flaking.

Materials: reddish-gray chert with sand inclusions (13), homogeneous light gray chert (6), and white quartzite (1).

Remarks: The diagnostic attributes of the *runge* variety are medium size; long, narrow stem; and relatively short blade. Because of its distinctive stem, this variety stands apart rather well from the other varieties of *Gary*.

Known distribution: James (Ray, 1960: Pl. 14, No. 3); Ck-44 (Hall, 1954: Pl. 13, Nos. 15–17); Davis (Newell and Krieger, 1949: Fig. 57, H); Hogge Bridge (Stephenson, 1952: Fig. 95, Nos. 6, 7 and 8 from left on line A); and Sam (Proctor, 1957: Pl. 14, No. 5) sites.

The *emory* variety—18 specimens (Fig. 4, J-L)

Blade: triangular or lozenge-shaped; edges straight, slightly concave, or convex; a few points have blade edges which are concave near the shoulders, but convex near the tip; shoulders fairly prominent, but lacking barbs.

Stem: about one-half the length of the entire specimen; relatively long and contracting; edges straight or slightly convex; base wide and tending to be flattened.

Dimensions: length—average 33 mm., range of variation 27 to 35 mm.; width at the shoulders—average 17 mm., range 14 to 24 mm.; thickness—average 8 mm., range 7 to 9 mm.

Workmanship: generally good, most specimens show some secondary pressure flaking.

Materials: reddish-gray chert with sand inclusions (15), pink quartzite (1), light gray, homogeneous chert (1), and novaculite (1).

Remarks: The distinguishing attributes of the *emory* variety are small size; relatively long, contracting stem; and flat base. It is much like the *hobson* variety, but has a characteristic flat base which is lacking in *hobson*. It is also rather closely similar to the *colfax* variety, an extremely marginal *Gary* variety having a less contracting stem that the *emory*.

Known distribution: Limerick (Duffield, 1961) and Davis (Newell and Krieger, 1949: Fig. 57, B) sites.

The *kemp* variety—13 specimens (Fig. 4, P-S)

Blade: roughly triangular; edges straight, very slightly concave, or slightly convex; shoulders prominent and protruding but without barbs.

Stem: approximately one-half the length of the entire point; long and contracting; edges slightly convex; base pointed or very slightly rounded.

Dimensions; length—average 32 mm., range of variation 29 to 40 mm.; width at shoulders—average 15 mm., range 13 to 18 mm.; thickness—average 7 mm., range 5 to 9 mm.

Workmanship: fair, most of the points show a little secondary pressure flaking.

Materials: reddish-gray chert with sand inclusions (12), and pink quartzite (1).

Remarks: The diagnostic attributes of the *kemp* variety are small size; long, narrow overall outline; long stem; and pointed base. The *kemp* points are quite similar to those of the *kenedy* variety, but are not as broad, and have a longer stem. Strong similarities are also shown to the *hobson* and *emory* varieties, but the *kemp* points stand apart as a result of their long stem.

Known distribution: Undetermined.

The *panna maria* variety—28 specimens (Fig. 4, T-V)

Blade: roughly triangular; edges straight or slightly convex; shoulders indistinct, lacking barbs.

Stem: one-third to one-half the length of the entire point; long and contracting; edges straight to slightly convex; base pointed or slightly rounded.

Dimensions: length—average 51 mm., range of variation 39 to 58 mm.; width at shoulders—average 20 mm., range 15 to 28 mm.; thickness—average 11 mm., range 7 to 18 mm.

Workmanship: fairly good, but most examples show little secondary pressure flaking.

Materials: reddish-gray chert with sand inclusions (22), novaculite (1), yellow jasper (1), and homogeneous gray chert (4).

Remarks: The distinctive characteristics of the points of the *panna maria* variety are medium size, indistinct shoulders, and long, narrow overall outline.

Known distribution: Limerick (Duffield, 1961); Martin (Davis and Davis, 1960; Fig. 4, T); Scott (Bell, 1953: Fig. 95, No. 4 from left on line 1); and Ck-44 (Hall, 1954: Pl. 13, Nos. 8, 9) sites.

The *kenedy* variety—4 specimens (Fig. 4, W Y)

Blade: triangular; edges slightly concave; shoulders prominent, but without barbs.

Stem: between one-third and one-half the length of the entire point; sharply contracting; edges straight, or nearly so; one specimen has ground edges; base pointed.

Dimensions: length—average 28 mm., range of variation 21 to 31 mm.; width at shoulders—average 18 mm., range 15 to 23 mm.; thickness—average 6 mm., range 5 to 7 mm.

Workmanship: moderately good, with some evidence of secondary pressure flaking.

Materials: reddish-gray chert with sand inclusions.

Remarks: The diagnostic attributes of the *kenedy* variety are small size; small, triangular stem; pointed base; very prominent shoulders; and diamond-shaped or lozenge-shaped outline. Although this variety stands well apart from the others of the *Gary* type, it is close to the *hobson* variety, which, however, has a much wider stem.

Known distribution: Davis site (Newell and Krieger, 1949: Fig. 57, C).

The *colfax* variety—8 specimens (Fig. 4, Z, AA-CC)

Blade: triangular; edges slightly concave, out-flaring at the shoulders; shoulders prominent, but without barbs.

Stem: one-third to one-half the length of the entire point; slightly contracting, but tending to be square; edges slightly convex, a few specimens have ground edges;

base flattened, with slightly rounded corners.

Dimensions: length—average 28 mm., range of variation 25 to 43 mm.; width at shoulders—average 20 mm., range 14 to 23 mm.; thickness—average 6 mm., range 5 to 8 mm.

Workmanship: fair, with some secondary flaking.

Materials: reddish-gray chert with sand inclusions.

Remarks: The salient characteristics of the *colfax* variety are small size, prominent shoulders, short blade, and contracting but rather square stem with flattened base. This variety stands apart, mainly, because of its almost square stem. It could perhaps be considered as a variety marginal to the *Gary* type and the contracting-stem tradition.

Known distribution: Undetermined.

Miscellaneous *Gary* Points

In addition to the *Gary* points presented in the above varieties, another 10 specimens (Fig. 4, DD–FF) exhibit the salient attributes of the type but fit none of those categories. These ten represent, perhaps, accidental forms or individual idiosyncracies within the *Gary* type.

TYPES INTERMEDIATE BETWEEN THE CONTRACTING STEM AND STRAIGHT STEM TRADITIONS. Between the contracting stem tradition and the straight stem tradition there are several types of projectile points which show an intermediate position. The *Wells* points, for example, have long, almost straight, but very slightly contracting stems, and though they show affinity with the contracting stem tradition, it was not deemed advisable to include them within it as a legitimate member. The *Kent* type also falls within this category.

The Wells Type—28 specimens (Fig. 5, A–C)

Blade: roughly triangular or lanceolate; edges straight or slightly convex; shoulders poorly to well developed, but without barbs.

Stem: approximately one-third the length of the entire point; extremely long, slightly contracting; edges straight or slightly convex, about half the specimens have ground edges; base convex.

Dimensions: length—average 60 mm., range of variation 49 to 84 mm.; width at the shoulders—average 25 mm., range 18 to 31 mm.; thickness—average 10 mm., range 6 to 12 mm.

Workcanship: poor; large, uneven flake scars; almost no evidence of secondary pressure flaking.

Materials: reddish-gray chert with sand inclusions (14), homogeneous gray chert (10), petrified wood (2), white quartzite (1), and jasper (1).

Remarks: The *Wells* points from the Yarbrough site fit very well the description of this type given by Suhm *et al.* (1954: 488, Pl. 123). A certain close resemblance is shown to *panna maria* variety of the *Gary* type, particularly in respect to general outline and overall proportions. The *panna maria* points, however, have a much more sharply contracting and shorter stem. Resemblance is also shown to that variety with regard to crudeness of workmanship.

In addition to this group of 28 points, six small fragments were recovered which may represent this type, but because of their highly fragmentary nature they are not included here. They likewise do not appear in the percentage tabulations for the type.

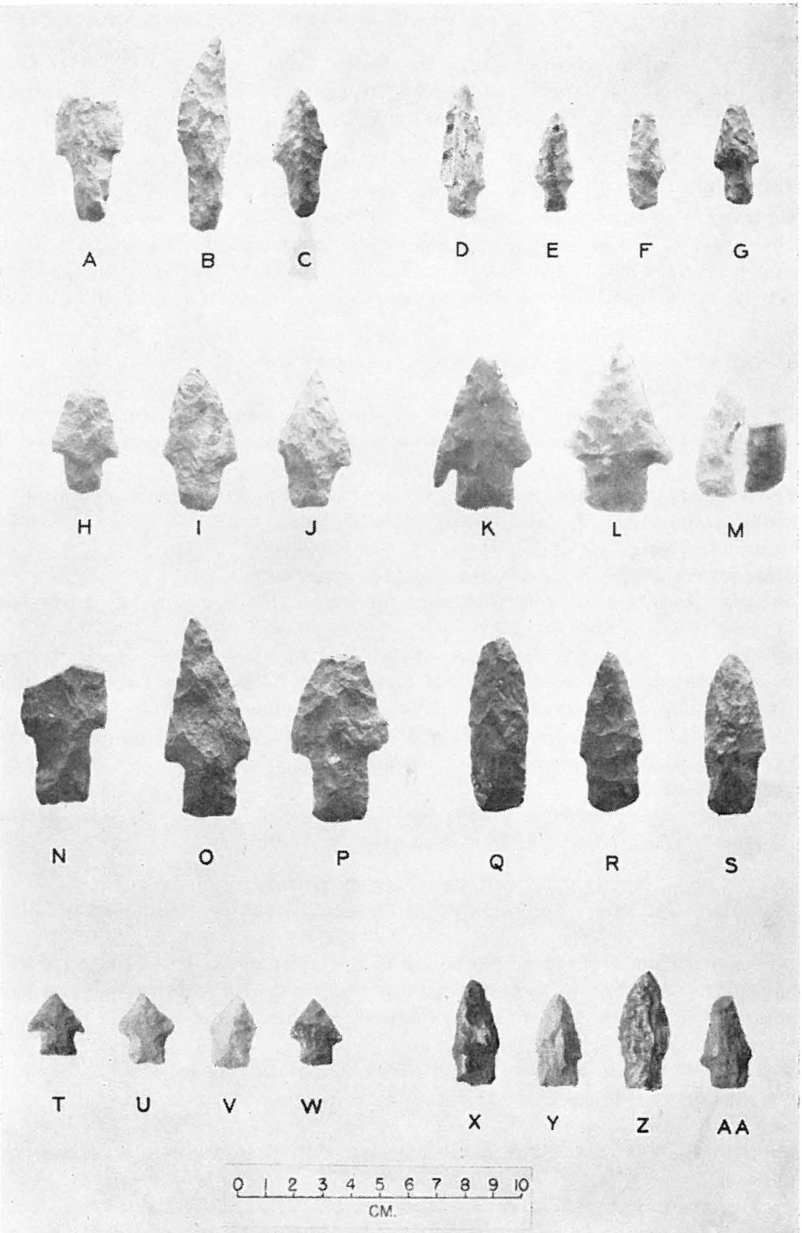


Fig. 5. Dart points: *Wells, Kent, Bulverde, Morrill,* and *Elam* types; miscellaneous straight stem points. A-C, *Wells* type; D-G, *Kent* type, *phalba* variety; H-J, *Kent* type, *quinlan* variety; K-M, *Bulverde* type (M, barb fragments); N-P, *Morrill* type, *slocum* variety; Q-S, *Morrill* type, *san pedro* variety; T-W, *Elam* type; X-AA, miscellaneous points with straight stems.

Known distribution: Martin (Davis and Davis, 1960: Fig. 5, A–E); Boat Dock (Bell, 1958: Pl. 11, F); Hogge Bridge (Stephenson, 1952: Fig. 95, Nos. 1 and 2 from left, line B); and Davis (Newell and Krieger, 1949: Fig. 58, P–W) sites.

The Kent Type. The *Kent* type dart point (Campbell, 1952: 66, Pl. 9, A–P; Suhm *et al.*, 1954: 432, Pl. 95), like *Wells*, shows transitional features between the contracting stem and the straight stem traditions. This type is represented by medium-sized points with triangular blades, prominent shoulders, and a short, almost parallel-sided stem which, however, is slightly contracting. The Kent type is represented at the Yarbrough site by two varieties: *phalba* and *quinlan.*

The *phalba* variety—11 specimens (Fig. 5, D–G)

Blade: roughly triangular; edges straight or slightly convex; shoulders fairly prominent, but without barbs.

Stem: one-third to one-half the length of the entire point; narrow, rather long; sides more or less parallel; edges straight to very slightly convex; base flat or slightly rounded.

Dimensions: length—average 40 mm., range of variation 35 to 44 mm.; width at the shoulders—average 20 mm., range 14 to 25 mm.; thickness—average 7 mm., range 5 to 8 mm.

Workmanship: poor, with little secondary pressure flaking.

Materials: reddish-gray chert with sand inclusions (8), homogeneous gray chert (1), and petrified wood (2).

Remarks: The diagnostic attributes of this variety are medium size; narrow, more or less parallel-sided stem; and flattish base. This variety resembles somewhat the *colfax* variety of *Gary*, but is longer, narrower, and has a less sharply contracting stem. The *phalba* variety can be distinguished from the *quinlan* variety of *Kent* since *quinlan* has a wider stem, a wider blade, and a somewhat greater overall size.

Known distribution: Martin (Davis and Davis, 1960: Fig. 6, A) and Addicks Reservoir (Wheat, 1953: Pl. 36, U–W) sites.

The *quinlan* variety—8 specimens (Fig. 5, H–J)

Blade: triangular; edges straight; shoulders prominent; three specimens have slight barbs.

Stem: approximately one-third the length of the entire point; sides almost parallel, but contracting slightly; edges straight or slightly convex, a few specimens have ground edges; base flattened or somewhat rounded; a few specimens have a ground base.

Dimensions: length—average 43 mm., range of variation 29 to 49 mm.; width at the shoulders—average 23 mm., range 20 to 26 mm.; thickness—average 7 mm., range 6 to 10 mm.

Workmanship: poor, the relatively large flake scars indicate the percussion chipping technique.

Materials: reddish-gray chert with sand inclusions (7) and petrified wood (1).

Remarks: The diagnostic, definitive attributes of the points of the *quinlan* variety are medium size; heavy weight; wide, almost parallel-sided stem; and flattened base. The *quinlan* variety is larger, broader, and heavier than the *phalba*, and also has a wider stem. This variety resembles the *colfax* variety of the *Gary* type, but the *quinlan* stem does not contract as much as that of the *colfax*.

Known distribution: Undetermined.

THE STRAIGHT STEM TRADITION. A relatively small number of projectile points belong to the straight stem tradition, which includes points with parallel-sided stems having relatively flat bases. The *Bulverde*, *Morrill*, and *Elam* types are its members at Area A. Four fragmentary points could not be properly described or typed, but seem to represent the straight stem tradition. Because of the uncertainty of this identification, however, they are not included in the general tabulations by traditions.

The Bulverde Type—10 specimens (Fig. 5, K–M)

Blade: triangular; edges straight or very slightly convex; shoulders prominent, with moderately long barbs.

Stem: approximately one-third to one-half the length of the whole point; long, straight; edges straight and tending to be parallel; base flat or slightly rounded (convex).

Dimensions: length—average 48 mm., range of variation 43 to 58 mm.; width at shoulders—average 32 mm., range 26 to 37 mm.; thickness—average 6 mm., range 6 to 8 mm.

Workmanship: good, with some fine pressure flaking.

Materials: reddish-gray chert with sand inclusions (3), homogeneous gray chert (4), petrified wood (1), and novaculite (2).

Remarks: The definitive characteristics of the *Bulverde* type are moderately large size; relatively long, parallel-sided stem; flattened base, and well developed barbs (Fig. 5, M, shows two large barb fragments). The ten specimens from Area A fit the definition of this type given by Suhm *et al.* (1954: 404, Pl. 81). The *Bulverde* point, although more characteristic of the central Texas area than eastern or northeastern Texas, shows some resemblance to the *Carrollton* type of northern Texas. However, *Carrollton* lacks the distinctive barbs of the *Bulverde* type. *Bulverde* is also similar to the *Travis* type, but once again can be distinguished by its prominent shoulders and barbs.

In addition to the 10 points described here, six basal fragments were recovered which perhaps also belong to this type. Because of their fragmentary nature, however, they are not included in any of the tabulations for the *Bulverde* type.

Known distribution: eastern Texas: Martin (Davis and Davis, 1960: Fig. 6, T, U) and Davis (Newell and Krieger, 1949: Fig. 59, L–Q) sites.

The Morrill Type. The *Morrill* category (Newell and Krieger, 1949: 167, 168, Fig. 58; Suhm *et al.*, 1954: 456, Pl. 107) is represented by two rather consistent and uniform varieties, the *slocum* and the *san pedro*, both of which have relatively long, straight-sided, wide stems. These points are quite large, and are therefore not easily confused with the somewhat similar, though smaller, *Yarbrough* type dart points.

The *slocum* variety—13 specimens (Fig. 5, N–P)

Blade: long, but roughly triangular; edges straight to slightly convex; shoulders prominent, but without barbs.

Stem: approximately one-third the length of the entire point; straight and long; edges straight; a few specimens have ground edges; base tends to be straight with rounded corners.

Dimensions: length—average 65 mm., range of variation 55 to 72 mm.; width at shoulders—average 32 mm., range 25 to 35 mm.; thickness—average 10 mm., range 7 to 12 mm.

Workmanship: fair, but with little secondary pressure flaking.

Materials: reddish-gray chert with sand inclusions (12) and homogeneous gray chert (1).

Remarks: The diagnostic attributes of the *slocum* variety are large size, long blade, long, parallel-sided stem, and flattened base. The *slocum* variety is quite easily distinguished from the *san pedro* variety of the *Morrill* type, in that the former has straighter stem sides, a relatively flatter base, and more prominent shoulders, while the shoulders of the latter variety are slight and somewhat rounded.

Known distribution: Davis (Newell and Krieger, 1949: Fig. 58, I, K) and Hogge Bridge (Stephenson, 1952: Fig. 95, No. 8 from left, line B) sites.

The *san pedro* variety—20 specimens (Fig. 5, Q–S)

Blade: triangular to lanceolate; edges straight to convex; shoulders not prominent, rounded, without barbs.

Stem: about one-fifth to one-third the length of the entire point; nearly straight, but slightly contracting; almost as wide as the shoulders; edges straight or very slightly convex, most of the specimens have ground edges; base slightly rounded, ground on many specimens.

Dimensions: length—average 62 mm., range of variation 48 to 77 mm.; width at shoulders—average 25 mm., range 23 to 30 mm.; thickness—average 9 mm., range 8 to 12 mm.

Workmanship: fair, but with very little secondary pressure flaking.

Materials: reddish-gray chert with sand inclusions (19) and quartzite (1).

Remarks: The distinctive attributes of the *san pedro* variety are great length, slightly contracting, very wide stem, slightly rounded base, and indistinct shoulders. This variety can be distinguished from the *slocum* variety by the presence, on *san pedro*, of a wide stem, slightly rounded base, and indistinct shoulders.

Known distribution: Undetermined.

The Elam Type—6 specimens (Fig. 5, T–W)

Blade: triangular; edges straight; shoulders prominent, two specimens have slight barbs.

Stem: approximately one-third to one-half the length of the entire point; expanding very slightly toward the base; edges straight to somewhat concave; three specimens have ground, smooth edges: base tends to be flat and straight, and three specimens have a ground base.

Dimensions: length—average 28 mm., range of variation 26 to 35 mm.; width at shoulders—average 21 mm., range 19 to 23 mm.; thickness—average 8 mm., range 6 to 10 mm.

Workmanship: fair, but without secondary pressure flaking.

Materials: reddish-gray chert with sand inclusions (4), homogeneous whitish-gray chert (1), and novaculite (1).

Remarks: The diagnostic attributes of the *Elam* points (Crook and Harris, 1952, 1954: 11, Pl. 6, Nos. 6–12; Suhm *et al.*, 1954: 420, Pl. 82) at the Yarbrough site, Area A, are rather small size; short blade; proportionately large, almost straight, but very slightly expanding stem with ground edges; and a straight base.

These points of the *Elam* type resemble those designated as *Ellis*, with the characteristics of the groups overlapping somewhat. However, the stem and blade of *Elam* are more equal in size; the stem does not expand so sharply at the base, and the size of *Elam* is consistently less when groups of points representing the two types are compared.

Known distribution: Milton (Crook and Harris, 1954: Pl. 1, Nos. 12, 13); James (Ray, 1960: Pl. 14, No. 9); Martin (Davis and Davis, 1960: Fig. 5, J–M); Limerick (Duffield, 1961); and Addicks Reservoir (Wheat, 1953: Pl. 39, K, L) sites.

Miscellaneous Points with Straight Stems (Fig. 5, X–AA). In addition to the points described under the types and varieties of the straight stem tradition, another 17 specimens can be assigned to this group; but these exhibit a great deal of variation and can not be placed in types or varieties. No two points of this miscellaneous group are alike. Most are of medium size, have triangular or subtriangular blades, prominent shoulders, a parallel-sided stem, and a flat, concave, or convex base.

TYPES INTERMEDIATE BETWEEN THE STRAIGHT STEM AND EXPANDING STEM TRADITIONS. Under this heading are described the *Marshall* and *Yantis* types.

The Marshall Type—3 specimens (Fig. 6, A–C)

Blade: triangular; edges straight; shoulders prominent, with long, broad barbs.

Stem: approximately one-fourth the length of the entire specimen; very slightly expanding; edges straight; base straight, slightly concave, or slightly convex.

Dimensions: length—specimen 1, 70 mm. (estimated), specimen 2, 45 mm. (estimated), specimen 3, 45 mm. (estimated); width at the shoulders—specimen 1, 47 mm.; specimen 2, 35 mm., specimen 3, 32 mm.; thickness—specimen 1, 7 mm., specimen 2, 7 mm., specimen 3, 5 mm.

Workmanship: good, with secondary pressure flaking on the blade.

Materials: homogeneous gray chert (2) and quartzite (1).

Remarks: The definitive characteristics of the *Marshall* type (originally defined by Suhm *et al.*, 1954: 444, Pl. 101), at Area A, are medium size, large barbs, small, slightly expanding stem, and narrow base.

Known distribution: Undetermined.

The Yantis Type. This type, composed of two varieties—the *cook* and *swan*—is characterized primarily by large size, crude workmanship, and short, indistinct stem.

The *cook* variety—7 specimens (Fig. 6, D–F)

Blade: uncertain because of the fragmentary nature of the specimens, probably triangular; edges straight or nearly so; shoulders prominent, but without barbs.

Stem: approximately one-fourth the length of the entire point (estimate); short, and expanding very slightly; edges gently concave, expanding slightly toward the base, and a few have ground edges; base slightly concave with pointed corners.

Dimensions: length—average (estimated) 60 mm.; width at shoulders—average 31 mm., range of variation 28 to 35 mm.; thickness—average 12 mm., range 11 to 13 mm.

Workmanship: crude, little evidence of pressure flaking.

Materials: reddish-gray chert with sand inclusions (6) and white quartzite (1).

Remarks: The definitive attributes of the *cook* variety are large size, crude workmanship, slightly expanding stem, and slightly concave base. The last two features serve to distinguish this variety from the *swan* variety.

Known distribution: Martin site (Davis and Davis, 1960: Fig. 5, G).

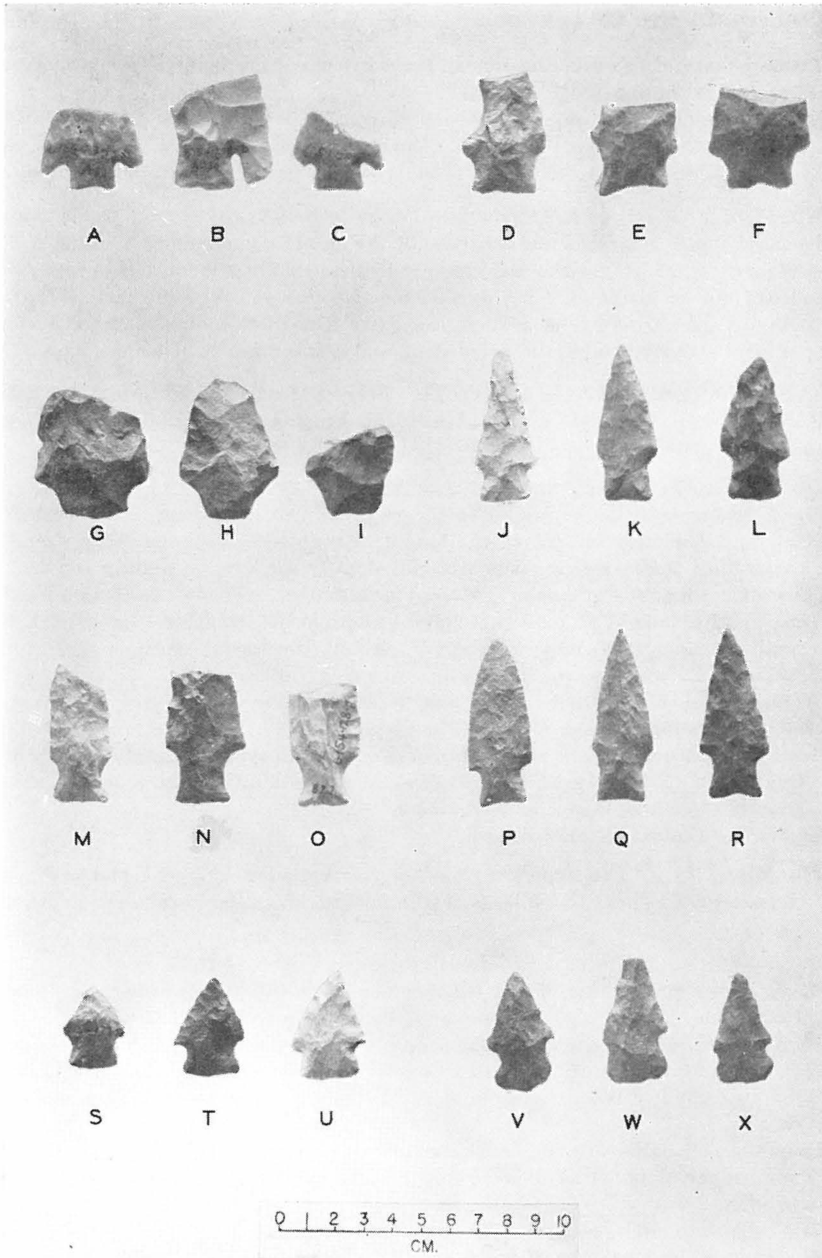


Fig. 6. Dart points: *Marshall, Yantis, Yarbrough, Ellis,* and *Trinity* types. A-C, *Marshall* type; D-F, *Yantis* type, *cook* variety; G-I, *Yantis* type, *swan* variety; J-L, *Yarbrough* type, *lindale* variety; M-O, *Yarbrough* type, *dike* variety; P-R, *Yarbrough* type, *mabank* variety; S-U, *Ellis* type; V-X, *Trinity* type.

The *swan* variety—9 specimens (Fig. 6, G–I)

Blade: crude, more or less lanceolate; edges irregular, tending to be somewhat convex; shoulders poorly developed.

Stem: about one-fourth the length of the entire point; short and almost contracting; edges slightly concave, a few have ground edges; base flattened or very slightly convex.

Dimensions: length—average 58 mm., range of variation 50 (estimated) to 65 mm.; width at shoulders—average 37 mm., range 31 to 43 mm.; thickness—average 12 mm., range 9 to 15 mm.

Workmanship: crude, lacking secondary pressure flaking.

Materials: reddish-gray chert with sand inclusions.

Remarks: The definitive characteristics of the *swan* variety are large size, crude workmanship, and rather short, almost contracting stem with flattened base. The last wo attributes serve to distinguish the *swan* from the *cook* variety.

Known distribution: Martin site (Davis and Davis, 1960: Fig. 5, H).

THE EXPANDING STEM TRADITION. The *Yarbrough, Ellis, Trinity, Edgewood, Ensor, Wesley, Fairland, Palmillas,* and *Lone Oak* types are the representatives of the expanding stem tradition at the Yarbrough site.

In addition to the points of these types, another 33 fragmentary points were found which represent this stemming tradition, but which could not, because of their incomplete nature, be placed in varieties and types.

The Yarbrough Type. This type accounts for most of the representatives of the expanding stem tradition at the Yarbrough site. The *Yarbrough* type (originally defined by Newell and Krieger, 1949: 168, Fig. 57; see also Suhm *et al.*, 1954: 492, Pl. 125), with its three varieties (the *lindale, dike,* and *mabank*) is characterized by relatively long, well made points with a slightly expanding and usually concave-sided stem.

Aside from the points described under the different varieties 19 additional, fragmentary, points perhaps represent the Yarbrough type but because of their incompleteness could not be assigned to the varieties and do not appear in the tabulations for the type.

The *lindale* variety—98 specimens (Fig. 6, J–L)

Blade: triangular or subtriangular; edges convex or almost straight, two specimens show opposed, bifacial beveling; shoulders very prominent but without barbs.

Stem: one-fourth to one-third the length of the entire specimen; expanding slightly toward the base; edges straight or nearly so, most of the specimens having ground lateral edges; base straight or, rarely, slightly concave or slightly convex, most of the specimens having a ground base.

Dimensions: length—average 58 mm., range of variation 34 to 74 mm.; width at shoulders—average 22 mm., range 15 to 32 mm.; thickness—average 8 mm., range 4 to 12 mm.

Workmanship: moderately good with some pressure flaking.

Materials: reddish-gray chert with sand inclusions (86), homogeneous gray chert (9), petrified wood (2), and black flint (1).

Remarks: The definitive attributes of the *lindale* variety are medium size, slightly expanding stem with straight edges, and straight base. The *lindale* is rather close to the *dike* variety, except that the *dike* has a longer stem, the edges of which are noticeably concave instead of straight.

Known distribution: Martin (Davis and Davis, 1960: Fig. 6, G, I, J); Davis (Newell and Krieger, 1949: Fig. 57, W, X); Boat Dock (Bell, 1958: Pl. 11, H, J); Scott (Bell, 1953: Fig. 96, No. 6 from the left, line 6); and Addicks Reservoir (Wheat, 1953: Pl. 37, I, J) sites.

The *dike* variety—15 specimens (Fig. 6, M–O)

Blade: lanceolate or almost triangular; edges slightly convex; shoulders prominent, but without barbs.

Stem: one-third the length of the point; narrow near the shoulders, but expanding considerably at the base; edges markedly concave, most of the specimens having ground edges; base straight and flat.

Dimensions: length—average 51 mm., range of variation 38 to 62 mm.; width at shoulders—average 25 mm., range 23 to 30 mm.; thickness—average 7 mm., range 5 to 9 mm.

Workmanship: good, but with very little pressure flaking.

Materials: reddish-gray chert with sand inclusions (12), homogeneous gray chert (2), and petrified wood (1).

Remarks: The *dike* variety can be distinguished by great length (in relation to the width); narrow, sharply expanding stem with concave edges; and flattened base.

Known distribution: Martin (Davis and Davis, 1960: Fig. 6, C–E) and Limerick (Duffield, 1961) sites.

The *mabank* variety—46 specimens (Fig. 6, P–R)

Blade: lanceolate or roughly triangular; edges convex or almost straight, one specimen with opposite edges beveled; shoulders moderately prominent, but without barbs.

Stem: approximately one-fourth to one-third the length of the entire point; expanding slightly toward the base; edges generally concave, but at times almost straight; base markedly concave.

Dimensions: length—average 48 mm., range of variation 37 to 54 mm.; width at shoulders—average 20 mm., range 17 to 24 mm.; thickness—average 7 mm., range 5 to 10 mm.

Workmanship: rather good, with some secondary pressure flaking.

Material: reddish-gray chert with sand inclusions (43) and homogeneous gray chert (3).

Remarks: The definitive characteristics of the *mabank* variety are medium size, lanceolate blade, narrow, expanding stem, and markedly concave base. The *mabank* variety is quite like the *dike* except that the former has a lanceolate blade and a concave base. Its concave base and concave stem edges likewise serve to distinguish it from the *lindale* variety.

Known distribution: Hogge Bridge (Stephenson, 1952: Fig. 95, No. 3 from the left on line B) and Martin (Davis and Davis, 1960: Fig. 6, K) sites.

The Ellis Type—33 specimens (Fig. 6, S–U)

Blade: roughly triangular; edges straight to slightly convex; shoulders prominent; three specimens have short barbs.

Stem: approximately one-fourth to one-third the length of the entire specimen; sharply expanding and short; edges generally straight or very slightly convex; base straight; a few specimens show grinding on the base.

Dimensions: length—average 33 mm., range of variation 21 to 41 mm.; width—average 22 mm., range 16 to 24 mm.; thickness—average 7 mm., range 6 to 11 mm.

Workmanship: fair, but with little secondary flaking.

Materials: reddish-gray chert with sand inclusions (20), agate (1), petrified wood (5), white quartzite (5), and homogeneous gray chert (2).

Remarks: The diagnostic characteristics of the *Ellis* points (originally defined by Newell and Krieger, 1949: 166–176, Fig. 8; see also Suhm *et al.*, 1954: 422, Pl. 90) are short and broad proportions, expanding stem, and flattened base. The *Ellis* points are somewhat similar to the *Elam* type, but are larger on the average and have a stem which expands much more markedly at the base.

Known distribution: Limerick (Duffield, 1961); Martin (Davis and Davis, 1960: Fig. 7, M–P); Wann (Sharrock, 1960: Pl. 4, E); Boat Dock (Bell, 1958: Pl. 11, T, Y); Ck-44 (Hall, 1954: Pl. 13, Nos. 36–40); Harroun (Jelks and Tunnell, 1959: Fig. 15, E); Scott (Bell, 1953: Fig. 95, Nos. 7 and 8 from the left on line 1); and the Addicks Reservoir (Wheat, 1953: Pl. 37, K) sites.

The Trinity Type—13 specimens (Fig. 6, V–X)

Blade: roughly triangular; edges irregular, straight to slightly concave or slightly convex; shoulders prominent, but without barbs.

Stem: approximately one-third the length of the entire point; expanding and almost bulbous; edges irregular, many specimens having ground edges; base rounded (convex) or almost straight, many specimens with a ground base.

Dimensions: length—average 39 mm., range of variation 30 to 45 mm.; width at the shoulders—average 20 mm., range 16 to 26 mm.; thickness—average 8 mm., range 7 to 9 mm.

Workmanship: of poor quality with rather large flakes removed, presumably by percussion; very little secondary pressure flaking.

Materials: reddish-gray chert with sand inclusions (10) and homogeneous gray chert (3).

Remarks: The most diagnostic attributes of the *Trinity* points (originally defined by Crook and Harris, 1952, 1954: 3, Pl. 1, Nos. 5–9; definition changed considerable by Suhm *et al.*, 1954: 486, Pl. 82; the present report follows the definition of Suhm *et al.*) at the Yarbrough site are medium size and large, expanding, bulbous stems.

Known distribution: Limerick (Duffield, 1961) and Trinity Aspect sites (Crook and Harris, 1954: Pl. 1, Nos. 8, 9).

The Edgewood Type

The Edgewood type (originally defined by Suhm *et al.*, 1954: 418, Pl. 88) is characterized, at the Yarbrough site, by medium to large size; generally prominent shoulders; short, expanding stem; and concave base. It is represented by three varieties, the *hooker*, *bull creek*, and *dixon*.

The *hooker* variety—13 specimens (Fig. 7, A–B)

Blade: triangular or laurel leaf-shaped; edges straight or slightly convex; shoulders prominent, two specimens show short barbs.

Stem: one-fourth to one-third the length of the entire point; sharply expanding and wide at the base; edges concave near the shoulders and straight near the base, a few having ground edges; base concave, often as wide as the shoulders, corners sharply pointed.

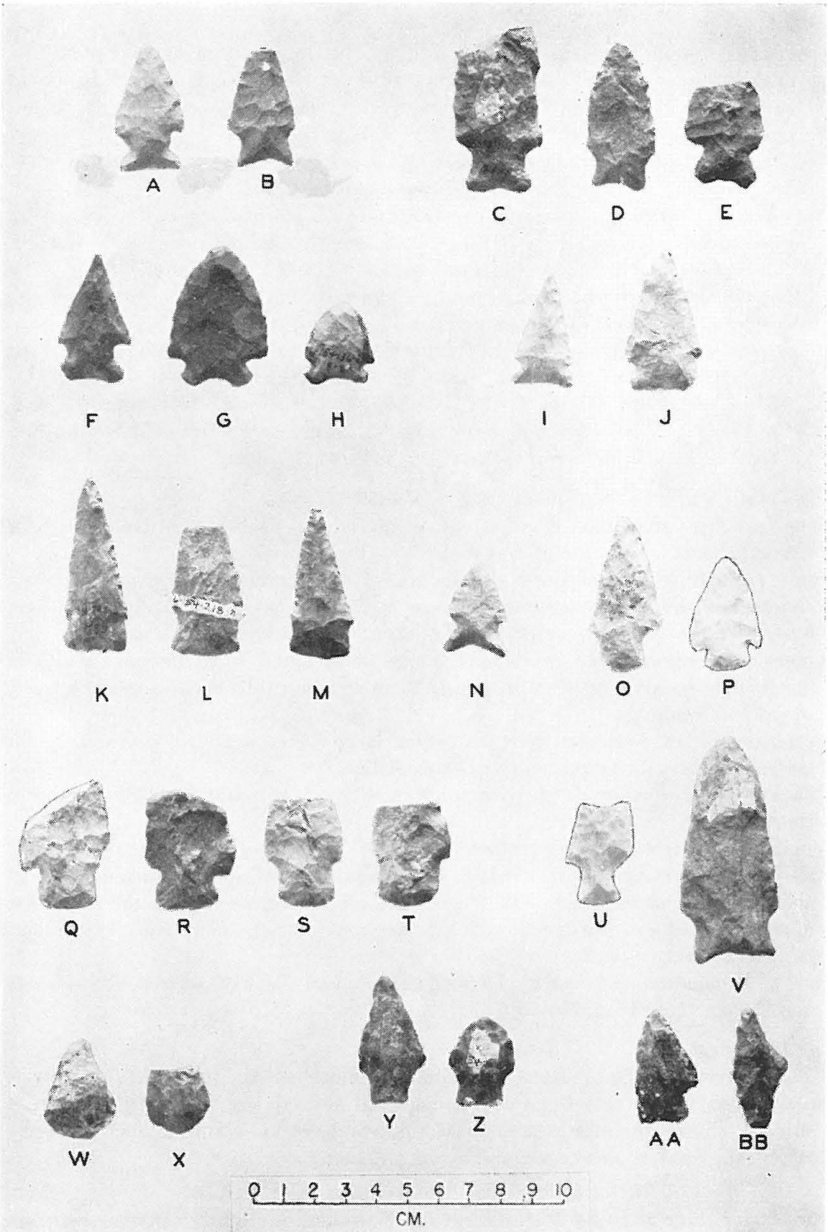


Fig. 7. Dart points: *Edgewood, Ensor, Wesley, Fairland, Palmillas,* and *Lone Oak* types; miscellaneous expanding stem points, stemless dart points, miscellaneous dart points, and points with one shoulder. A-B, *Edgewood* type, *hooker* variety; C-E, *Edgewood* type, *bull creek* variety; F-H, *Edgewood* type, *dixon* variety; I-J, *Ensor* type; K-M, *Wesley* type; N, *Fairland* type; O-P, *Palmillas* type; Q-T, *Lone Oak* type; U-V, miscellaneous expanding stem points; W-X, stemless dart points; Y-Z, miscellaneous dart points; AA-BB, points with one shoulder.

Dimensions: length—average 37 mm., range of variation 32 to 41 mm.; width at the shoulders—average 22 mm., range 18 to 24 mm.; thickness—average 6 mm., range 5 to 8 mm.

Workmanship: moderately good with some amount of secondary pressure flaking.

Materials: reddish-gray chert with sand inclusions (9), petrified wood (1), and homogeneous gray chert (3).

Remarks: The definitive attributes of the *hooker* variety are medium size, relatively long blades, expanding stems, and concave bases. The most important of these attributes is the long blade.

Known distribution: Limerick site (Duffield, 1961).

The *bull creek* variety—30 specimens (Fig. 7, C–E)

Blade: lanceolate, rarely triangular; edges convex or almost straight; shoulders poorly developed and without true barbs.

Stem: approximately one-fourth the length of the entire point; expanding; edges concave; base narrow and deeply concave, many specimens having a ground base.

Dimensions: length—average 47 mm., range of variation 31 to 73 mm.; width at the shoulders—average 25 mm., range 16 to 29 mm.; thickness—average 9 mm., range 7 to 13 mm.

Workmanship: crude, exhibiting percussion flaking.

Material: reddish-gray chert with sand inclusions (21), homogeneous gray chert (4), pink quartzite (3), and petrified wood (2).

Remarks: The definitive characteristics of the *bull creek* variety are rather large size; narrow, lanceolate blade; short, expanding stem; narrow, concave base; and crude workmanship.

Known distribution: undetermined.

The *dixon* variety—7 specimens (Fig. 7, F–H)

Blade: roughly triangular; edges straight or slightly convex; shoulders prominent, but lacking barbs.

Stem: approximately one-fourth to one-third the length of the entire point; sharply expanding, very wide at the base; edges deeply concave (or notched); base wide, concave; corners distinctly blunted or turned up; many of the specimens have a markedly ground and smooth base.

Dimensions: length—average 37 mm., range of variation 24 to 45 mm.; width at the shoulders—average 20 mm., range 21 to 33 mm.; thickness—average 6 mm., range 3 to 7 mm.

Workmanship: moderately good, with some secondary pressure flaking.

Materials: reddish-gray chert with sand inclusions (3), jasper (2), and homogeneous gray chert (2).

Remarks: The definitive attributes of this variety are comparatively wide blade; short, wide stem; and concave base with blunt corners. The stem form serves to segregate this variety from others of the *Edgewood* type.

Known distribution: Undetermined.

The Ensor Type—2 specimens (Fig. 7, I–J)

Blade: triangular; edges straight; shoulders fairly prominent, barbs absent.

Stem: approximately one-fifth the length of the entire point; short and expanding; edges concave; base straight or slightly concave; one specimen has a ground base.

Dimensions: length—specimen 1, 35 mm., specimen 2, 46 mm.; width at the shoulders—specimen 1, 19 mm., specimen 2, 26 mm.; thickness—specimen 1, 6 mm., specimen 2, 7 mm.

Workmanship: good, with some evidence of pressure flaking.

Materials: reddish-gray chert with sand inclusions.

Remarks: The original definition for the *Ensor* type (Suhm *et al.*, 1954: 422, Pl. 90; see also Miller and Jelks, 1952: 172, Pl. 22, panel 2) is followed in the classification presented here. Another approach, as opposed to calling *Ensor* an expanding stem form, would be to consider it as a stemless point with side notches on the blade.

Known distribution: Undetermined.

The Wesley Type—5 specimens (Fig. 7, K–M)

Blade: long and triangular; edges straight; shoulders not prominent.

Stem: approximately one-fifth to one-fourth the length of the entire specimen; expanding and wide; edges very slightly concave; base almost as wide as the shoulders and straight.

Dimensions: length—average 50 mm., range of variation 44 to 56 mm.; width at the shoulders—average 23 mm., range 21 to 25 mm.; thickness—average 8 mm., range 7 to 9 mm.

Workmanship: good, with careful pressure flaking on four specimens.

Materials: reddish-gray chert with sand inclusions (4) and pink quartzite (1).

Remarks: The definitive attributes of the *Wesley* type are medium size; long, triangular blade; short, wide, expanding stem; and straight base. The type resembles *Trinity*, but lacks the bulbous stem of that type.

Known distribution: Martin (Davis and Davis, 1960: Fig. 7, K, L) and Sam (Proctor, 1957: Pl. 14, No. 15) sites.

The Palmillas Type—11 specimens (Fig. 7, O–P)

Blade: triangular to laurel leaf-shaped; edges straight or convex; shoulders prominent, but lacking strong barbs.

Stem: approximately one-third the length of the entire specimen; expanding and bulbous; edges concave near the shoulder, convex near the base; base rounded (convex) with non-angular corners.

Dimensions: length—average 43 mm., range of variation 34 to 51 mm.; width at shoulders—average 23 mm., range 21 to 30 mm.; thickness—average 6 mm., range 4 to 9 mm.

Workmanship: rather poor with little secondary pressure flaking.

Materials: reddish-gray chert with sand inclusions (8), novaculite (1), quartzite (1), and petrified wood (1).

Remarks: The diagnostic attributes of the *Palmillas* type (named by MacNeish, 1958: 67, Fig. 24, Nos. 24–27; see also Suhm *et al.*, 1954: 462, Pl. 110) at Area A, are medium size, small bulbous stem, and convex base.

Known distribution: Undetermined.

The Lone Oak Type—5 specimens (Fig. 7, Q–T)

Blade: probably triangular, but uncertain because of the fragmentary nature of the specimens; edges straight or very nearly so; shoulders prominent, with short barbs on three specimens.

Stem: approximately one-third the length of the entire point; expanding, bulbous; edges concave near the shoulders, convex near the base; base rounded (convex).

Dimensions: length—average 60 mm. (estimate): width at shoulders—average 28 mm., range 26 to 31 mm.; thickness average 9 mm., range 7 to 10 mm.
Workmanship: crude, with almost no secondary pressure flaking.
Materials: reddish-gray chert with sand inclusions.
Remarks: The diagnostic attributes of the *Lone Oak* type are medium size, large, bulbous stem, and convex base. The points of this type resemble rather closely those of the *Palmillas* type, but are larger, cruder, and have proportionally shorter stems.
Known distribution: Undetermined.

Miscellaneous Expanding Stem Points (Fig. 7, U–V). In addition to the points described under the types and varieties of the expanding stem tradition, 12 additional expanding stem specimens were recovered which do not coincide with any of the afore-described categories. The variation shown in these 12 points seems to be almost random and, perhaps, accidental. All examples are of medium to large size, have triangular or lanceolate blades, a few have barbs, and show either straight or concave bases.

MISCELLANEOUS STEMMED AND STEMLESS POINTS.

Stemless Dart Points (Fig. 7, W–X). Although rare at the Yarbrough site, a few stemless dart points were recovered. These 26 specimens are, almost without exception, very crude and of an irregular form and general outline. Indeed, some doubt exists that they actually served as projectile points. Although great variation is found in the outline, most specimens tend to be either lozenge- or laurel-leaf-shaped, with rounded bases. A few approach the subtriangular in shape.

These specimens, varying in length from 24 to 43 mm., were manufactured from reddish-gray chert with sand inclusions (15 specimens), petrified wood (8), homogeneous gray chert (1), and pink quartzite (2).

Because of their almost random variation in form, these stemless points could not be grouped and described under variety or type categories.

Similar stemless points have been found at the Martin (Davis and Davis, 1960: Fig. 5, F); Boat Dock (Bell, 1958: Pl. 11, O); and Sam (Proctor, 1957: Pl. 15, No. 15) sites.

Miscellaneous Dart Points. Twenty-five crude, stemmed dart points were of an irregular shape and could not be placed in types or varieties (Fig. 7, Y–Z). Most of these specimens (17), are of petrified wood, while the others, except for one large point of whitish-gray chert, are of exceptionally poor quality reddish-gray chert. The poor quality of the materials used in manufacture goes a long way in explaining the crudeness and heterogeneity of these specimens. Thirteen examples have crude expanding stems, eight have straight stems, and four have slightly contracting stems. Yet their stems are very crude and irregular, and it seems that the shapes of the stems are almost random. For this reason these points have not been included in the tabulations for the various stemming traditions. Many of them, particularly those made of petrified wood, are identical to specimens recently recovered at McGee Bend Reservoir in southeastern Texas (Jelks, personal communication).

Another interesting group of five miscellaneous dart points stands out because only one shoulder occurs on the blade of each specimen (Fig. 7, AA–BB). On one edge the blade joins directly to the stem, while the other blade edge terminates just above the stem in the usual, prominent shoulder. Whether these artifacts represent accidents, points reworked or resharpened only upon one edge, or a consistent style, can not now be determined. Among these there is a great deal of variation in stem forms, with two contracting, one bulbous, one straight, and one expanding stem represented. The expanding stem specimen is of petrified wood, but the others are of local reddish-gray chert with sand inclusions. Their length varies from 38 to 55 mm., the width at the shoulders from 18 to 26 mm., and the maximum thickness from 7 to 10 mm.

Unclassifiable Dart Point Fragments. One hundred fifty-five fragments of dart point blades were found at the Yarbrough site, and these could not be classified into varieties or types. It can only be said that no blade forms are present which do not occur among the typed specimens.

Ninety-four fragments were recovered which are medial segments of broken dart points. No type assignments can be made since these specimens lack their bases.

POINTS OF POSSIBLE PALEO-INDIAN ORIGIN. A total of 19 projectile points and projectile point fragments exhibit certain features which suggest their affinity with Paleo-Indian artifact traditions or industries. In some cases the affinities and resemblances are so patent that they allow for little doubt, while for other points only general, non-specific resemblances can be noted to particular Paleo-Indian point types.

The Clovis Type (Fig. 8, A–B). Two basal fragments of Clovis points were recovered at the site. Although these specimens are incomplete, a general lanceolate outline can be inferred. Both are bifacially fluted and show ground lateral edges and bases. The corners of the base turn out slightly—more so in one (A) than the other (B). In outline, specimen A resembles very closely *Clovis* points from the Miami locality of Texas (Sellards, 1952: 26, Fig. 9), while the base of specimen B seems to flare out somewhat more than is common in points of this type. Specimen A is of a brown, banded chert and specimen B of a homogeneous mottled gray chert; both materials are presumably foreign to the immediate area of the Yarbrough site.

Dimensions: Specimen A—width at base 32 mm., thickness 5 mm.; specimen B—width at base 23 mm., thickness 6 mm.

The Plainview Type (Fig. 8, C). One small basal fragment seems to have come from a non-fluted, but Paleo-Indian point probably of the *Plainview* type. The sides of this specimen are ground smooth, and its base is deeply concave and likewise smoothed. The edges of the base flare out slightly. The base is 22 mm. in width, and the maximum thickness is 4 mm. This point is made of pinkish-gray mottled chert, presumably of non-local origin.

The San Patrice Type (Fig. 8, D–E). Two projectile points can be assigned to the San Patrice type, originally defined by Webb (1946: 13–17, Pl. 1; 1948: 230–231). Although Suhm *et al.* (1954: 477) place the type in their Archaic Stage, there is much evidence (general resemblance in outline to the *Meserve* type, smoothed stems edges, etc.) to suggest a Paleo-Indian affiliation for these points.

The two specimens from the Yarbrough site, Area A, have a very short blade, rather prominent shoulders, concave and ground stem edges, and a deeply concave, thinned and ground base. Specimen E, of white quartzite, measures 34 mm. in

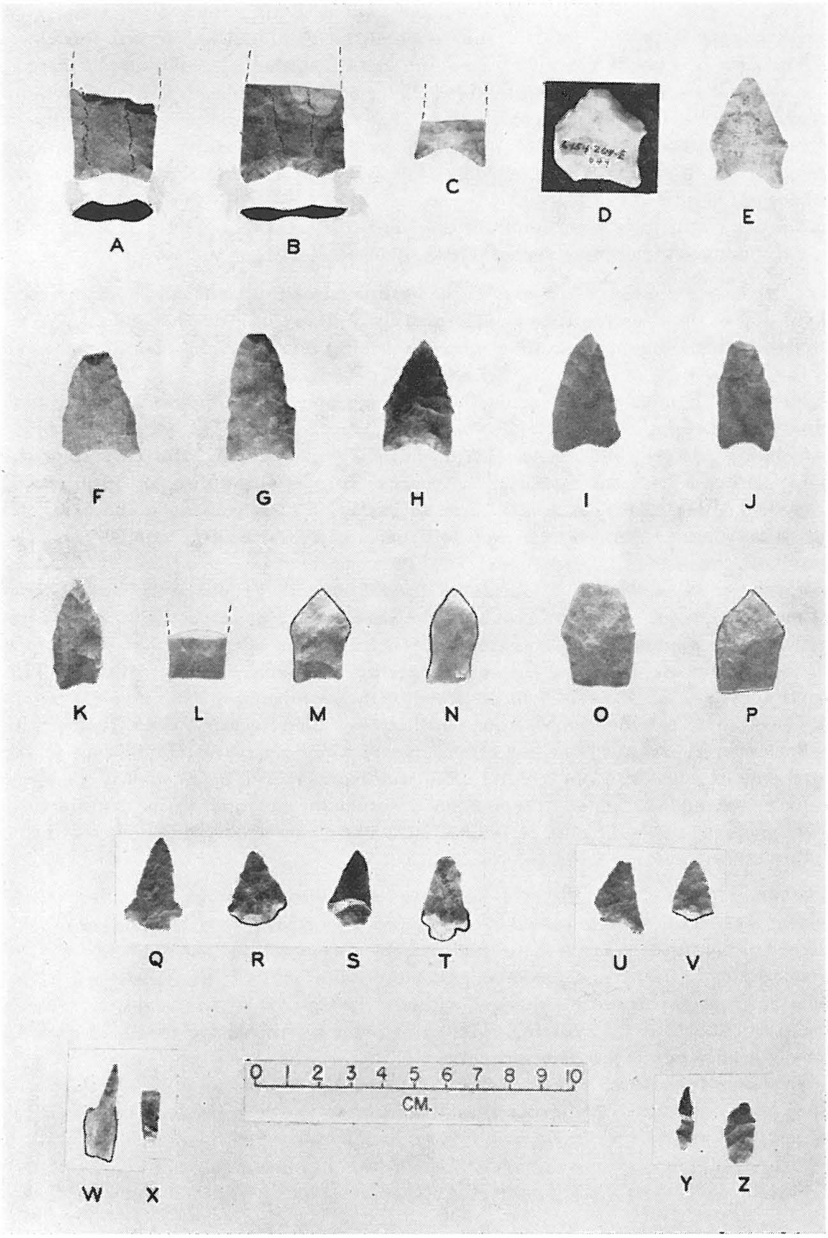


Fig. 8. Dart points: *Clovis*, *Plainview*, *San Patrice*, *Meserve*, and *Sandy Creek* types; miscellaneous Paleo-like points; arrow points; drills. A-B, *Clovis* type; C, *Plainview* type; D-E, *San Patrice* type; F-H, *Meserve* type; I-K, *Sandy Creek* type; L-P, miscellaneous Paleo-like points; Q-V, arrow points; W-Z, drills.

length, 24 mm. in width at the shoulders, and is 6 mm. thick. Specimen D, of milky quartz, is 30 mm. long, 27 mm. wide at the shoulders, and 6 mm. thick.

The stem of a possible *San Patrice* point (not illustrated), in contrast to D and E, is somewhat more narrow than the blade. This point resembles the *Meserve* type in general outline, but lacks a beveled blade. The stem edges and base have been very slightly smoothed by grinding. Its length is 35 mm., the width at the shoulders 22 mm., and the thickness 5 mm. Moss agate was used in manufacture, and the general workmanship is quite good.

Similar points have been found at the Martin site (Davis and Davis, 1960: Fig. 4, F–G) and in Addicks Reservoir (Wheat, 1953: Pl. 38, M).

The Meserve Type (Fig. 8, F–H). Three medium-sized projectile points fit the broad definition of the *Meserve* type as presented by Suhm *et al.* (1954: 450, Pl. 104), although perhaps they do not agree in every detail with the original points recovered at the Meserve site in Nebraska (Schultz, 1932; Davis, 1953).

Specimen F most closely resembles the Meserve site examples. It has a stem with ground edges, which is somewhat wider than the blade. The edges of the blade are slightly convex, and are beveled on the right side of both faces (orienting the point with the base downward). The concave base is also noticeably ground and smoothed. This point measures 39 mm. in length, is 21 mm. wide at the base, and has a maximum thickness of 5 mm. It is made of a pinkish-gray, mottled chert of non-local origin.

Specimen G is similar to specimen F, but exhibits cruder workmanship and general execution, probably because of the poor quality of the petrified wood from which it was manufactured. Its blade is less noticeably beveled than that of specimen F, but its concave base and the stem edges are well smoothed by grinding. This point measures 33 mm. in length, 23 mm. in width at the base, and 6 mm. in thickness. The petrified wood from which it was manufactured is of local origin.

Specimen H is much like the others, but is wider at the shoulders than at the base and its edges are not ground. The workmanship exhibited on this specimen is excellent, and an apparently non-local moss-agate was used in its manufacture. This point measures 34 mm. in length, is 22 mm. wide at the shoulders, and has a maximum thickness of 4 mm.

The Sandy Creek Type (Fig. 8, I–K). Three small stemless points are of very crude appearance, and though somewhat irregular in outline, tend to be laurel leaf-shaped. They have concave bases and present an overall outline quite like that of many Paleo-Indian points, particularly those found east of the Mississippi River. The bases of two specimens, along with the lower part of the edges, have been carefully smoothed by grinding. The third point resembles the others in general form but lacks any evidence of grinding.

Specimen I measures 34 mm. in length, 18 mm. in width, and 7 mm. in thickness. Specimen J measures 36 mm. in length, 20 mm. in width at the base (which is the widest part of the specimen) and 7 mm. in thickness. Specimen K is 31 mm. in length, 15 mm. in width at mid-section, and 7 mm. in thickness.

Similar specimens were found at Addicks Reservoir (Wheat, 1953: Pl. 39, F).

Miscellaneous Paleo-like Points (Fig. 8, L–P). In addition to the aforementioned types, seven projectile points, which fit no defined types, show some relation in form to points from the eastern United States having supposed Paleo-Indian affiliation.

These seven specimens exhibit a great deal of variation among themselves, though all but three have stems with ground edges and a ground base. Their blades are short and have very inconspicuous shoulders. One example has a triangular outline, while the others tend to be more lanceolate in form. These points, although described together here, do not constitute a homogeneous assemblage. The length ranges from 29 to 37 mm., the width at the shoulders from 15 to 24 mm., and the thickness from 5 to 8 mm. Two were manufactured from petrified wood, three from quartzite, one from rose quartz, and one from jasper.

A small segment of the ground base of another possible Paleo-Indian dart point was also found. This has slightly contracting sides and a straight, thinned base. The width at the base measures 8 mm., and the maximum thickness is 4 mm. It is of a non-local, mottled, siliceous stone.

Arrow Points

In contrast to the large number of dart points, only one complete arrowhead and eight fragments were obtained from the excavations. The complete specimen (Fig. 8, T), which is made of petrified wood, has a roughly triangular but somewhat irregular blade, prominent shoulders, and a small bulbous stem. It is 29 mm. in length, 16 mm. in width at the shoulders, and 3 mm. thick.

Three other specimens (Fig. 8, Q–S), only slightly damaged, all have a triangular blade and a short protrusion which serves as a rudimentary stem. The other five specimens (Fig. 8, U–V) have lost their stems through breakage but show triangular blades. The shoulders of two of these are square and have outflaring barbs. The length of the fragmentary points ranges from 21 to 32 mm. (estimate), the width at the shoulders from 14 to 23 mm., and the thickness from 2 to 5 mm.

One of the fragmentary points is of a homogeneous gray chert, the others of reddish-gray chert with abundant sand inclusions.

2. Bifacial Artifacts

A total number of 351 bifacial artifacts and fragments (excluding, here, the projectile points) was recovered from the excavation of the knoll, Area A. These generally crude and somewhat irregular artifacts exhibit, except for a few exceptions mentioned below, at least one cutting edge prepared by the percussion flaking technique. Some have definite points for piercing, while others have two cutting edges. The distinctive feature of all is that they were worked from both faces, as opposed to the scrapers which were flaked only from one face. Because of their rather irregular shapes and the lack of comparative data of a distributional nature, it is deemed best not to attempt to classify these artifacts into varieties and types for the present time. Rather, as many as possible will be described in small, homogeneous groups which future research may show, it is hoped, to correspond to true varieties or types. Here each group will be designated with Roman numerals.

Many of the bifacial artifacts were obviously intended to be used as knives (they have clearly-distinguishable cutting adges), while others, though also worked from both faces, do not show such easily recognizable edges. The members of the first category will be called "knives," those of the second, "miscellaneous bifacial artifacts."

Knives

Group I (Fig. 9, A-C) consists of 28 knives which are lanceolate in general outline (the edges are convex), and have approximately straight bases which tend to contract. The workmanship shown on these specimens is quite crude. Their length varies from 48 to 96 mm., the width from 21 to 45 mm., and the thickness from 9 to 20 mm. Two of the specimens were manufactured from ferruginous sandstone, 19 from reddish-gray chert with sand inclusions, six from petrified wood, and one from homogeneous, gray chert.

Group II (Fig. 9, D-F) is made up of 20 rather small knives which are triangular or subtriangular in general outline. Their edges are straight or slightly convex, and the bases are very slightly rounded. The workmanship is somewhat better than that exhibited by the Group I specimens, but no pressure flaking was used. The length varies from 37 to 50 mm., the width (at the base) from 27 to 36 mm., and the thickness from 6 to 13 mm. Four of these knives were manufactured from quartzite, 11 from reddish-gray chert with sand inclusions, three from petrified wood, and two from homogeneous gray chert.

Group III (Fig. 9, G-I) consists of 32 medium-sized knives which are ovate-acuminate in general outline. The edges are convex and the base is rounded. The workmanship shown on these specimens is crude, and the outline of many is irregular. The length varies from 40 to 66 mm., the width from 20 to 42 mm., and the thickness from 8 to 18 mm. Two were manufactured from quartzite, two from petrified wood, one from a homogeneous light gray chert, and 27 from reddish-gray chert.

Group IV (Fig. 9, J-L) is made up of long, narrow knives with a lanceolate outline. Their sides are slightly convex and their bases flattened or somewhat rounded. The length varies from 53 to 125 mm., the maximum width from 25 to 35 mm., and the thickness from 9 to 16 mm. These artifacts are somewhat better made than the previously described groups, although only the percussion flaking technique was employed in their manufacture. One was made from ferruginous sandstone, seven from reddish-gray chert with sand inclusions, one from homogeneous gray chert, three from quartzite, and two from petrified wood.

Group V (Fig. 9, M-P) is composed of 12 bi-pointed knives of medium size. Their edges are convex and contract at both extremities.

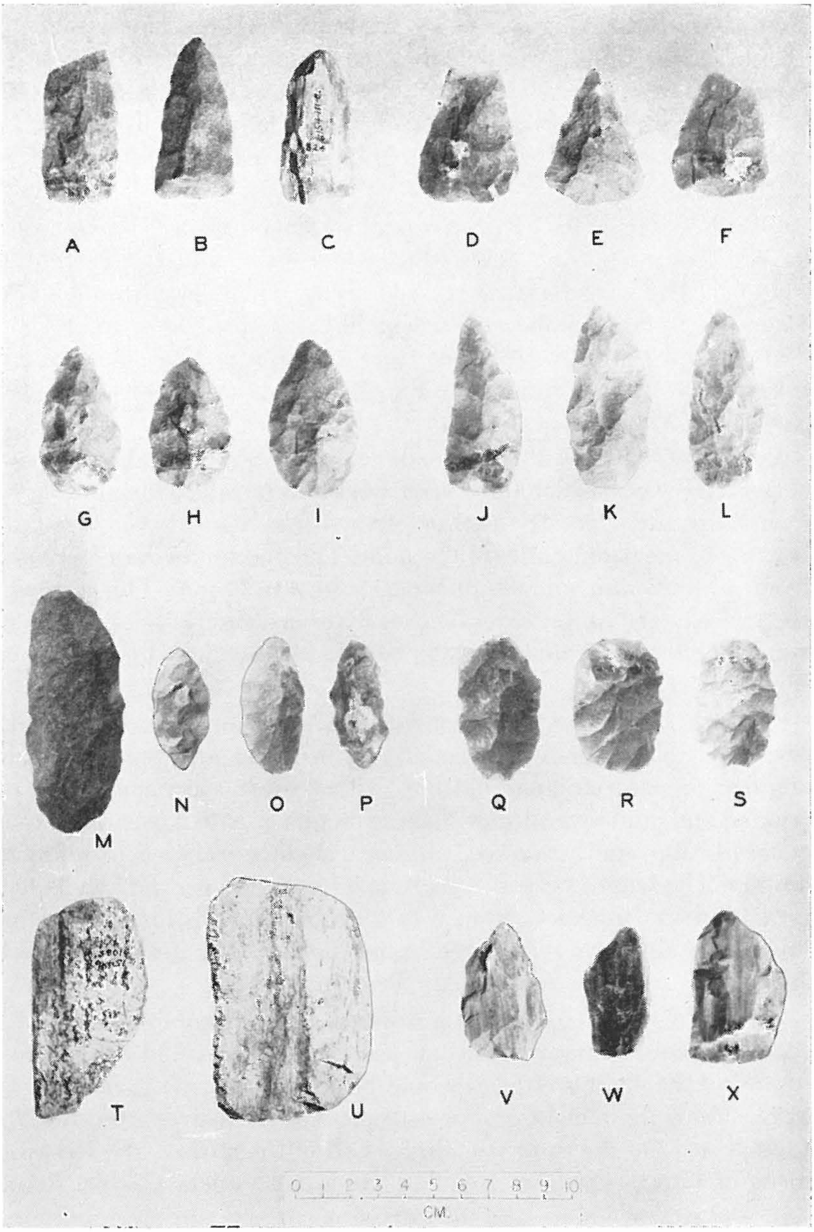


Fig. 9. Knives: Groups I-VIII. A-C, Group I; D-F, Group II; G-I, Group III; J-L, Group IV; M-P, Group V; Q-S, Group VI; T-U, Group VII; V-X, Group VIII.

Here again the flaking is of the percussion type and quite crude. The length ranges from 45 to 87 mm., the width (measured midway on the edges) from 22 to 29 mm., and the thickness from 8 to 20 mm. One is made of petrified wood, two from quartzite, one from ferruginous sandstone, and eight from reddish-gray chert with abundant sand inclusions.

Group VI (Fig. 9, Q-S) consists of 10 medium-sized knives which have an ovate outline. The edges are convex and the extremities rounded. The workmanship is quite crude. Their length ranges from 45 to 63 mm., the width (measured midway on the edges) ranges from 29 to 40 mm., and the thickness from 7 to 16 mm. One specimen was made from a black flint, while the remaining nine are of a reddish-gray chert with sand inclusions.

Group VII (Fig. 9, T-U) is made up of 13 large, thin sheets or slabs of petrified wood which have been worked bifacially along one side to form a cutting edge. The outline of these specimens is very irregular because of the poor quality of the stone. The maximum diameter varies from 50 to 95 mm. and the thickness from 4 to 14 mm. This group has been recognized in the lower Neches River area in McGee Bend Reservoir by Edward B. Jelks (MS), who has designated them "Harvey Blades."

Group VIII (Fig. 9, V-X) consists of 27 medium-sized knives, all of petrified wood, which are crudely formed into an approximate triangular or subtriangular outline. All of these specimens have one pointed end, and several show flaking on one or both edges. The base is generally flat and unworked, although slightly rounded in a few examples. The length ranges from 40 to 60 mm., the width from 24 to 50 mm., and the thickness from 6 to 22 mm. This distinctive group of knives has also been recognized in the McGee Bend Reservoir area by Jelks (MS), who has called them "Bronson Blades."

Group IX (Fig. 10, A-C) is a residual category composed of 154 irregular, fragmentary, or unusual specimens which could not be placed in any of the eight groups. It would be a great mistake to consider the examples of those eight groups as typical of the knives from the Yarbrough site. On the contrary, almost half of the knives (the 154 specimens of Group IX) are irregular, crude, and unclassifiable. Round, flat, and concave bases and all sorts of edges and tips are represented in this group, but practically no two examples are alike. In fact, many appear to represent stones which were slightly worked only on one small portion of the specimen.

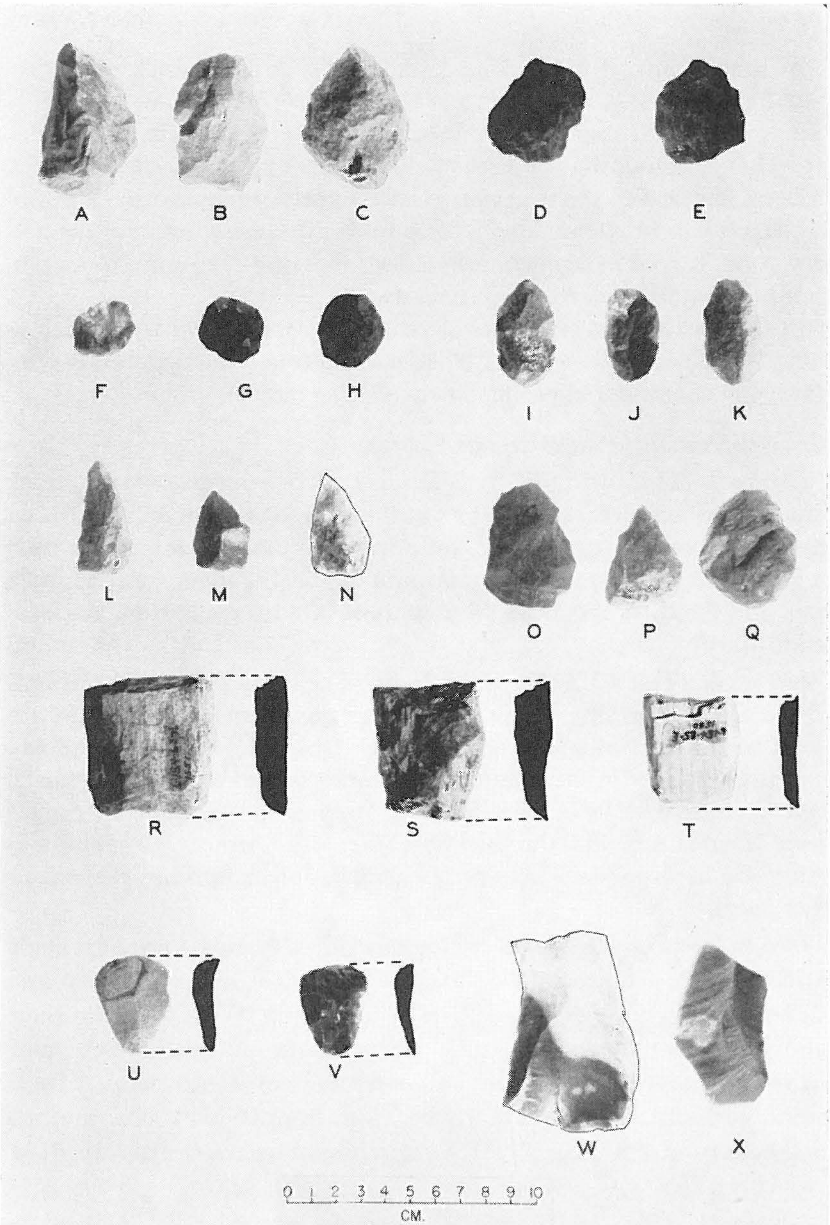


Fig. 10. Knives (Group IX), miscellaneous bifacial artifacts (Groups I-V), Mineola end scrapers, triangular end scrapers, and side scrapers. A-C, knives, Group IX; D-E, miscellaneous bifacial artifacts, Group I; F-H, miscellaneous bifacial artifacts, Group II; I-K, miscellaneous bifacial artifacts, Group III; L-N, miscellaneous bifacial artifacts, Group IV; O-Q, miscellaneous bifacial artifacts, Group V; R-T, Mineola end scrapers; U-V, triangular end scrapers; W-X, side scrapers.

In sharp contrast to the others, one interesting specimen of this residual category is a long, thin, well-made knife which has the outline (lanceolate blade and concave base) of an *Angostura* point (Fig. 13, G). This specimen has been made very thin by the removal of wide, shallow flakes, and the edges have been evenly retouched by pressure flaking. It was found at a depth of 18 in. in Analysis Unit 1, in the pottery zone. It is of a compact, gray chert, measures 125 mm. in length, 28 mm. in width, and 6 mm. in thickness.

In Group IX are 110 knives of reddish-gray chert with sand inclusions, 22 of petrified wood, 11 of quartzite, nine of homogeneous gray chert, one of ferruginous sandstone, and one of agate.

Miscellaneous Bifacial Artifacts

Group I (Fig. 10, D-E) is composed of five medium-sized, thick bifacial artifacts with a circular outline. The workmanship shown on these specimens is very crude, and only percussion flaking was used in their manufacture. Their maximum diameter ranges from 35 to 51 mm. and the thickness from 14 to 25 mm. All are made from the local reddish-gray chert.

Group II (Fig. 10, F-H) is made up of five thick, bifacial artifacts with a circular outline which, apart from their much smaller size, are equal to the specimens described under Group I. The workmanship here is likewise very crude and only the percussion technique seems to have been used in their manufacture. The maximum diameter ranges from 27 to 33 mm. and the thickness from 9 to 14 mm. One example is made of a homogeneous light gray chert; the other four are of reddish-gray chert.

Group III (Fig. 10, I-K) is composed of 15 very small, crudely-made artifacts with a lanceolate outline. A great deal of irregularity and variation is shown by the members of this group. Were it not for their relatively great thickness, crude workmanship, and rather irregular outline, these artifacts might be considered projectile points. Their length varies from 26 to 35 mm., the width from 16 to 24 mm., and the thickness from 7 to 11 mm. All 15 specimens are made from reddish-gray chert.

Group IV (Fig. 10 L-N) with its eight members, is identical to Group III except that the general outline of the artifacts is subtriangular rather than lanceolate. The base is slightly rounded and the edges somewhat convex. The maximum length ranges from 30 to 39 mm., the width from 19 to 26 mm., and the thickness from 8 to 12 mm. All of these specimens are made of the local reddish-gray chert with abundant sand inclusions.

Group V (Fig. 10, O-Q) is composed of ten pointed artifacts which, in all but their small size, resemble fist-axes. These were made from small river or gravel pebbles and cobbles which were worked bifacially near the point, but the lower half, still exhibiting the original cortex patina, was left unmodified. Their general outline is ovate-acuminate in shape. The typical base is rounded and the edges, although somewhat irregular, tend to be straight. The length ranges from 31 to 60 mm., the maximum width from 24 to 33 mm., and the thickness from 9 to 25 mm. Three examples were made from petrified wood and the other seven from reddish-gray chert.

3. Scrapers

Mineola End Scrapers (Fig. 10, R-T). Thirty-seven medium- to large-sized end scrapers form an easily recognizable and discrete group, here designated "Mineola end scrapers." All of these specimens were manufactured from slabs of petrified wood, generally have a square or rectangular outline, and are flat on both faces. Chipping of the percussion type was done on the bit end, frequently on the two sides, and rarely on the base, but only from one face. The bit itself is very steeply beveled and is concave on six specimens, forming a "gouge" bit, is straight on 24 specimens, and is slightly convex on seven examples. When more comparative data are available it may be possible to group the various bit shapes into distinctive varieties, but not enough is known at the present about the extra-site occurrence of these artifacts to justify such division. Their length ranges from 40 to 70 mm., the maximum width from 24 to 52 mm., and the thickness from 6 to 13 mm.

It is quite probable that the rectangular form of these scrapers is a function of the fracturing qualities of petrified wood. Since the flakes removed by percussion tend to fracture in parallel planes, it would be very difficult, with this material, to produce the usual triangular shape found frequently on end scrapers. Parallel sides can be produced much more easily and effectively when working with petrified wood.

Triangular End Scrapers (Fig. 10, U-V). A total number of 17 end scrapers with an approximate triangular or subtriangular outline was recovered from the excavation in Area A. These specimens have a somewhat wide, convex bit and straight, slightly concave or slightly convex edges. The base tends to be pointed on ten specimens and flat or blunt on the remaining seven. These latter seven examples may represent specimens with broken bases. Although the artifacts were roughly shaped by percussion flaking, careful secondary pressure knapping was used to sharpen the bit, sides, and occasionally the pointed base. In cross section a majority are plano-convex, with almost all the chipping occurring on the convex side. Three scrapers, however, are concavo-convex in cross section. In all cases the end scrapers are thickest at the bit end and considerably thinner toward the base. The angle of the bit is quite steep.

It appears that practically all these scrapers were manufactured from large flakes struck from prepared platform cores. The bit was fashioned on the end exhibiting the hinge fracture, while the base invariably shows a positive bulb of percussion on the flat or concave face of the artifact.

Six of these scrapers were manufactured from a homogeneous whitish-gray chert, six from a homogeneous dark gray chert, one from black flint, three from reddish-gray chert, and one from agate (a variety called "Quitaque flint" from Briscoe County in the Texas Panhandle).

Side Scrapers (Fig. 10, W-X). Thirty-five side scrapers, showing a great deal of variation, were recovered. All of these show fine secondary pressure flaking. Fifteen have an approximately rectangular or subrectangular outline, are worked from one face on only one of the long edges, and are relatively flat on both faces. Another five show the same general outline and are identical to the aforementioned scrapers, but are worked on two adjacent edges.

Fifteen side scrapers have an approximate triangular outline, with two long edges and one shorter edge. The two long edges, which come together to form a prominent point, are both worked from only one face, while the base is usually unmodified. The members of this last group are usually plano-convex in cross section but not very thick. Secondary pressure flaking was used to form the scraping edge of all examples.

Since all these artifacts show a uniform size range, their dimensions will be given together. Their length varies from 22 to 61 mm., the width from 21 to 55 mm., and the thickness from 3 to 11 mm.

Two were manufactured from ferruginous sandstone, six from petrified wood, seven from homogeneous whitish-gray chert, 13 from homogeneous dark gray chert, four from reddish-gray chert with sand inclusions, one from quartzite, one from agatized dolomite ("Alibates flint"), one from black flint, one from brown striated chert, and one from an unidentified blue-white stone.

Miscellaneous Scrapers. Six medium-sized, irregular scrapers could not be placed in any of the above categories. Three are plano-convex (Fig. 11, A, C, F), worked by pressure flaking from the convex face, and are roughly circular in outline. The edge is worked around a greater part of the circumference of these artifacts. One is of a pink quartz, one of a light gray and the other of a dark gray chert. They range from 28 to 40 mm. in diameter, and from 3 to 8 mm. in thickness.

Another specimen (Fig. 11, B) is plano-convex in cross section, bipointed, and chipped by pressure flaking around the entire circumference of the convex face. It was made of reddish-gray chert with sand inclusions. Its maximum length is 50 mm. and the thickness is 10 mm.

Another specimen (Fig. 11, D) is a small, flat flake (20 mm. long and 4 mm. thick) of a very irregular outline which is worked around approximately half the circumference. It is made from banded gray chert.

The last specimen is a thick scraper with a subtriangular outline (Fig. 11, E). It represents the initial flake struck from a large core, the rounded cortical surface being unmodified while the other surface was percussion flaked around the entire circumference. This unusual specimen is made of reddish-gray chert. The length is 48 mm., the maximum width 42 mm., and the thickness 15 mm.

4. Clear Fork Gouges

Thirty-five complete artifacts and 15 fragments belong to the various varieties of the Clear Fork gouge described by Cyrus N. Ray (1941: 152–162). These were manufactured, without exception, from ferruginous sandstone. Thirty of these (Fig. 11, G-I) belong to Ray's Variety 1 (1941: 153–154, Pl. 27, Nos. 1, 2, 6, 11). The specimens of this group found at the Yarbrough site are triangular or subtriangular in general outline and biconvex in cross section. The bit is deeply concave on 10 specimens, straight or very slightly concave on 11 specimens, and slightly convex on nine. Crude percussion flaking was used around the entire circumference of the specimens, and the underside was ground smooth and shows extreme wear. Their length varies from 50 to 82 mm., the width (at the bit) from 34 to 45 mm., and the thickness (at the bit) from 12 to 15 mm. The thickness, however, decreases considerably toward the base.

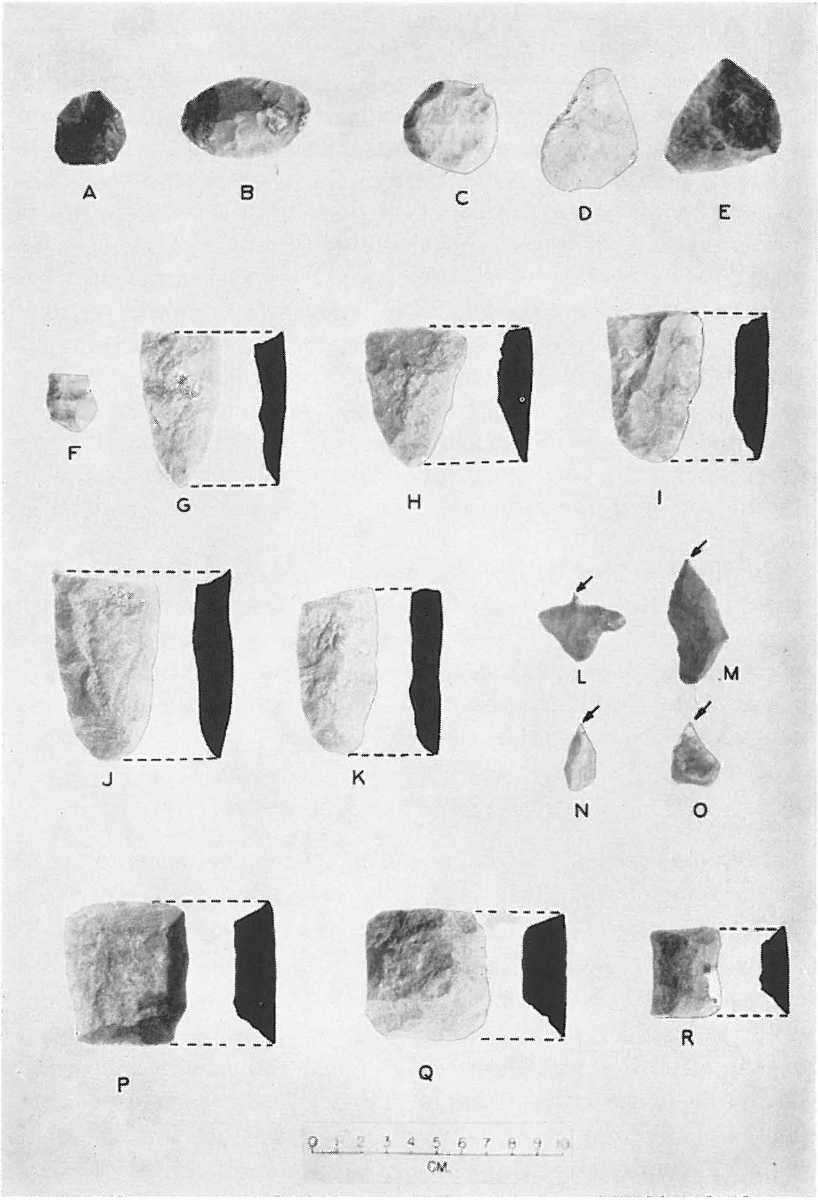


Fig. 11. Scrapers, gouges, and gravers. A-F, miscellaneous scrapers; G-1, Clear Fork gouge, Variety 1; J-K, Clear Fork gouge, Variety 3; L-Q, gravers; P-R, Clear Fork gouge, Variety 4.

Although no specimens of Ray's Variety 2 are present (although a few Mineola end scrapers resemble them strongly), two basal fragments (Fig. 11, J-K) probably represent Variety 3 (Ray, 1941: 157, Pl. 28, Nos. 1, 2, 3, 4, 6).

Variety 4 (Ray, 1941: 157, Pl. 28, Nos. 7, 10) is represented by four specimens (Fig. 11, P-R) that are rectangular in outline, plano- or biconvex, and have bits at both extremities. Their length varies from 36 to 60 mm., the width from 25 to 50 mm., and the thickness from 12 and 22 mm.

The only real difference between the specimens discussed here and those described by Ray is in the use-polish shown on the underside of the Yarbrough site specimens. However, the hard flint from which Ray's gouges were manufactured may account for the lack of polish on his speciments.

5. Drills

Three complete drills and three fragmentary drill bits were recovered from the knoll (Fig. 8, W-Z). One of these, measuring 31 mm. in length, has a short, narrow bit with a maximum thickness of 5 mm., and an irregularly shaped base 11 mm. wide. This artifact was made from petrified wood by means of pressure flaking.

The other complete specimens are short, broad, bi-pointed drills made of reddish-gray chert with sand inclusions. The first measures 21 mm. in length and has a maximum width of 7 mm. The second specimen measures 20 mm. in length and 9 mm. in width. Both were shaped by pressure flaking.

The three fragments represent medial sections of bits ranging in maximum thickness from 6 to 9 mm. Two were made from light grayish-brown chert and one from black flint.

6. Gravers

Eleven gravers were recovered. These are rather small artifacts which have a protruding beak or bit which was presumably designed to serve for incising bone, ceramics, or other artifacts (Fig. 11, L-O). The general outline of these specimens is irregular, with the maximum diameter ranging between 21 and 50 mm. All of the gravers except one were worked by percussion flaking from only one face. The other specimen was worked bifacially. Two small concavities or notches were made on one edge by means of pressure flaking; the protruding section remaining between the two concavities served as the bit of the graver. Two of the gravers were made from petrified wood, two from homogeneous light gray chert, one from quartzite, and six from reddish-gray chert.

7. Miscellaneous Chipped Stone Artifacts

In addition to the artifacts described above, the following specimens were recovered: a large fist-axe, two small choppers, a spokeshave, a small chipped hammerstone, a stemmed knife with crescent-shaped blade, an unusual oval flint with numerous notches, two chipped quartz crystals, and a slightly worked obsidian flake.

The large fist-axe (Fig. 12, C), made of ferruginous sandstone, was crudely worked into a subtriangular outline by percussion flaking on both faces. The end opposite the point is broad and was left unmodified. This specimen measures 116 mm. in length, 100 mm. in width at the base, and 45 mm. in maximum thickness.

The two small choppers (Fig. 12, D-E) are flat pebbles of reddish-gray chert which have been bifacially chipped along one long edge. The percussion method was employed in their manufacture. The first of these specimens measures 45 mm. in length, 32 mm. in width, and 11 mm. in thickness. The second is 60 mm. long, 35 mm. wide, and 13 mm. thick.

The spokeshave (Fig. 12, F) is an irregular flake of gray chert worked unifacially around the circumference by pressure flaking. On one edge a concavity or notch, 7 mm. wide and 4 mm. deep, was formed. The maximum diameter of this artifact is 41 mm.; the maximum thickness is 5 mm.

The hammerstone (Fig. 12, G) is a rectangular piece of petrified wood, 55 mm. long, which has been percussion flaked from both faces, but only at one end. This worked end has been battered quite smooth, presumable from repeated use.

A stemmed knife (Fig. 12, H) of petrified wood was also found. This artifact has a flat base, deep side notches just above the base, and a broken but originally crescent-shaped blade. Though worked bifacially by the percussion technique, one face shows a great deal more modification than the other. The original length cannot be accurately estimated, but the width at the base measures 34 mm., and the maximum thickness 8 mm.

Little can be said about the oval artifact with numerous marginal notches. The photograph (Fig. 12, I) provides a much better impression than a description. It is made of a light gray chert, is 31 mm. long,

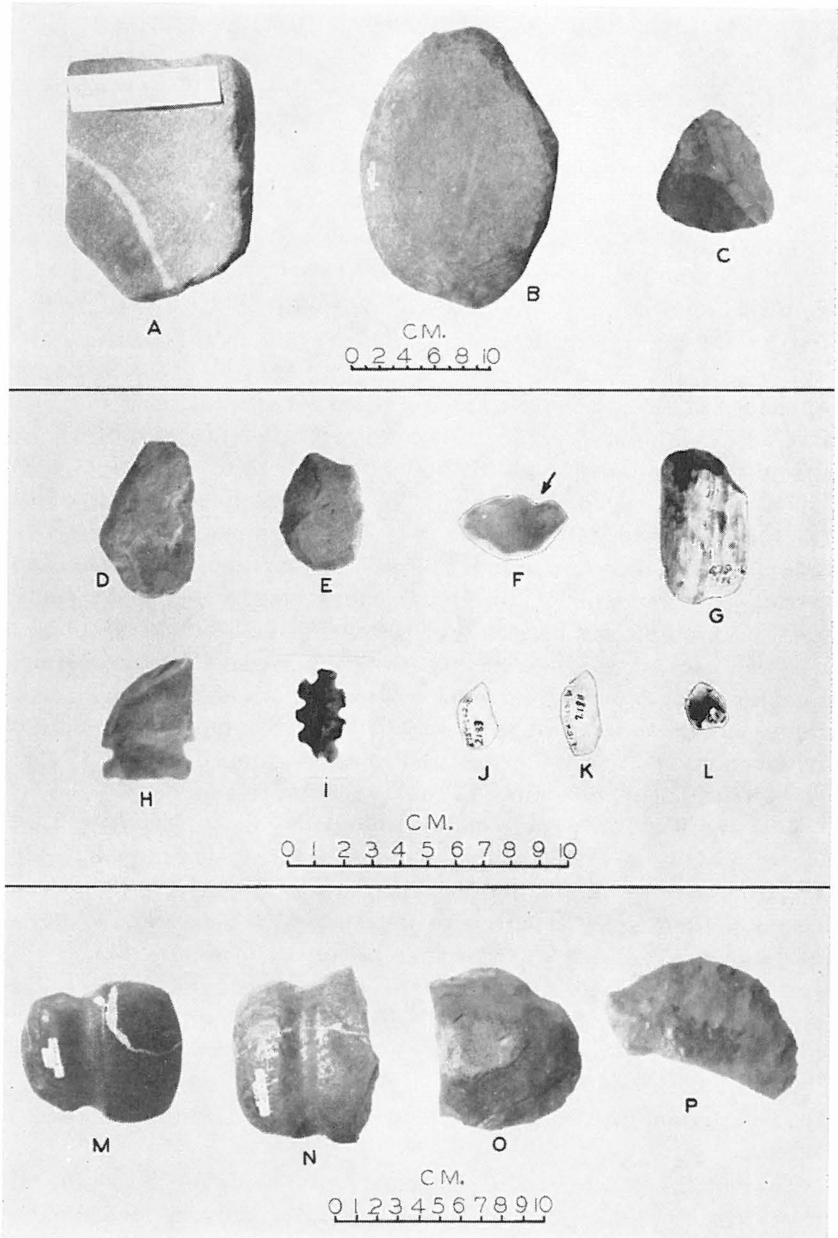


Fig. 12. Miscellaneous chipped and ground stone artifacts. A-B, milling stones; C, fist Axe; D-E, choppers; F, spokeshave; G, hammerstone; H, stemmed knife; I, notched artifact; J-K, quartz crystals; L, obsidian flake; M-N, ground axes; O-P, chipped axes.

19 mm. wide, and 5 mm. thick. Four deep notches occur on each lateral edge.

The two quartz crystals (Fig. 12, J-K) and the obsidian flake (Fig. 12, L) show only very slight and indefinite indications of flaking.

8. Axes

One complete axe and three fragments were recovered from the knoll. The complete specimen (Fig. 12, M) is full-grooved, has a wide blade and a rather small, rounded poll. It appears to have been worked first by the percussion chipping technique and then ground smooth with an abrader. Although the blade and bit are well ground, the poll still shows rough flake scars. The length (poll to the bit) is 75 mm., the maximum width of the blade is 66 mm., and the maximum thickness is 35 mm. The groove is approximately 16 mm. wide and 6 mm. deep.

One of the fragments (Fig. 12, N) appears to represent a full-grooved axe quite similar to the complete specimen described above, but some differences are found. The poll of this fragmentary axe is approximately the same width and thickness as the axe blade. Many small peck marks can be seen over the entire surface; and although it was well ground, this axe was not thoroughly smoothed like the first specimen. The complete axe shows no indications of the pecking technique, but rather exhibits percussion flaking. The maximum width of the fragmentary axe is 79 mm. and the maximum thickness 35 mm. The groove is approximately 14 mm. wide and 4 mm. deep.

The two remaining fragments represent the blade portions of axes. One of these (Fig. 12, O) was worked by the removal of large flakes by the percussion technique and was then ground slightly on both faces, but not so thoroughly as to remove all traces of the flake scars. Whereas the bit of the complete axe was slightly convex in profile, that of this specimen is extremely rounded. It can not be determined whether this fragment was fully grooved originally. There is some slight trace of notches at the top and bottom edges like those occurring on the typical Fourche Maline chipped stone axes (Bell and Baerreis, 1951: Pl. 4, No. 9). The maximum width of the blade is 75 mm. and the thickness is 34 mm.

The last fragment (Fig. 12, P) represents a blade much like the one described above, except that it is flatter, more crudely chipped, and has very little indication of grinding. Only the forward portion of the bit is present. It is 80 mm. wide and 14 mm. thick, and resembles Fourche Maline chipped axes.

All four axes were manufactured from reddish-brown ferruginous sandstone.

9. Sinker Stones

Four medium-sized stone artifacts were recovered which presumably were intended to function as weights, or as *bolas* stones. Three are oval in outline, having a thickness somewhat less than the width. Two of these (Fig. 13, C-D) have shallow notches at both extremities, while the other (Fig. 13, A) has a shallow, almost V-shaped groove around its longitudinal circumference. Presumably a string or thong could be passed around the artifacts and held secure by means of the end notches or the groove. The three were manufactured from ferruginous sandstone of a reddish-brown color. The maximum lengths of the two end-notched specimens are 50 and 40 mm., their widths 31 and 29 mm., and the thickness 21 and 20 mm. The longitudinally grooved artifact measures 53 mm. in length, 37 mm. in width, and 27 mm. in thickness.

The fourth of these artifacts (Fig. 13, B), made from a basaltic stone, is cylindrical in form and has rounded ends. A shallow concave groove runs around its latitudinal circumference. The length is 41 mm. and the diameter averages 33 mm.

All four specimens appear to have been shaped by pecking and then smoothed by grinding with an abrader.

10. Gorget Fragment (Fig. 13, E)

The rounded corner-section of a thin, perforated stone gorget was made from a very fine-grained sandstone. Both faces are ground flat and smooth, and the only corner which is present is rounded. The single perforation was accomplished by drilling from both faces. The maximum thickness of the gorget fragment is 5 mm., and the diameter of the hour glass-shaped perforation measures 3 mm. at the narrowest place.

11. Stone Palette (Fig. 13, F)

A small, concavo-convex, ferruginous sandstone artifact with a square outline could easily have served as a small palette for mixing and applying ochre pigments. It is 47 mm. in diameter and 7 mm. thick. The concave face shows evidence of pecking and has a low, turned-up rim. The convex face is smooth.

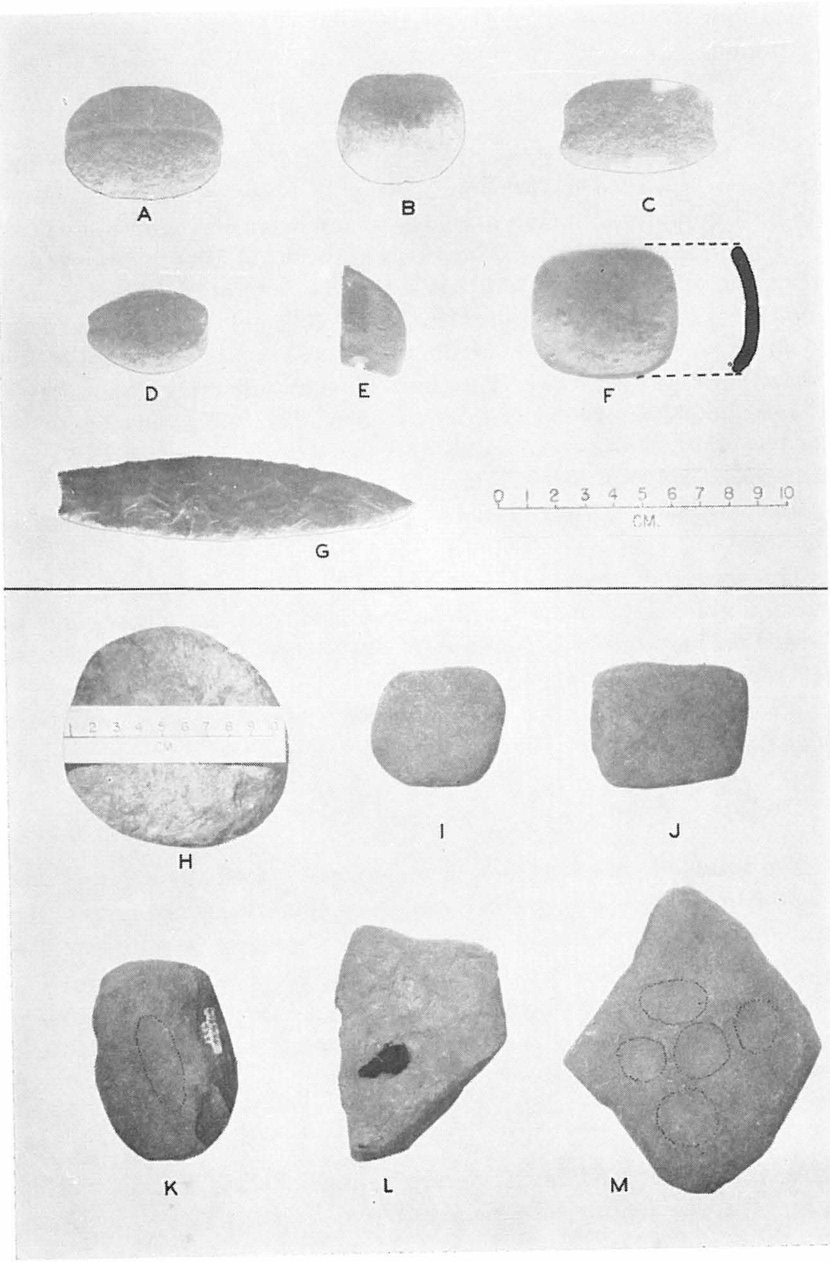


Fig. 13. Ground stone artifacts and chipped knife. A-D, sinker stones; E, gorget fragment; F, palette; G, knife; H-J, manos; K, pitted mano; L-M, pitted stones.

12. Grinding Slabs (Fig. 12, A-B)

Ten slabs of ferruginous sandstone have one or both surfaces (faces) ground concave. These were apparently used, with manos, to crush and pulverize plant parts. One specimen is quite large (18 × 24 × 6 cm.) and has a roughly rectangular outline. One surface is deeply concave, evidencing a rotary grinding action, while the other is flat and exhibits several grooves which presumably were used for abrading purposes. Another large specimen is roughly circular in outline (20 × 6 cm.) and is worked on only one face. Its face is concave and ground fairly smooth, although peck marks can still be discerned on its surface. A third large stone is oval in outline (22 × 16 × 60 cm.) and concave on both faces. The surface concavities were pecked out, but very little grinding was done on this stone subsequent to the original shaping.

Four smaller grinding slabs are roughly rectangular in outline, and are bifacially ground. Their surfaces are concave and still show indications of the pecking technique used to rough-shape the surfaces. Their diameter ranges from 11 to 24 cm. and the thickness from 3 to 5 cm.

Another group of three small grinding slabs is identical to the four described immediately above, except that one of the faces has been left unworked. The other face is concave and shallow. The diameter of these grinding slabs varies from 10 to 16 cm. and the thickness from 5 to 9 cm.

All 10 specimens were made from locally acquired, reddish-brown ferruginous sandstone.

13. Manos

A total of 40 manos—the small hand stones used with the grinding slabs—was recovered from the knoll, Area A. These may be divided into (1) those having two grinding surfaces, and (2) those showing only one grinding surface.

Among those with only one ground surface, nine have rather irregular outlines, although several tend to be circular (Fig. 13, H). They were manufactured from sandstone and quartzite cobbles. Their diameter ranges from 7 to 13 cm., and their thickness from 5 to 7 cm. A few of these show slight modifications around the edges caused by pecking. The grinding surfaces of all the manos are flat, or else very slightly convex.

Seven manos have only one grinding surface, are subrectangular in outline, and were fashioned from reddish-brown ferruginous sandstone. The grinding surfaces of these specimens are flat, slightly concave, or sligthly convex. Their diameter varies from 6 to 10 cm. and their thickness from 3 to 5 cm.

Three manos, also showing only one grinding surface, are like those described immediately above except that they are irregular and crudely-shaped, lacking the rectangular outline of the others. These range from 5 to 10 cm. in diameter and from 3 to 4 cm. in thickness. They, too, are of the reddish-brown ferruginous sandstone.

The remaining 19 manos all show two opposed grinding surfaces. Seven of them, made of thick sandstone cobbles, tend to be round in outline, and show considerable modification by pecking on the edges and on the surfaces. These range in diameter from 7 to 11 cm. and in thickness from 3 to 7 cm. Nine additional specimens have subrectangular outlines and were manufactured from reddish-brown ferruginous sandstone (Fig. 13, I-J). Their diameter ranges from 6 to 11 cm. and their thickness from 3 to 5 cm. A few show some slight indications of grinding on the sides as well as on the surfaces. Three manos are identical to those described immediately above, but are highly irregular in outline. They are of the same ferruginous sandstone and range from 7 to 9 cm. in diameter and from 3 to 4 cm. in thickness.

The surfaces of all the examples which have two grinding faces are flat, slightly convex, or rarely slightly concave.

Almost all of the manos appear to have been used with a circular grinding motion. Only a few of the rectanguloid specimens could possibly have been used with a back and forth movement. The circular, concave basins commonly found on the grinding slabs also suggest that manos were used with rotary motion.

14. Pitted Stones

In addition to the manos described immediately above, another 44 manos were found which show small pits or depressions on their surfaces. An additional 35 irregular stones (not ground) also show one or more of these pits. Heretofore, such artifacts have been called "nutting stones" or "nut stones," but it has recently been suggested (Honea, MS) that they were used as anvils or base stones in the bi-polar flaking technique.

Of the pitted manos (Fig. 13, K), 21 have one pit on each grinding surface (all of these manos are bifacially ground). Nine are irregular in outline, eight are subrectangular, and four tend to be circular.

Another group of 18 manos exhibit a single pit on only one grinding surface. Of this group, nine are irregular in outline, two are subrectangular, and seven are almost circular. In addition to these, one irregular mano has one pit on each face and on two of the sides as well. Another shows three pits on one face and none on the other, while yet another specimen has two elongated pits or channels on only one face. A rather unusual modified mano has one elongated pit or channel on each surface, one of which is crossed at right angles by a narrow, V-shaped groove.

Thirty-five stones, which are not ground as were the manos, also show one or more of these depressions or pits. All these specimens are irregular in outline and were very roughly shaped by hammerstone percussion. Seventeen of these have a pit on only one surface, 16 have a pit on both surfaces, one has four pits on one surface and two on the other (Fig. 13, L), and the last specimen has five on one surface and four on the other (Fig. 13, M).

All the pitted stones, both those made from manos and those which show no grinding facets, are of red ferruginous sandstone. Since the size range is rather consistent throughout the different groups, only one set of dimensions will be given for the entire lot of 79 artifacts. Their maximum diameter ranges from 7 to 15 cm. and the thickness from 25 mm. to 7 cm. The diameter of the pits themselves varies from 2 to 4 cm. and their maximum depth from 2 to 9 mm. The pits occurring on the manos are shallower than those on the other stones, and their interiors are frequently smoothed by grinding. The pits on the irregular stones, however, are deeper, and their interiors show evidence of pecking.

15. Ceramics

A total of 657 potsherds was recovered from Area A. In describing the potsherds the usual presentation by types will not be followed. This deviation from standard procedure is necessitated by the relatively small number of specimens and by the scarcity of complete vessels. The sherds will be described and grouped primarily on the basis of the techniques used in applying surface decoration (engraving, punctating, brushing). Of course the use of the term "decoration" here is not quite correct, since several of the alterations made on the vessel surfaces may have had a functional rather than an aesthetic value (e.g., brushing, which could aid in firmly grasping greasy cooking vessels). Nevertheless, an effort has been made, when possible, to show type affiliations or resemblances. In certain cases, however, sherds of different descriptive groups may conceivably represent the same type.

Later, in the description of the ceramics from Area B—the small occupation area 300 yards distant from the knoll, it will be possible to follow a more orthodox presentation by types, since we have a larger number of sherds and several reconstructed vessels from that area.

INCISED POTSHERDS. A total of 36 incised sherds was recovered from the knoll. In this report the term "incised" is reserved for pre-firing incising, while the term "engraved" is used for post-firing incising. Twenty-two specimens are rim or neck sherds, apparently from large jars or deep bowls. Of these, 14 represent the high, somewhat everted rims of the *Maydelle Incised* type of the Frankston Focus. Two of the *Maydelle* sherds have parallel lines running diagonally toward the right and downward from the lip (Fig. 14, A). Another six (Fig. 14, B) have parallel lines running diagonally to the left and downward from the lip, two have almost vertical parallel lines, and four (Fig. 14, C) have grids of crossed diagonal lines. The general shape of these high rims is concave (viewing the outside surface) and the lip is either rounded and everted, or flat and everted. Most of these potsherds fractured along horizontal coil lines at the point where the rim joined, at a sharp angle, the presumably globular body of the pot (see Suhm *et al.*, 1954: 324, Pl. 46). Another rim sherd exhibits the same shape, but has horizontal parallel lines which do not occur, so far as is known, on *Maydelle* vessels. This sherd can not be assigned to any established type.

The remaining seven rim sherds appear to represent vessels affiliated with the Gibson Aspect. These sherds are straight-walled and have the characteristic flattened rims of Gibson Aspect ceramics, particularly those of the Alto and Sanders foci. Two of these (Fig. 14, D–E), with parallel lines running diagonally to the left and downward from the lip, are clearly of the *Canton Incised* type of the Sanders Focus. Two of the remainder show crossed diagonal lines and another two have rather random and wandering lines. These last four sherds can not be assigned to any recognized types.

Fourteen sherds show parallel incised lines which can not be oriented. They represent body sherds or perhaps rim sherds without the lip. No type designations can be made for them.

The paste, thickness, and color of the various incised sherds varies uniformly from one group to the next, hence all the specimens will be described as a single unit. Their wall thickness ranges from 5 to 9 mm., the surface color from cream, to brownish-black, to reddish-brown. The core is invariably darker than the surface color, and is usually dark brown or black. One cream-colored sherd, however, has a light brown core. Small lumps of clay and, rarely, ground potsherds were used as tempering agents, lending a very granular appearance to the paste. The surface of most of the specimens has been smoothed but not polished, and its hardness varies from 3 to 4.5 according to Moh's scale.

BRUSHED POTSHERDS: Ninety brushed body sherds were recovered. A majority of these are apparently from large pots or deep bowls, and may be assigned to the *Bullard Brushed* type (Fig. 14, F–G) of the Frankston and Titus foci (Suhm *et al.*, 1954: 252, Pl. 9). Since many of these specimens fractured along horizontal coil

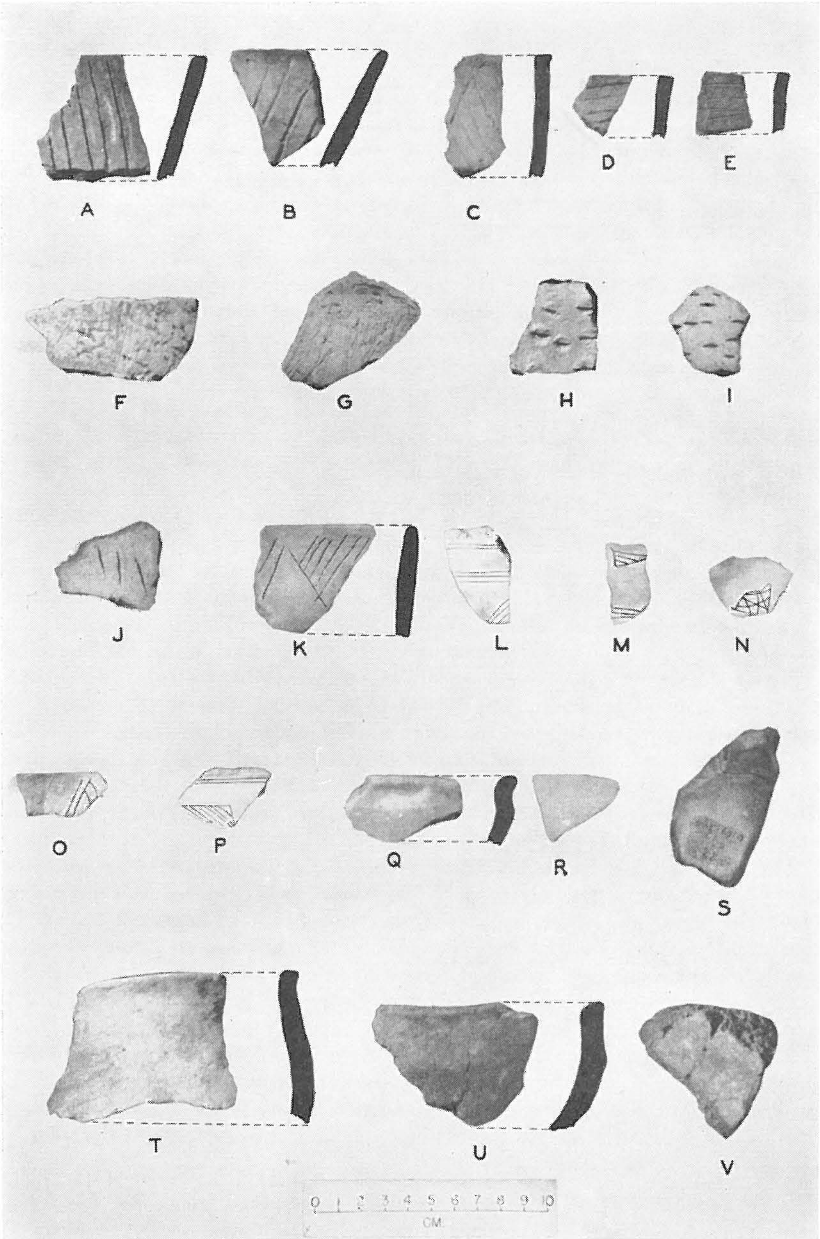


Fig. 14. Potsherds: *Maydelle Incised, Canton Incised, Bullard Brushed, Sanders Engraved, Poyner Engraved, Sanders Plain,* and *Williams Plain* types; *punctated,* engraved, plain, and sand-tempered sherds. A-C, *Maydelle Incised;* D-E, *Canton Incised;* F-G, *Bullard Brushed;* H-I, punctated sherds; K, N, O, *Sanders Engraved;* L-M, *Poynor Engraved;* P, engraved potsherd; Q, plain potsherd; R, *Sanders Plain;* S, sand-tempered plain sherd; T-V, *Williams Plain.*

lines, it is possible to orient them correctly and to determine that the brushing was applied vertically. The brushed lines tend to be fine, although some incisions are deeper and heavier than others. Although generally parallel, some of the lines cross each other and wander randomly. The main impression, however, is one of vertical brushing. Perhaps a corn cob, bundle of grass, or straw was used to produce these closely-spaced, fine lines. This type of brushing can be easily distinguished from the circular brushing found on vessels of the *Clements Brushed* type.

The surfaces of the brushed sherds are porous and rough, and of a cream, light brown, or reddish-cream color. The paste is coarse and tempered either with clay lumps (70 specimens) or with ground bone combined with clay lumps (30 specimens). The core is either of a light cream or dark brown color, the latter indicative of incomplete oxidation during the firing process. The wall thickness varies from 5 to 9 mm. and the hardness from 1.5 to 3 according to Moh's scale.

PUNCTATED POTSHERDS. Thirty-one sherds recovered from Area A have punctations on their surfaces. These punctations were executed in three different styles. The first of these, represented by 23 specimens, consists of a small and rather deep groove which, viewed from above, has the outline of a half circle (Fig. 14, H). These punctations are deepest at the straight side, where the clay was mounded up and pushed back, generally causing the formation of a small node. These marks were probably made by angular gouging with a circular stick or section of cane, although this type has usually been designated as "fingernail-punctating." Of these 23 sherds, five are rim sherds with a row of punctations just under the lip, and 18 are body sherds with apparently random surface punctations. Of this last group of 18, three show a certain amount of surface smoothing after the punctating was done, which partially eliminated the nodes; the remainder lack this trait.

The second kind of punctation, found on six body sherds (Fig. 14, I), consists of short, narrow grooves or short incisions applied randomly over the vessel surface. The two remaining sherds, which constitute the third style (Fig. 14, J), show long, narrow gashes applied over the surface.

The paste, color, and other characteristics of all these sherds are rather consistent, hence a single description will suffice for the whole group. The wall thickness ranges from 5 to 9 mm., and the surface color from cream to orange to grayish-brown. The core of all the examples is a dark brownish-black, indicating an incompletely oxidizing firing atmosphere. The paste is coarse and granular, with 17 sherds having, as temper, small clay lumps (possibly including some ground potsherds) and 14 having clay lumps plus ground bone. The surface hardness ranges from 3 to 3.5.

Rims decorated with rows of punctations have been found on vessels of *Bullard Brushed* (Suhm *et al.*, 1954: 252, Pl. 9, B) and on many miscellaneous vessels of utilitarian ware, with both plain and punctated bodies, of the Fulton Aspect. Although this group of 31 sherds can not be assigned to definite types, it can safely be ascribed to the Fulton Aspect.

ENGRAVED POTTERY. Fourteen engraved sherds were recovered during the excavations, five of which are related to the *Poynor Engraved* type (Fig. 14, L, M) and seem to represent the rims of squat bowls with rounded body and slightly everted, rounded lips. The surface decoration consists of blank areas set off by masses of closely spaced parallel lines, running either vertically or diagonally. Two of the specimens in question, however, are slightly different from the *Poynor* bowls described by Suhm *et al.* (1954: 342, Pl. 55) in that parallel horizontal lines occur below the lip. These horizontal lines are known, however, on bottles of this type (*ibid.*: Pl. 56, A, B, G). The thickness of these sherds ranges from 5 to 8 mm. The surface, which has been smoothed but not polished, is reddish-brown and the core dark gray. The paste is coarse and granular and rather large clay lumps were employed as a tempering agent. The surface hardness varies from 2.5 to 3.

The six sherds of *Sanders Engraved* (Fig. 14, K, N, O; Fig. 15, A) show small triangles filled with somewhat crudely executed, cross-hatched lines. One represents a straight-walled rim sherd with rounded lip, one a bottle fragment, and the remaining four are probably from carinated bowls. These last four come from the area of the vessel where the rim joins the body. Similar vessels have been found at the Sanders site (Krieger, 1946: Pl. 27, C, D). The thickness of these sherds ranges from 4 to 6 mm., and the exterior and interior surface colors range from dark brown to grayish-black. The core is dark gray or black and the paste is coarse, with clay lumps serving as the tempering agent. The surface hardness varies from 2.5 to 3.5.

The remaining three unidentifiable engraved sherds represent vessels with rims which join the body at a sharp angle. Their engraving consists of rectilinear designs filled with diagonal lines (Fig. 14, D) such as is found in the *Barkman Engraved* and *Friendship Engraved* types of northeastern Texas. The thickness varies from 5 to 7 mm., and the surface color ranges from brownish-gray to red. The color of the core is the same as that of the exterior in all three cases. The paste is coarse and clay lumps were used for tempering. The average hardness is 2.5 according to Moh.

PLAIN POTSHERDS. A total of 482 undecorated potsherds was recovered from Area A. Most of these represent the same paste and manufacturing traditions represented by the previously described ceramics. Rather surprisingly for such a large number of sherds, only 10 basal and nine rim sherds were found. This fact suggests that a majority of these plain specimens represent the undecorated portions of vessels belonging to *Sanders Engraved*, *Maydelle Incised*, and other types which are generally decorated only along the area near the rim.

Four hundred seventy-six sherds are of the typical "Caddoan" ware or paste, to which the previously described types belong. Eight of the basal sherds, all quite flat and varying from 7 to 10 mm. in thickness, and five of the rim sherds pertain to this group. Three of the rim sherds have straight walls and slightly rounded lips and are of *Sanders Plain* type (Fig. 14, R). The two remaining rim sherds are concave and have rounded, everted lips (Fig. 14, Q). Although they are typical of the form popular throughout the Fulton Aspect, no specific type assignment can be made for them. Nine small sherds have vestiges of a dark red wash or slip of ochre which was applied to their interior and exterior surfaces; they represent bottle and bowl fragments of the *Sanders Plain* type. One basal and two rim sherds occur among these nine. One of the rim sherds is straight-walled with a rounded lip and probably represents a simple bowl. The other, also from a bowl, has a depression or channel just below the rim on the exterior surface, which lends to their rounded lip an everted appearance. On the interior surface there is a marked thickening or flange extending from the lip for a distance of 17 mm. downward toward the base. This feature has been reported on other *Sanders Plain* vessels. The base sherd is flat and moderately thick.

The remainder of the 476 specimens represent body sherds, mainly from large bowls and jars. The following description applies to the entire group of 476 "Caddoan ware" plain sherds. Their wall thickness ranges from 5 to 8 mm., and the surface color from cream to reddish-brown to gray-brown. These differences or variations in surface color do not appear to be important or intentional, however. Indeed, most of the vessels were fired unevenly, with many smoke clouds and color variations resulting on the same vessel. The core of these sherds is generally gray and frequently darker than the interior and exterior surfaces. The paste is granular and the following tempering agents and combinations were used: small clay lumps (357 sherds), clay lumps plus sand (57), clay lumps and ground bone (44), clay lumps with sand and ground bone (18). The surface hardness varies from 2 to 3.5.

The remaining seven plain sherds are rather different from those described above. One of these (Fig. 14, S) is the sharply rounded base sherd of a heavily sand-tempered ware which has been reported at the Davis site (Newell and Krieger, 1949: 130–133) and at several sites of the McGee Bend Reservoir (Jelks, MS). The surface and core color of this sherd is a dark brownish-black and it measures 12 mm. in thickness. The surface hardness ranges between 3.5 and 4.

The other six sherds (Fig. 14, T–V) are of a thick-walled ware known as *Williams Plain* (Bell, 1953: 328–330; Proctor, 1957: 72–77). One of the rim sherds represents a globular jar with a tall, constricting, concave rim with flat lip. The other rim sherd is from a large bowl which has a slight suggestion of a shoulder; the rim is flat, as in the case of the first specimen. The two basal sherds are very thick (measuring 11 and 17 mm., respectively) and are flat, but are thicker in the center than at the edges. The thickness of the rim and body sherds is 9 mm. The interior and exterior surface color is a dark brownish-black, and the core is of the same color. The paste is exceedingly coarse and granular, with clay lumps (5 sherds) and clay lumps plus ground bone (1 sherd) being used as tempering agents. The surface is smooth and has a hardness of 2 to 2.5.

MISCELLANEOUS POTSHERDS. Four potsherds were found which do not fit any of the previously described groupings. One of these, a concave rim sherd with slightly everted lip, is of the Frankston Focus type *La Rue Neck Banded* (Fig. 15, A). This sherd shows three tiers of flattened neck coils. The wall thickness is 5 mm. and the surface color is a light brown but the core is gray. The paste is coarse and small clay lumps were used as temper; the surface hardness is 2.5.

One strap-handle sherd comes from a vessel decorated with vertical rows of pinch-marks done in the style of *Killough Pinched* (Fig. 15, C). The rim is concave and exhibits a rounded lip. The wall thickness is 5 mm., the surface and core color is a dark gray-black, and the core is coarse and tempered with clay lumps plus ground bone. Its surface hardness is 2.5.

The two remaining sherds (Fig. 15, D–E) show parallel diagonal incisions bounded by rows of small punctations. These incised-punctated sherds are of the *Maydelle Incised* type and possess the same general specifications as the incised sherds of that type.

PIPE FRAGMENT. One ceramic pipe stem fragment (Fig. 15, F) was recovered from the surface of the knoll. This represents the forward portion of the stem just behind the bowl. The surface and core color is a light orange-brown. The paste is somewhat coarse, and is tempered with ground clay lumps combined with a small amount of pulverized bone. The outside diameter of the stem is 11 mm. and the inside diameter measures 4 mm. Similar pipes occur at the Sanders site in Lamar County, Texas (Krieger, 1946: 324, Pl. 22, G).

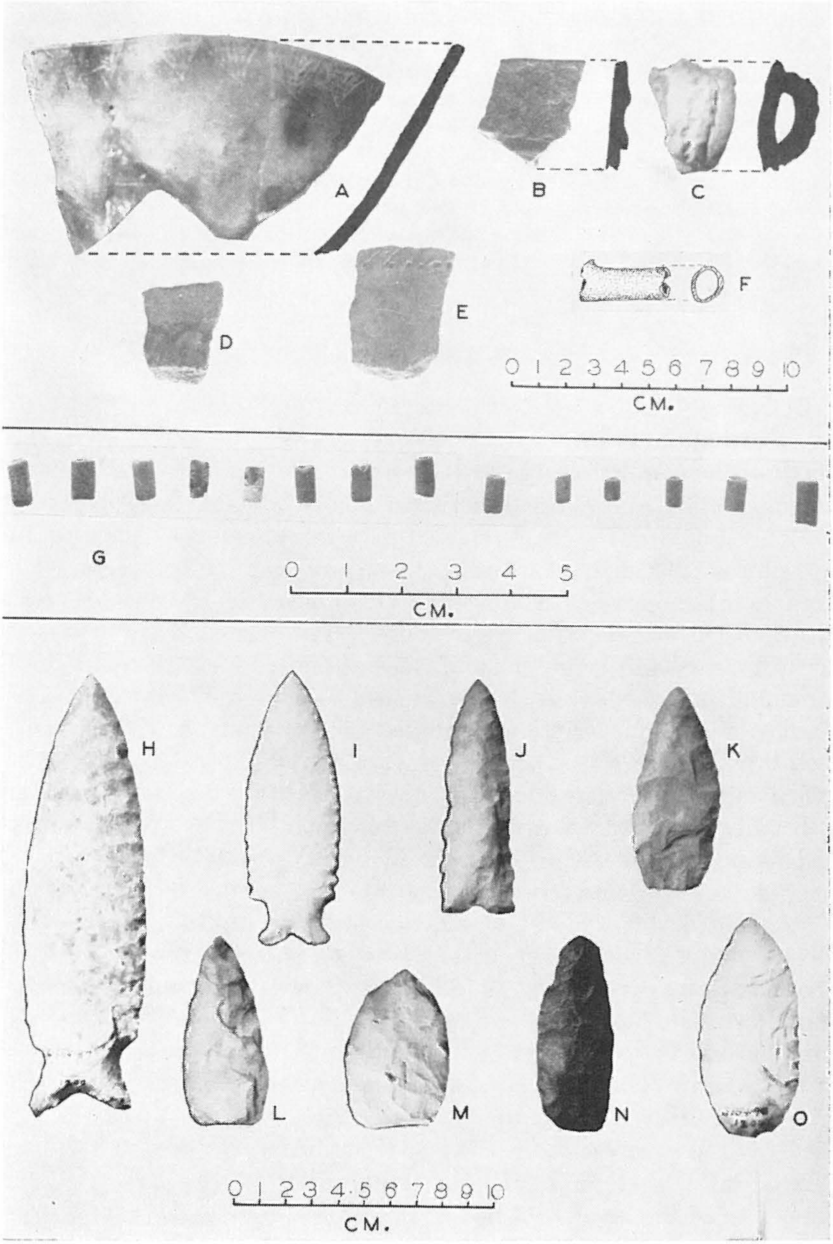


Fig. 15. Potsherds (*Sanders Engraved, La Rue Neck Banded, Killough Pinched,* and *Maydelle Incised*); pipe fragment; beads; and knife. A, *Sanders Engraved* potsherd; B, *La Rue Neck Banded* potsherd; C, *Killough Pinched* potsherd; D-E, *Maydelle Incised* potsherds; F, pipe fragment; G, ceramic beads; H-O, knives from cache.

CERAMIC BEADS. Fifteen small, tubular ceramic beads (Fig. 15, G) were found at the neck of the skeleton of Burial 3. These are all of an untempered, compact clay of a light grayish-brown color. The hardness of the surface of the beads varies from 2.5 to 3.5, about that of most of the ceramic vessels from the site. The length of the beads varies from 4 to 9 mm., the exterior diameter from 3 to 4 mm., and the interior diameter from 1 to 2 mm. Their apertures are straight-sided and do not appear to have been made by drilling; rather, the apertures were most likely formed by molding the clay around a twig or some other smooth object, which was later extracted. One end of eight of the beads is flat or somewhat rounded while the other shows a marked concavity. The remaining seven, however, are flat or rounded at both ends.

Provenience and Distribution of the Artifacts from Area A

Certain difficulties were encountered in attempting to plot the vertical distribution of the artifacts recovered from the knoll. First, the depth of the artifacts had been recorded in relation to the surface and not in relation to any fixed elevation points. Second, there exists no contour map for the knoll, which fact increased the difficulty in correlating the artifact stratigraphy from one 10-foot square to another. A relatively reliable analytical procedure, however, was finally decided upon, which is as follows. The occurrence of artifacts, according to depth below the surface, was plotted for each square and the data from adjacent squares were then compared. If alike or closely similar, these squares were combined for analytical purposes. As a result of this process of combining squares, two large analysis units consisting of numerous squares were established for the knoll, Area A. Substantial validity was given to these analysis units by the horizontal distribution of the artifacts. When plotted horizontally on a plan of the site, the artifacts fell naturally into two areal groupings which corresponded very closely to the two analysis units established by means of the vertical comparisons between squares. The location of these units appears in Fig. 16. Although they account for a majority of the artifacts found in the knoll, other implements were recovered from several 10-foot squares which could not be combined with these analysis units. The number of artifacts, by classes and types, occurring in Analysis Unit 1, in Analysis Unit 2, on the surface of the knoll, and in squares outside the analysis units is presented in Table 1.

Analysis Unit 1 (Fig. 16) was composed of 60 10-foot squares in the center of the knoll, and had rather good, clear-cut, vertical differentiation in the distribution of artifacts, particularly in the dart point group. This part of the knoll had not been seriously eroded or disturbed. Unit 2, made up of 58 ten-foot squares (Fig. 16), was located

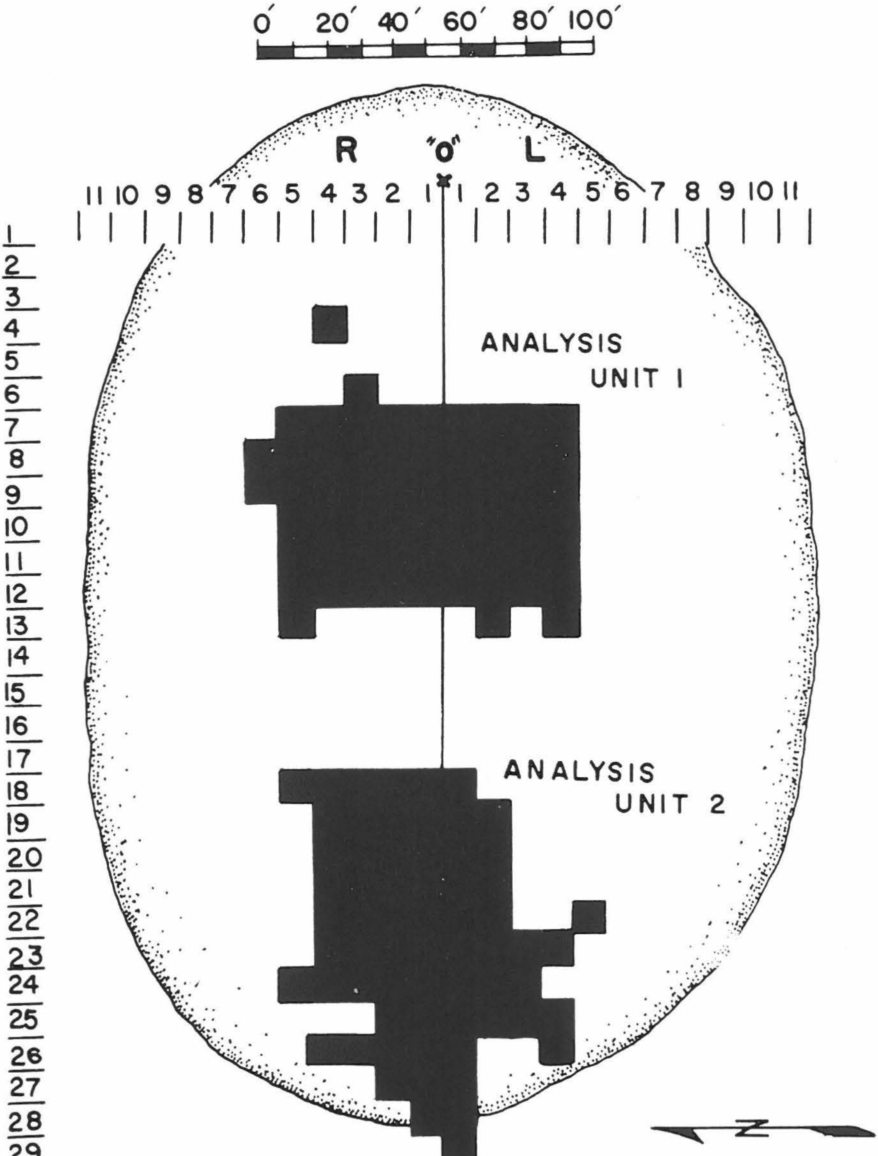


Fig. 16. Analysis Units 1 and 2, the Knoll, Area A, the Yarbrough Site.

on the western slope of the knoll and has a confused and mixed artifact stratigraphy. It seems that artifacts and soil eroding from the slopes of the knoll, particularly in late prehistoric and recent time, gradually filled in this area, thereby causing a considerable mixture of artifacts which represent diverse periods in the history of the site. Therefore a major part of the emphasis in the stratigraphic and distributional studies will be placed on Unit 1, although it is also possible to see, in some instances, some valid but extremely gross stratigraphic differentiations in the distribution of the artifacts from Unit 2. The occurrence of the artifacts of Unit 1 is presented in Table 2, those of Unit 2 in Table 3.

TABLE 1

Provenience of the Artifacts, Area A

	Analysis Unit I	Analysis Unit II	Surface	5′ Sq's. Outside Analysis Units	Totals
Gary kaufman	20	15	14	27	76
alsa	5	1	7	4	17
runge	10	4	2	4	20
panna maria	5	3	3	17	28
kenedy	0	0	4	0	4
colfax	3	1	4	0	8
hobson	35	29	57	23	144
emory	5	2	3	8	18
kemp	3	2	5	3	13
Misc. Gary	2	1	6	1	10
Wells	5	13	3	7	28
Kent phalba	4	0	3	4	11
quinlan	5	1	2	0	8
Bulverde	3	3	0	4	10
Morrill slocum	5	0	2	6	13
san pedro	9	2	3	6	20
Elam	2	3	1	0	6
Misc. Straight Stem	5	6	0	6	17
Marshall	0	0	0	3	3
Yantis cook	2	1	2	2	7
swan	1	2	2	4	9
Yarbrough lindale	33	23	14	28	98
dike	4	5	3	3	15
mabank	15	12	2	17	46
Ellis	8	6	8	11	33
Trinity	2	5	2	4	13
Edgewood hooker	2	5	2	4	13
bull creek	11	6	5	8	30
dixon	4	1	2	0	7
Ensor	1	0	0	1	2
Wesley	1	2	0	2	5
Fairland	1	0	0	0	1

TABLE 1—Continued

Provenience of the Artifacts, Area A

	Analysis Unit I	Analysis Unit II	Surface	5′ Sq's. Outside Analysis Units	Totals
Palmillas	2	2	4	3	11
Lone Oak	0	2	0	3	5
Misc. Expanding Stem	2	1	5	4	12
Stemless Points	3	7	13	3	26
Misc. Dart Points	10	6	8	6	30
Clovis	0	2	0	0	2
Plainview	0	1	0	0	1
San Patrice	0	0	1	1	2
Meserve	0	1	1	1	3
Sandy Creek	0	2	1	0	3
Misc. Paleo-like Points	0	3	1	3	7
Arrow Points	4	1	3	0	8
Knives Group I	10	4	8	6	28
Group II	6	5	2	7	20
Group III	10	6	8	8	32
Group IV	7	3	1	3	14
Group V	3	3	4	2	12
Group VI	5	2	0	3	10
Group VII	3	4	5	1	13
Group VIII	10	7	4	6	27
Group IX	44	40	29	41	154
Misc. Bifacial Artifacts					
Group I	2	1	1	1	5
Group II	1	1	3	0	5
Group III	0	2	9	4	15
Group IV	1	4	3	0	8
Group V	2	3	0	5	10
Mineola End Scrapers	8	19	8	2	37
Triangular End Scrapers	5	5	5	2	17
Side Scrapers	13	9	5	8	35
Misc. Scrapers	2	1	0	3	6
Clear Fork Gouges	13	8	11	3	35
Drills	0	2	4	0	6
Gravers	2	2	6	1	11
Small Choppers	0	1	1	0	2
Chipped Hammerstone	1	0	0	0	1
Fist Axe	0	1	0	0	1
Axes	2	2	0	0	4
Spokeshave	0	1	0	0	1
Sinkers	1	2	1	0	4
Gorget	1	0	0	0	1
Stone Palette	1	0	0	0	1

TABLE 1—Continued

Provenience of the Artifacts, Area A

	Analysis Unit I	Analysis Unit II	Surface	5′ Sq's. Outside Analysis Units	Totals
Grinding Slabs	1	1	8	0	10
Manos	3	6	29	2	40
Pitted Stones	2	6	64	7	79
POTSHERDS					
Williams Plain	2	1	2	1	6
Sanders Plain	2	0	3	7	12
Sanders Engraved	2	0	4	0	6
Poynor Engraved	1	0	3	1	5
Bullard Brushed	3	12	71	4	90
Maydelle Incised	2	2	13	0	17
La Rue Neck Banded	1	0	0	0	1
Misc. Incised	1	1	12	7	21
Punctated	1	5	25	0	31
Misc. Engraved	1	0	2	0	3
Misc. Plain	33	33	376	22	442
Sandy Ware	1	0	0	0	1
Canton Incised	0	0	2	0	2
TOTAL					2,124

A total of 572 fragmentary and unclassified artifacts do not appear in this tabulation. Including these, the grand total of artifacts from Area A is 2,696.

Viewing the artifact sequence as a whole, we can discern an early and stratigraphically low period of occupation represented by specific dart point types, styles of knives, scrapers, and other implements. In the upper levels most of the early styles of artifacts continued (although their late occurrence may conceivably result from a partial mixing of the deposits), but ceramics, arrow points, and new forms of dart points, knives, etc., made their appearance. This gradual addition of new artifacts to the older assemblage represents several later periods in the history of the site. It should be understood that this periodification is intended to be used in a very specific, local way, and that these periods are not designed for broad areal studies. The periods themselves are based (1) on stratigraphic data from the Yarbrough site, and (2) on pertinent chronological data from related archeological sites.

To deal now with Period 1, we have some evidence in the way of projectile point styles for brief occupations of the site by the big game hunters of the Paleo-Indian, or Lithic, Stage of the late Pleistocene. Regrettably, these early points were found either in Analysis Unit 2 (the mixed area), or in squares outside the areas embraced by the analysis units, and can not, therefore, be clearly related to the artifact sequence defined on the basis of Unit 1. In Unit 2 these Paleo and Paleo-like points occurred, in certain cases, in the same levels with dart points characteristic of the Archaic Stage, and in some instances at depths in which potsherds were encountered, albeit rarely. The fact, however, that one *Clovis* point was found resting on the deep, sterile clay member underlying the midden soil suggests considerable antiquity. The practice of explaining away the Paleo-Indian points found so frequently in Archaic sites of the region as material picked up and reused by later cultures is unrealistic and unsatisfactory.

Although there is considerable evidence for stratigraphic mixing in Unit 2, all the Paleo points, except one specimen, occur in the lower deposits below a depth of 22 inches. Yet the Paleo materials at the site do not indicate a single occupation by one people. Rather, the diversity of types—*Clovis*, *Plainview*, *Meserve*, and *San Patrice*,—suggests that the site was used as a brief camping spot throughout a long segment of prehistoric time.

Period 2 (turning now to the Archaic materials) represents, in the main, a preceramic gathering-hunting culture or cultures whose artifacts occur below a depth of 36 inches in Analysis Unit 1 (Figs. 17, 18). The dart points which are well represented are the *lindale* and *mabank* varieties of *Yarbrough*; *Ellis*; the *bull creek* and *dixon* varieties of *Edgewood*; and the *san pedro* variety of *Morrill*. All of these points but *Morrill* (which has a straight stem) represent the expanding stem tradition (Table 2).

Period 3, which owing to the small numbers of artifacts grouped therein is an extremely hypothetical and tentative construct, consists of contracting stem points represented primarily by very small numbers of the *runge* variety of the *Gary* type. *Yantis* points also occur in Period 3, while the types and varities of the previous period continue. The 30–36 inch depths may be assigned to Period 3.

Several of the knife styles (Groups I, II, III, VIII, and IX) occur in significant numbers in all periods, as do Mineola end scrapers, triangular end scrapers, side scrapers, Clear Fork gouges, and full-grooved axes. The only grinding slab found in place is from the lowest levels of Unit 1.

Period 4, represented by the artifacts occurring above 30 inches beneath the surface (Fig. 17, 18), represents a somewhat arbitrary division in the stratigraphic continuum which, however, announces the appearance of several new artifact classes and types. We do not

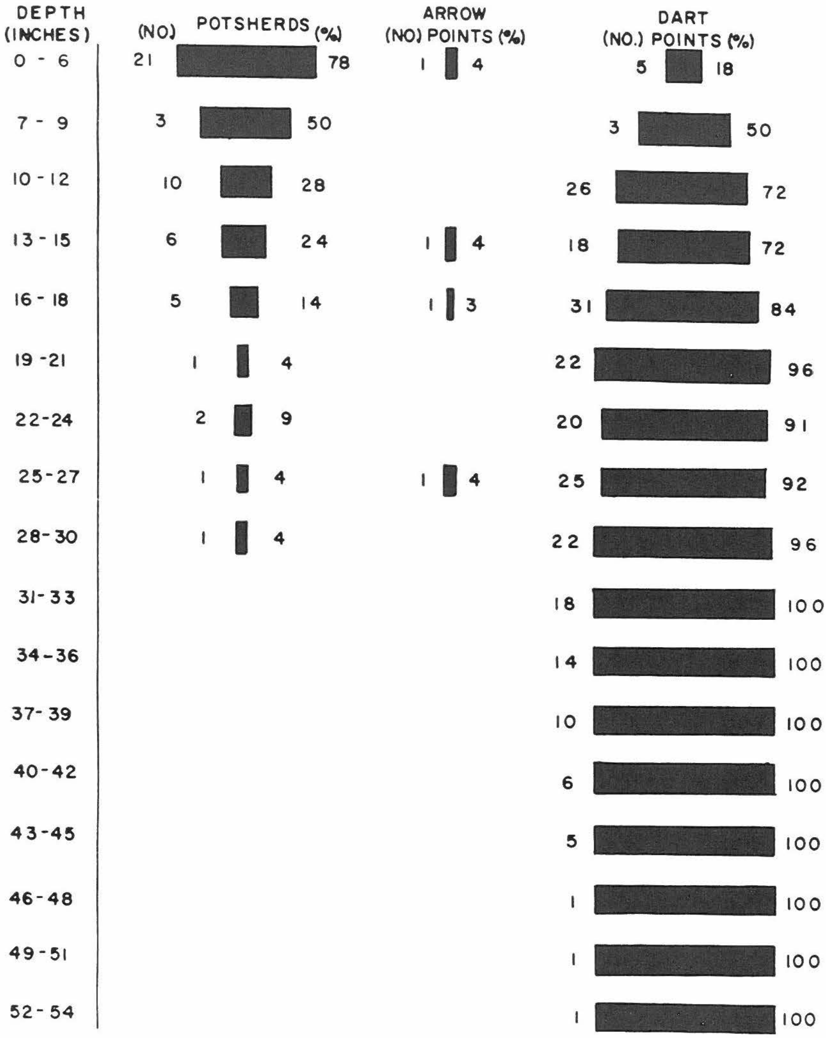


Fig. 17. Area A, Analysis Unit 1, relative percentages of potsherds, arrow points, and dart points.

have evidence, however, for a large population change from period to period. Rather, we seem to have the gradual addition of new elements, new kinds of artifacts, to the existing assemblage or artifact matrix. The only other possible interpretation that occurs to me is that, due to the absence of clearcut geologic strata at the site, the artifacts of dis-

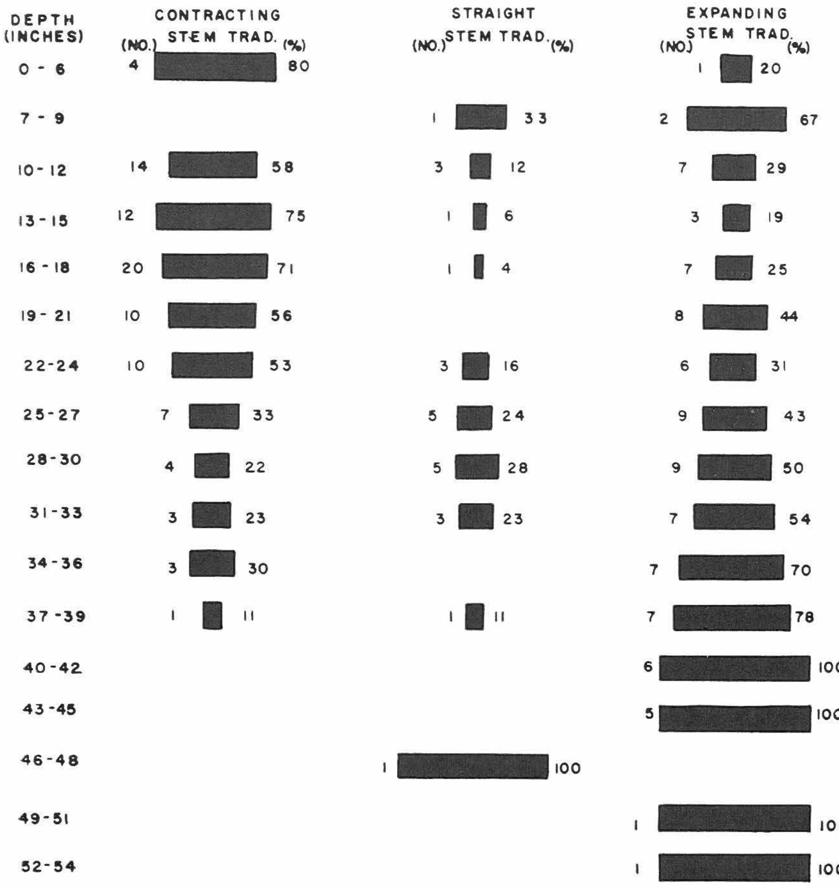


Fig. 18. Area A, Analysis Unit 1, relative percentages of three dart point stemming traditons.

tinct peoples or cultures became mixed together as the site grew up slowly over a long period of time.

In Period 4, potsherds make their appearance (although 1 sherd occurs in the Period 3 level), are rare at first, but increase in numbers through time (Figs. 17, 18; Table 2). Arrow points, although never present in any quantity, also occur. Judging from studies carried out in other areas, the ceramics from the knoll do not all represent the same cultural complex. Those of the *Williams Plain* type, and perhaps *Sanders Plain* as well, will be included, on the basis of data from other sites, in Period 4, while the sherds of *Sanders Engraved*, *Poynor*

Engraved, *Bullard Brushed*, and *Maydelle Incised* will be placed in Period 5 (Area B at the Yarbrough site belongs entirely to Period 5). Although representing several distinct periods of time, the materials of Periods 4 and 5 occur as a single stratigraphic unit in the knoll.

Turning to the dart points of Periods 4 and 5, the types and varieties of Periods 2 and 3 continue, but diminish in relative abundance with the increase in popularity of contracting stem points, which appeared at the end of Period 2 but were not abundant. The most important dart points of Periods 4 and 5 (the upper 30 inches of Analysis Unit 1) are the *kaufman* and *hobson* varieties of the *Gary* type; the *phalba* and *quinlan* varieties of *Kent*; and the *slocum* variety of *Morrill*. Various minor types and varieties occur in Periods 4 and 5, but many of these can also be found in earlier periods (consult Table 2).

TABLE 2

Analysis Unit 1, Area

Depth in inches below surface	0-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	31-33	34-36	37-39	40-42	43-45	46-48	49-51	52-54
Total Potsherds	(21)	(3)	(10)	(6)	(5)	(1)	(2)	(1)	(1)	....	....	....	....	....	....	....	....
Williams Plain	....	1	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....
Sanders Plain	1	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....
Sanders Engraved	1	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Poynor Engraved	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Bullard Brushed	1	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....
Maydelle Incised	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
La Rue Neck Banded	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....
Miscellaneous Incised	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Punctated	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....
Miscellaneous Engraved	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....
Miscellaneous Plain	13	2	8	3	4	....	2	....	1	....	....	....	...	....	....	....	....
Sandy Ware	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Arrow Points	1	....	....	1	1	....	....	1	....	....	....	....	....	....	....	....	....
Total Dart Points	(5)	(3)	(26)	(13)	(31)	(22)	(20)	(25)	(20)	(13)	(14)	(10)	(6)	(5)	(1)	(1)	(1)
Contracting Stem Points (Gary)	(4)	....	(14)	(12)	(20)	(10)	(10)	(7)	(4)	(3)	(3)	(1)	....	....	....	....	....
Gary, Kaufman	....	....	5	2	4	2	3	4	....	....	....	....	....	....	....	....	....
Gary, Alsa	....	....	....	3	....	1	....	....	....	1	....	....	....	....	....	....	....
Gary, Runge	....	....	1	....	....	2	1	1	1	2	2	....	....	....	....	....	....
Gary, Panna Maria	....	....	1	....	1	....	2	....	....	....	....	....	....	....	....	....	....
Gary, Kenedy	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Gary, Colfax	1	....	1	....	1	....	....	....	....	....	....	....	....	....	....	....	....
Gary, Hobson	3	....	5	6	11	4	1	2	3	....	....	....	....	....	....	....	....
Gary, Emory	....	....	1	....	2	....	1	....	....	....	1	....	....	....	....	....	....
Gary, Kemp	....	....	....	1	....	1	1	....	....	....	....	....	....	....	....	....	....
Gary, Misc. Gary	....	....	....	....	1	....	1	....	....	....	....	....	....	....	....	....	....
Intermediate Contract-Straight Stem	....	....	(1)	(2)	(1)	(2)	(1)	(1)	(2)	(1)	(2)	(1)	....	....	....	....	....
Wells	....	....	....	....	....	1	....	....	1	....	2	1	....	....	....	....	....
Kent, Phalba	....	....	1	1	....	....	1	....	....	1	....	....	....	....	....	....	....
Kent, Quinlan	....	....	....	1	1	1	....	1	....	1	....	....	....	....	....	....	....
Straight Stem Points	....	(1)	(3)	(1)	(1)	....	(3)	(5)	(5)	(3)	....	(1)	....	....	(1)	....	....
Bulverde	....	....	....	....	....	....	1	....	1	1	....	....	....	....	....	....	....

TABLE 2—Continued

Analysis Unit 1, Area

Depth in inches below surface	0-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	31-33	34-36	37-39	40-42	43-45	46-48	49-51	52-54
Morrill, Slocum	....	....	....	1	....	....	1	2	1	....	....	....	....	....	....	....	....
Morrill, San Pedro	....	1	1	....	1	....	1	1	1	1	....	1	....	....	1	....	....
Elam	....	....	1	....	....	....	....	....	....	1	....	....	....	....	....	....	....
Misc. Straight Stem	....	....	1	....	....	....	....	2	2	....	....	....	....	....	....	....	....
Intermediate Straight-Expanding-Stem Pts.	....	....	....	....	....	....	....	(1)	....	(2)	....	....	....	....	....	....	....
Yantis, Cook	....	....	....	....	....	....	....	1	....	1	....	....	....	....	....	....	....
Yantis, Swan	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....
Expanding Stem Points	(1)	(2)	(7)	(3)	(7)	(8)	(6)	(9)	(9)	(7)	(7)	(7)	(6)	(5)	....	(1)	(1)
Yarbrough, Lindale	....	2	4	2	4	3	2	3	4	....	1	2	3	2	....	....	1
Yarbrough, Dike	....	....	....	....	....	....	1	1	....	1	....	....	1	....	....	....	....
Yarbrough, Mabank	....	....	2	1	....	2	....	1	3	2	1	1	....	2	....	....	....
Ellis	....	....	....	....	2	1	....	1	....	....	1	1	1	....	....	1	....
Trinity	....	....	....	....	....	....	....	1	....	....	....	....	1	....	....	....	....
Edgewood, Hooker	....	....	1	....	....	....	1	....	....	....	....	....	....	....	....	....	....
Edgewood, Bull Creek	....	....	....	....	....	2	2	1	1	3	....	2	....	....	....	....	....
Edgewood, Dixon	....	....	....	....	....	....	....	....	....	1	2	1	....	....	....	....	....
Ensor	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....
Wesley	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....
Fairland	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....
Palmillas	1	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....
Lone Oak	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Misc. Expanding Stem Points	....	....	....	....	....	....	....	....	....	....	1	....	....	1	....	....	....
Stemless Dart Points	....	....	....	....	....	....	....	1	....	1	1	....	....	....	....	....	....
Misc. Dart Points	....	....	1	....	2	2	....	1	2	1	1	....	....	....	....	....	....
Total Knives	(6)	....	(10)	(4)	(14)	(8)	(11)	(7)	(14)	(5)	(6)	(6)	(2)	(3)	(1)	....	....
Knives, Group I	....	....	1	1	1	1	....	....	3	1	2	....	....	....	....	....	....
Knives, Group II	1	....	1	....	....	....	....	....	1	2	....	....	....	....	1	....	....
Knives, Group III	3	....	....	1	2	2	1	....	....	....	....	1	....	....	....	....	....
Knives, Group IV	1	....	....	....	1	....	....	2	1	....	....	1	....	1	....	....	....
Knives, Group V	....	....	1	....	....	1	....	....	1	....	....	....	....	....	....	....	....
Knives, Group VI	....	....	2	....	....	....	1	....	2	....	....	....	....	....	....	....	....
Knives, Group VII	....	....	1	....	....	1	....	....	1	....	....	....	....	....	....	....	....
Knives, Group VIII	1	....	1	....	2	....	2	....	....	....	....	....	....	....	....	....	....
Knives, Group IX	....	....	3	2	9	3	7	5	5	2	2	2	2	2	....	....	....
Total Miscellaneous Bifacial Artifacts	....	....	....	(1)	(2)	(1)	....	....	(2)	....	....	....	....	....	....	....	....
Misc. Bifacial Artifacts Group I	....	....	....	1	....	....	....	....	1	....	....	....	....	....	....	....	....
Misc. Bifacial Artifacts Group II	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....
Misc. Bifacial Artifacts Group III	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Misc. Bifacial Artifacts Group IV	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....
Misc. Bifacial Artifacts Group V	....	....	....	1	....	1	....	....	....	....	....	....	....	....	....	....	....
Total Scrapers	....	....	(1)	(2)	(3)	....	(2)	(1)	(5)	....	(2)	(4)	(2)	(6)	....	....	....
Mineola End Scrapers	....	....	....	....	2	....	....	1	....	....	....	1	2	2	....	....	....
Triangular End Scrapers	....	....	....	....	....	....	....	....	1	....	2	1	....	....	....	....	....
Side Scrapers	....	....	....	2	1	....	1	....	4	....	....	2	....	3	....	....	....
Miscellaneous Scrapers	....	....	....	....	....	....	1	....	....	....	....	....	....	1	....	....	....
Clear Fork Gouges	....	....	....	3	4	....	1	....	1	1	3	....	2	1	....	....	....

TABLE 2—Continued

Analysis Unit 1, Area

Depth in inches below surface	0-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	31-33	34-36	37-39	40-42	43-45	46-48	49-51	52-54
Drills	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Gravers	....	....	1	....	....	....	....	....	1	....	....	....	....	....	....	....	....
Chipped Hammerstone	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....
Axes	....	....	1	....	....	....	....	....	....	....	....	....	....	1	....	....	....
Sinkers	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....
Gorget	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....
Stone Palette	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....
Grinding Slabs	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....
Manos	1	....	....	....	....	....	1	....	1	....	....	....	....	....	....	....	....
Pitted Stones	....	....	1	....	1	....	....	....	....	....	....	....	....	....	....	....	....

( ) = Totals.

TABLE 3

Analysis Unit 2, Area A

Depth in inches below surface	0-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	31-33	34-36	37-39	40-42	43-45	46-48	49-51	52-54
Total Potsherds	(15)	(1)	(10)	(6)	(4)	(5)	(3)	(4)	(3)	....	....	....	(3)	....	....	....	....
Williams Plain	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Bullard Brushed	2	....	4	1	....	3	2	....	....	....	....	....	....	....	....	....	....
Maydelle Incised	1	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Miscellaneous Incised	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Punctated	1	....	1	....	....	....	....	1	1	....	....	....	1	....	....	....	....
Miscellaneous Plain	9	1	4	5	4	2	1	3	2	....	....	....	2	....	....	....	....
Arrow Points	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....
Total Dart Points	(7)	....	(20)	(27)	(22)	(19)	(22)	(17)	(11)	(10)	(9)	(8)	(12)	....	(3)	....	....
Contracting Stem Points (Gary)	(3)	....	(10)	(5)	(8)	(4)	(5)	(4)	(3)	(5)	(2)	(3)	(4)	....	(2)	....	....
Gary, Kaufman	....	....	2	3	2	1	2	1	1	....	1	1	1	....	....	....	....
Gary, Alsa	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Gary, Runge	....	....	....	....	1	1	....	1	....	1	....	....	....	....	....	....	....
Gary, Panna Maria	....	....	1	....	1	....	....	....	....	1	....	....	....	....	....	....	....
Gary, Hobson	3	....	3	2	2	2	3	2	2	2	1	2	3	....	2	....	....
Gary, Emory	....	....	....	....	1	....	....	....	....	1	....	....	....	....	....	....	....
Gary, Kemp	....	....	1	....	1	....	....	....	....	....	....	....	....	....	....	....	....
Gary, Colfax	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Miscellaneous Gary	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Intermediate Contract-Straight Stem	....	....	(3)	(1)	(2)	(3)	(2)	....	....	(1)	(1)	(1)	....	....	....	....	....
Wells	....	....	3	1	2	3	1	....	....	1	1	1	....	....	....	....	....
Kent, Quinlan	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....
Straight Stem Points	....	....	....	(1)	(2)	(1)	(2)	(3)	(1)	(1)	(1)	....	(1)	(1)	....	....	....
Bulverde	....	....	....	....	1	....	....	1	....	1	....	....	....	....	....	....	....
Morrill, San Pedro	....	....	....	....	....	1	....	....	1	....	....	....	....	....	....	....	....
Elam	....	....	....	....	....	....	....	....	....	....	1	....	1	1	....	....	....
Misc. Straight Stem Points	....	....	....	1	1	....	2	2	....	....	....	....	....	....	....	....	....
Intermediate Straight-Expanding Stem Points	....	....	....	(1)	....	....	....	....	....	....	....	(2)	....	....	....	....	....
Yantis, Cook	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....
Yantis, Swan	....	....	....	1	....	....	....	....	....	....	....	1	....	....	....	....	....
Expanding Stem Points	(4)	....	(5)	(9)	(7)	(10)	(8)	(9)	(4)	(1)	(5)	(3)	(3)	....	(1)	....	....
Yarbrough, Lindale	1	....	2	3	3	3	3	3	1	....	....	1	2	....	1	....	....
Yarbrough, Dike	....	....	....	....	....	2	1	2	....	....	....	....	....	....	....	....	....
Yarbrough, Mabank	1	....	2	1	1	1	2	1	2	1	....	....	....	....	....	....	....

TABLE 3—Continued

Analysis Unit 2, Area A

Depth in inches below surface	0-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	31-33	34-36	37-39	40-42	43-45	46-48	49-51	52-54
Ellis	....	....	....	1	....	2	....	1	....	....	1	1	....	....	....	....	....
Trinity	....	....	...	1	....	....	1	1	....	....	2	....	....	....	....	....	....
Edgewood, Hooker*	....	....	1	....	1	....	....	....	1	....	1	....	....	....	....	....	....
Edgewood, Bull Creek	....	....	....	1	....	2	1	1	....	....	1	....	....	....	....	....	....
Edgewood, Dixon	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....
Wesley	....	....	....	2	....	....	....	....	....	....	....	....	....	....	....	....	....
Palmillas	1	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....
Lone Oak	....	....	....	....	2	....	....	....	....	....	....	....	....	....	....	....	....
Miscellaneous Expanding Stem Points	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Stemless Dart Points	....	....	1	....	2	....	1	....	1	1	....	....	1	....	....	....	....
Misc. Dart Points	....	....	....	....	1	1	2	....	1	....	....	....	1	....	....	....	....
Clovis	....	....	....	....	....	....	....	....	1	....	....	....	1	....	....	....	....
Plainview	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....
Meserve	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....
Sandy Creek	....	....	....	....	....	....	2	....	....	....	....	....	....	....	....	....	....
Misc. Paleo-like Points	....	....	1	....	....	....	....	....	....	1	....	....	....	1	....	....	....
Total Points	(3)	....	(5)	(4)	(10)	(10)	(12)	(4)	(9)	(5)	(2)	(1)	(8)	(1)	....	....	....
Knives, Group I	....	....	....	....	....	....	2	....	....	....	....	....	2	....	....	....	....
Knives, Group II	....	....	....	1	....	2	....	....	1	1	....	....	....	....	....	....	....
Knives, Group III	....	....	....	....	2	1	1	....	1	....	1	....	....	....	....	....	....
Knives, Group IV	....	....	....	....	....	....	....	2	....	....	....	1	....	....	....	....	....
Knives, Group V	....	....	....	....	1	....	1	....	....	....	....	....	1	....	....	....	....
Knives, Group VI	....	....	....	....	....	....	....	....	1	....	....	....	1	....	....	....	....
Knives, Group VII	....	....	....	....	1	....	1	1	....	1	....	....	....	....	....	....	....
Knives, Group VIII	....	....	....	....	....	3	1	1	....	....	....	....	1	1	....	....	....
Knives, Group IX	3	....	5	3	6	4	6	....	6	3	1	....	3	....	....	....	....
Total Miscellaneous Bifacial Artifacts	(1)	....	(2)	(2)	....	(3)	(1)	....	....	....	(1)	(1)	....	....	....	....	....
Misc. Bifacial Artifacts Group I	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Misc. Bifacial Artifacts Group II	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Misc. Bifacial Artifacts Group III	1	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....
Misc. Bifacial Artifacts Group IV	....	....	....	1	....	2	....	....	....	....	1	....	....	....	....	....	....
Misc. Bifacial Artifacts Group V	....	....	....	1	....	1	1	....	....	....	....	....	....	....	....	....	....
Total Scrapers	....	....	(3)	(3)	(5)	(7)	(6)	(2)	(4)	(1)	(1)	(2)	(1)	(1)	....	....	....
Mineola End Scrapers	....	....	1	1	2	2	6	2	2	1	....	1	....	1	....	....	....
Triangular End Scrapers	....	....	1	1	....	2	....	....	1	....	....	....	....	....	....	....	....
Side Scrapers	....	....	1	1	3	3	....	....	1	....	1	....	1	....	....	....	....
Miscellaneous Scrapers	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....
Clear Fork Gouges	....	....	2	2	2	1	....	1	....	....	....	....	....	....	....	....	....
Drills	....	....	....	....	....	....	....	....	1	....	....	....	....	....	1	....	....
Gravers	....	....	....	....	....	....	....	....	1	....	....	....	1	....	....	....	....
Small Choppers	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....
Spoke-shave	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....
Fist Axe	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Sinkers	....	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....
Grinding Slabs	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....
Manos	....	....	....	3	1	....	1	1	....	....	....	....	....	....	....	....	....
Pitted Stones	2	....	1	1	1	....	....	....	1	....	....	....	....	....	....	....	....
Axes	....	....	1	....	....	....	....	....	....	....	....	....	....	....	1	....	....

( ) = Totals.

Many other artifacts from Periods 2 and 3 continue in Periods 4 and 5: knives from Groups I, II, III, IV, VIII, IX, and the various scrapers and Clear Fork gouges. Three knife groups—V, VI, and VII—occur only in Periods 4 and 5, however, as do all of the groups of the miscellaneous bifacial artifact category. Minor artifacts include gravers, the gorget fragment, the small stone palette, manos, and pitted stones. These last artifacts occur only in very small numbers in the strata of Periods 4 and 5 and we certainly can not say, with our statistically small sample, that these artifacts were not also in use in the area during Periods 2 and 3.

As mentioned earlier, the artifacts from Analysis Unit 2 appear to be extremely mixed, and therefore do not coincide with the pattern of distribution which we have from Unit 1 except in the most general and gross way.

In addition to the stratigraphic (vertical distribution) studies, the horizontal distribution of each artifact type, class, variety, etc., was plotted on plans of the site. In almost all instances the distribution of types, etc., followed the general distribution of artifacts for the site, i.e., they clustered almost equally in two areas: Analysis Units 1 and 2. Only two exceptions were noted: most of the Sanders Focus potsherds occurred in Unit 1 and the Paleo and Paleo-like projectile points in Unit 2. This gives some substantiation to the idea that the Paleo points represent separate occupations, and would suggest that the Sanders Focus pottery, because of its clustering in one area, represents an occupation distinct from that represented by the Frankston Focus potsherds.

Occupational Features in Area A

The Burials

Eight burials were discovered in the knoll, Area A, all of which were single interments (Fig. 19). The skeletal remains were generally in very poor condition and were not collected for osteometric study. However, general observations on age groups were made while in the field.

Burial 1 was a tightly flexed adult burial encountered at a depth of 10 inches in Square 16R2 in the sandy midden soil. The long axis of the skeleton was oriented north-south with the head toward the south, and it rested on its left side. No associated artifacts were found.

Burial 2 represents a highly fragmentary skeleton found at an unrecorded depth in Square 18R2. Very few bone fragments were encountered, and although the head seemed to be oriented to the northwest, it could not be determined whether the burial was flexed or extended. No burial furniture was found therewith.

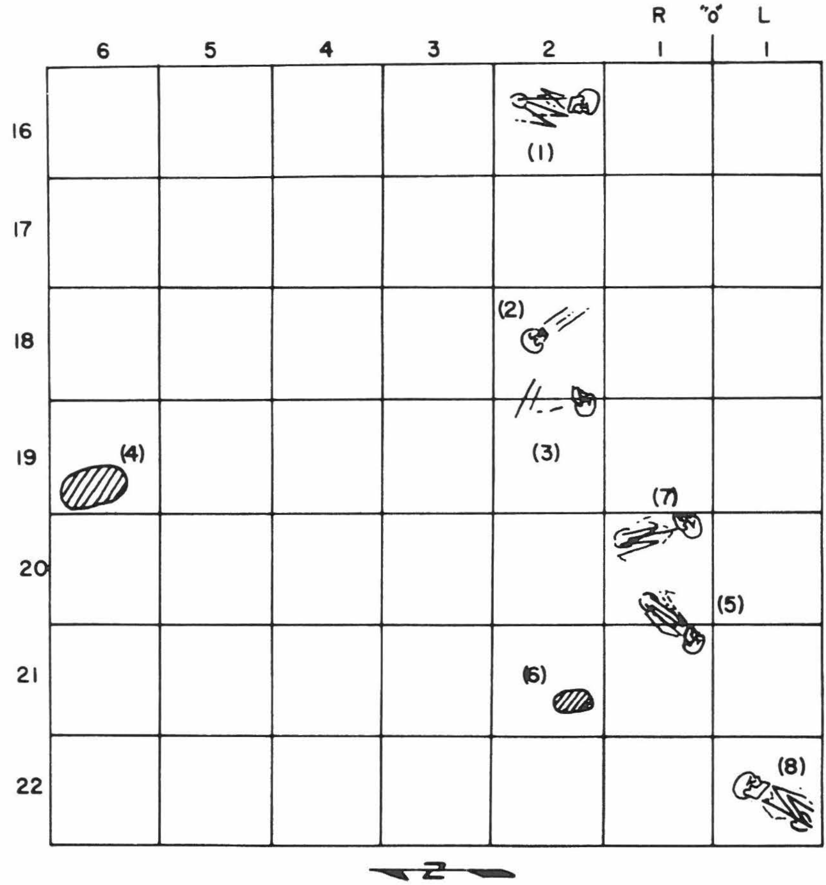


Fig. 19. Location of the burials, Yarbrough Site.

Burial 3 was a tightly flexed adult interment encountered at a depth of 42 inches resting on top of the red clay member of the knoll in Squares 18R2 and 19R2. Although the skeletal material was extremely fragmentary, it could be determined that the orientation was north-south with the head to the south. The skeleton rested on the right side. Fifteen very small, tubular ceramic beads (Fig. 15, G) were found in the neck region.

Burial 4 represents a few skull and teeth fragments found in the disturbed surface soil in Square 19R6. The skeleton had been scattered and broken up by plowing and the orientation of the remains could not be determined. No artifacts were found in association.

Burial 5 (Fig. 20) consisted of a tightly flexed juvenile skeleton found in Squares 20R1 and 21R1 at a depth of 12 inches in the dark midden soil. The long axis of the skeleton was oriented northeast-southwest with the head to the southwest; it rested

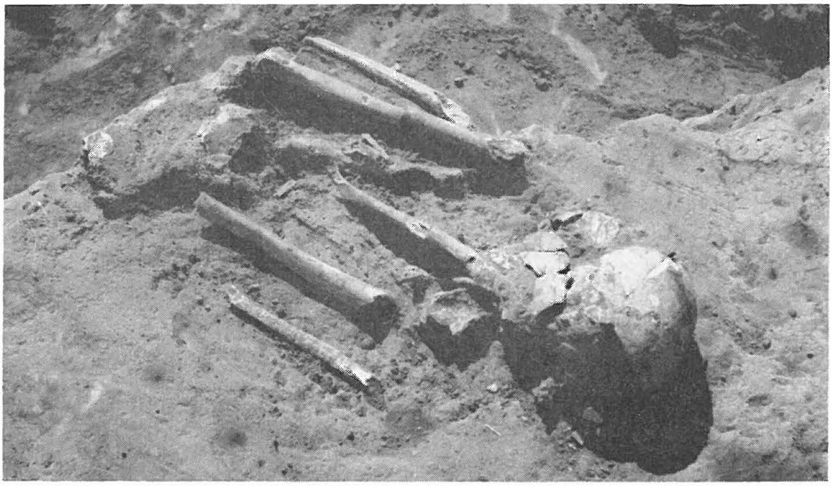


Fig. 20. Burial 5, Yarbrough Site.

on the right side. The knees had been drawn up to the chin, and the arms were extended downward with the hands at the pelvis. No associated artifacts were recovered.

Burial 6 contained the badly broken skull fragments and shattered long bones of a child. These were found at a depth of 24 inches below the surface in dark midden soil in Square 21R2. Because of the highly fragmentary nature of the remains it could not be determined whether the skeleton was flexed or extended. Likewise, the orientation was uncertain, although there is some indication that the head may have been to the north.

Burial 7 (Fig. 21) was a tightly flexed adult burial in dark midden soil in Square 20R1. It was found at a depth of 33 inches below the surface. The orientation of the long axis of the skeleton was northwest-southeast with the head to the southeast. The skeleton rested on its back with the knees above the body and pulled up under chin. The skull had fallen over slightly to one side, to the southeast. The position of the upper limbs was not recorded by the field crew. No burial furniture was found in association.

Burial 8 consisted of an incompletely flexed adult found at a depth of 30 inches in dark midden soil, in Square 22L1. The skeleton was oriented northeast-southwest with the head to the northeast. It lay on its back with the knees extending outward to one side (the southeast), forming a right angle with the long axis of the body. The feet were drawn up against the pelvis. No burial furniture was found.

Unfortunately, the outline of the burial pits could not be discerned by the field crew, and we do not know, therefore, from which levels the burials were dug. The general absence of associated artifacts (a trait of many burials in northern Texas dating from preceramic times) and of ceramic vessels in the burials speak favorably for a preceramic

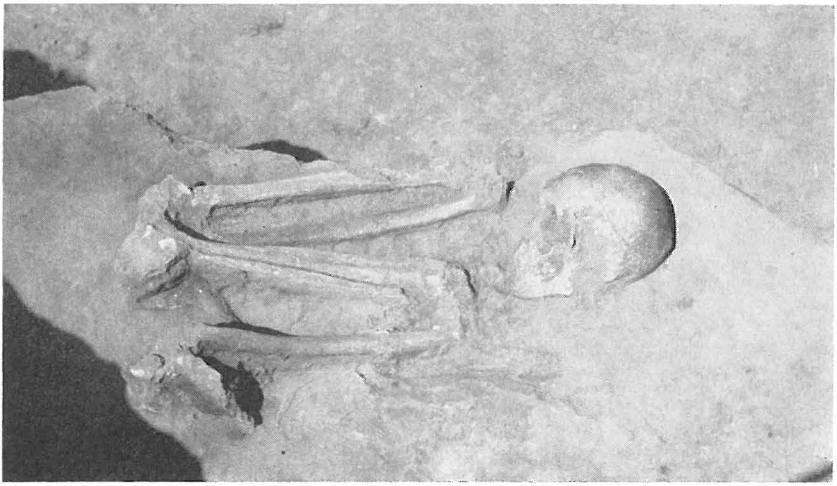


Fig. 21. Burial 7, Yarbrough Site.

date for most of the interments. Of the eight burials, seven occurred in the area comprising artifact Analysis Unit 2 (Burials 2–8) making a rather tight clustering: three below the lowest depth at which potsherds were found (Burials 3, 7, 8), one at the lowest level of the sherds (Burial 6), and two (Burials 4 and 5) in the upper levels and well above the lowest occurrence of pottery. Burial 1, found outside the analysis unit, was also in a pottery zone, and one potsherd was found very near the bones. Still, it is safe to estimate that a majority of the burials are preceramic in age, while the others date, perhaps, from the period in which pottery was first being introduced into the site. Although ceramic beads were found with Burial 7, these do not occur, as far as is presently known, in the later ceramic sites of the area, and the burial probably belongs to the preceramic occupation of the site. Also, the paste of these beads is more homogeneous than that of the late ceramic vessels, lacking bone or other readily discernible tempering agents. They could easily have been manufactured by people ignorant of ceramic cooking vessels.

In summary, all the burials except Burials 2 and 6, which were very fragmentary and badly disturbed, were flexed, four had the head to the south or approximate southern direction, and the skeletons generally rested on the right side. Burials 7 and 8, however, were in a supine position, Burial 2 had the head to the northwest, and Burial 8 had the head to the northeast.

The Knife Cache (Fig. 9).

In square 17L2, at a depth of 23 inches below the surface, a concentration of 10 knives was encountered (Fig. 15, H-O). This group of artifacts seemingly represents a cache, since the knives were found in close association five inches down into the sterile clay member of the knoll. Unfortunately, the field notes do not record the level from which the feature was dug.

Specimen 1 (Fig. 15, H) is a large stemmed knife or spear point with a lanceolate blade, expanding stem, and deeply concave, bifurcating base. This specimen is of gray but mottled compact chert which was well flaked by the percussion and pressure techniques. The edges of the stem and the base have been ground quite smooth. The length of this specimen is 161 mm., the maximum width 43 mm., and the thickness 12 mm. The workmanship shown on this knife is of a very high quality.

Specimen 2 (Fig. 15, I) is a stemmed knife or spear point much like specimen 1 in outline, but of a smaller size. Its blade is lanceolate, but serrated just above the stem. The stem itself is expanding and bifurcating, and has a "fishtail" appearance. Both the edges of the stem and the concave base are well ground. The flaking of this specimen, made of a gray-brown mottled chert, is extremely good, with long, shallow flake scars extending from the blade edge to the center of the specimen. Long flakes were probably removed by some kind of indirect pressure. The length of specimen 2 is 102 mm., the maximum width 34 mm., and the thickness 8 mm.

Specimen 3 (Fig. 15, J) is a narrow, stemless knife with a straight, notched base. The flaking shown on this specimen is inferior to that of the preceding two, and it appears only to have been worked by the percussion knapping technique. A coarse, sandy agate was used in manufacture. The maximum length is 89 mm., the maximum width (at the base) is 27 mm., and the thickness 10 mm.

Specimen 4 (Fig. 15, O), made from a white chert, is a medium-sized knife belonging to Knife Group III, and Specimens 5 and 6 (Fig. 15, K, N) belong to Group IV. The reader is referred to the section on knives for a description of these artifacts. Specimen 4 is 81 mm. long, 37 mm. wide, and 9 mm. thick. Specimen 5 measures 77 mm. long, 32 mm. wide, and 9 mm. thick, while specimen 6 is 74 mm. by 29 mm. by 8 mm. Specimens 5 and 6 are of a dark gray chert.

Specimens 7 and 8 (Fig. 15, L, M) are simple knives with more or less lanceolate blades which, unfortunately, lack their bases and can not therefore be assigned to any of the knife groups. Specimen 7 measures 65 mm. in length (estimate), 39 mm. in width, and 7 mm. in thickness. Specimen 8 was approximately 75 mm. long (estimate), measures 31 mm. in width and 9 mm. in thickness. Both are of a gray, homogeneous chert.

Unfortunately, Specimens 9 and 10 have been lost since their exhumation in 1940, but judging from field drawings, both examples were of Knife Group I.

II. Area B at the Yarbrough Site

The small midden located 300 yards to the south of the knoll has been designated as Area B. This consisted of a small area, approximately 20 feet in diameter, of dark humus-stained midden soil containing many potsherds and bone scraps. The area was thoroughly excavated by the W.P.A. field crew using shovels and trowels. Unfortunately, however, the provenience of the artifacts was not recorded, and it is therefore impossible to attempt distribution studies within the area. It is also not known to what depth the excavation penetrated, although the field notes indicate that this entire midden area was troweled down to red, clayey subsoil. No occupation features (hearths, post molds, etc.) were recognized, and although 612 potsherds, 8 reconstructable ceramic vessels, and several bone tools were found, only two items of stone were recovered—a small ground piece of ferruginous sandstone and a nondescript flint core.

From the meager field data it is hard to determine the kind of feature Area B represented. The best guess, I think, would be that it was a small habitation area of one, or at the most, two houses. The lack of post molds may be due to the black color and homogeneous composition of the soil, or to the gross excavation procedures employed at the site. To support this hypothesis there are two pieces of wattle-impressed daubing such as is frequently found at house sites in the Caddoan area. At any rate, the ceramic materials are all extremely uniform and homogeneous, all representing the Sanders Focus of the Neo-American (or Formative) Stage. The fact that only one unit is represented at Area B, along with its small extent, allows us to suppose a very brief occupation.

As mentioned above, the W.P.A. laboratory at San Antonio was able to reconstruct eight vessels from the potsherds which were recovered. This relatively large number of pots is somewhat surprising considering the small amount of sherds, and leads one to wonder whether they represent furniture from graves or other features which could have been destroyed by repeated agricultural cultivation of a recent date. The insufficient field data, however, only serve to bring up such possibilities and problems, and do not solve them.

The Ceramics

The 612 potsherds and eight reconstructed vessels from Area B present a picture of uniformity and homogeneity. All are of typically "Caddoan" paste and represent only Sanders Focus types: *Sanders Plain*, *Canton Incised*, and *Sanders Engraved*. The paste, wall thickness, color, etc., vary uniformly from type to type, and one description of these characteristics will suffice for the whole collection. The surface color varies from cream to light brown and (rarely) to black.

The paste is lumpy, with clay particles (possibly including some amount of ground potsherds), clay lumps combined with pulverized bone, and very rarely, shell, being used as tempering agents. The core is either the same color as the surface or is slightly darker, the latter condition indicative of an incompletely oxidizing firing atmosphere. The wall thickness ranges from 5 to 8 mm. and the surface hardness from 2.5 to 3.5 according to Moh's scale of hardness.

These sherds and vessels correspond well to those reported upon by Krieger (1946: 185–192) from the Sanders site on Red River, with one notable exception. The execution of the design motifs and elements themselves is much more careless and crude on the Yarbrough site specimens than on the Sanders site examples. Also, the most elaborate wares and types of the Sanders site are not present at Yarbrough. Otherwise the two collections resemble each other very strongly.

The *Canton Incised* Type.

One reconstructed vessel and 126 rim and body sherds could be identified as the *Canton Incised* type (originally defined by Krieger, 1946: 185–192; see also Suhm *et al.*, 1954: 254). Of these, 71 sherds were tempered with small clay lumps and 55 with clay lumps combined with ground bone.

The one reconstructed vessel of this type (Fig. 22, B) is cylindrical, round, and has a flat rim and circular, concave base. Its oral diameter is 13 cm., the average wall thickness is 5 mm., and the height 19 cm. The surface color is of a rather dark reddish-brown, and ground clay lumps were employed as the tempering agent. The decoration consists of a band of crossed, diagonal incised lines located on the exterior surface just below the rim.

Sixty sherds represent cylindrical vessels with similar crossed diagonal lines below the rim (Fig. 23, A, B). Of these, about half the rim sherds have rounded, and the remainder flat, lips. Another five sherds, two with flattened rims and three with rounded lips, have alternate panels filled with diagonal lines running in different or opposite directions; these are located just below the rim.

Seven sherds (Fig. 23, C) have vertical incised lines below the rim. Six of these are from a small carinated bowl with flat lip, the other from a cylindrical vessel having a rounded and very slightly everted lip.

Fifteen of the 126 *Canton* sherds (Fig. 23, P-E) have punctations combined in various ways with incisions below the rim of cylindrical, presumably straight-walled vessels. All of these have flat lips except for one specimen the lip of which is somewhat rounded. The design consists either of alternate panes of diagonal incisions and punctations, or of diamonds formed by crossed diagonal lines and filled with punctations.

An interesting group of 27 sherds (Fig. 23, F) represent flat-lipped carinated bowls with parallel, diagonal incisions in a band around the rim. These lines run downward and to the left from the rim. This group is particularly interesting since the design and vessel shape are characteristic of the *Sanders Engraved* type. Here we have the very same thing, but with incised instead of engraved lines.

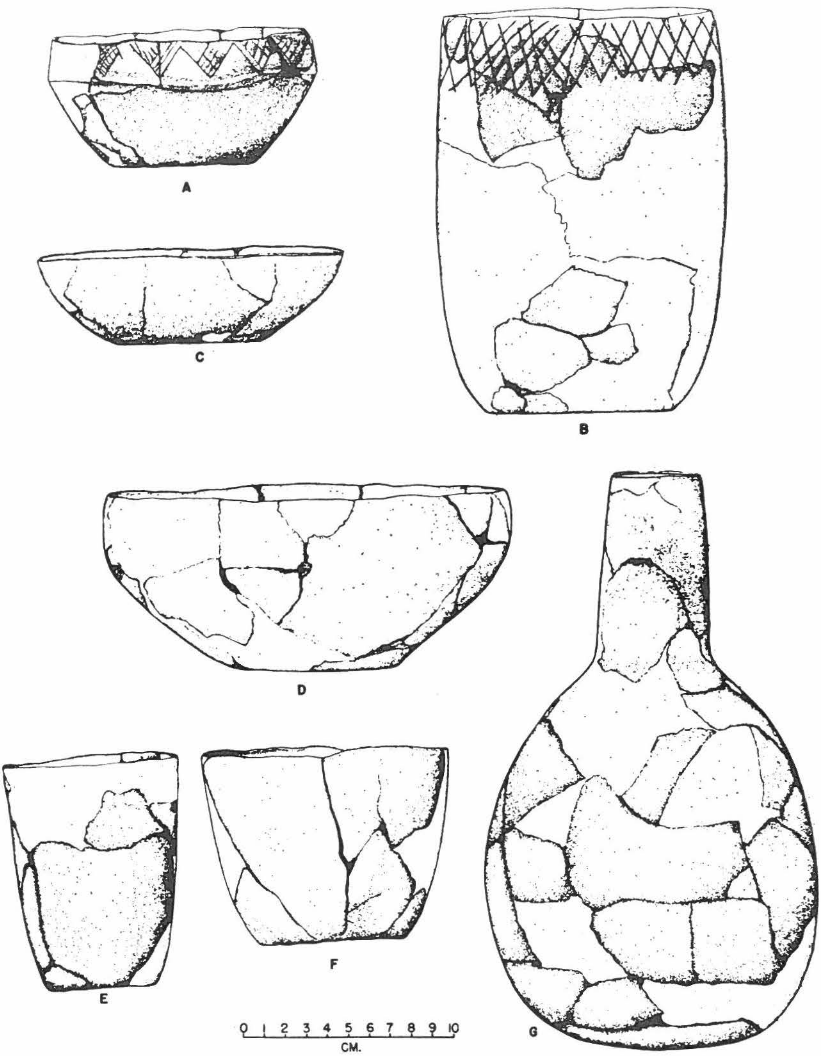


Fig. 22. Ceramic vessels, Area B, Yarbrough Site. A, *Sanders Engraved*; B, *Canton Incised*; C-G, *Sanders Plain*.

Another 11 incised body sherds probably belong to the *Canton Incised* type. These are very small and the position of the parallel incised lines can not be oriented with respect to position on the vessel.

The *Sanders Engraved* Type

One partially reconstructed bowl and 45 body and rim sherds belong to the *Sanders Engraved* type (originally defined by Krieger, 1946: 185–192; see also

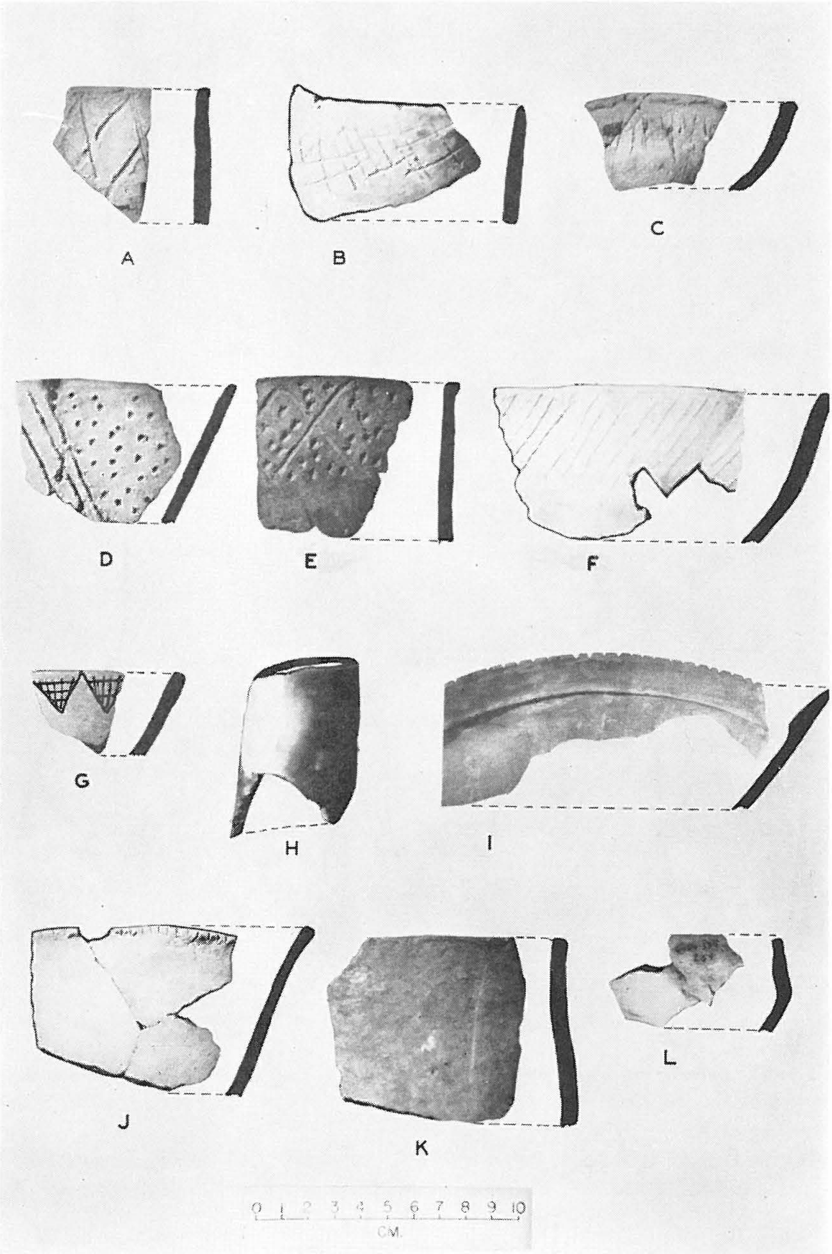


Fig. 23. Potsherds. A-F, *Canton Incised;* G, *Sanders Engraved;* H-L, *Sanders Plain.*

Suhm *et al.*, 1954: 352). Of these sherds, 34 were tempered with clay lumps and 11 with clay lumps combined with pulverized bone.

The partially reconstructed vessel (Fig. 22, A) is of the typical "Caddoan" paste, and has a reddish-brown surface color. Clay lumps were employed as the tempering agent. The bowl has a flat base, is carinated, and has a flat lip. Small, contiguous engraved triangles filled with crossed diagonal lines form a band around the outside of the rim. The oral diameter is 117 mm., the basal diameter 67 mm., and the height 62 mm.

Sixteen sherds, probably representing a single vessel, are from a bottle of undeterminable dimensions and shape which was decorated with circles of crudely made, indistinct triangles. These decorations were located on the body just below the place where the neck was connected. In addition to the bands of triangles, several apparently random zigzag and irregular lines occurred on parts of the vessel body.

Another 11 sherds (Fig. 23, G) also show triangles filled with cross-hatching or with parallel diagonal lines. Four of these come from bottles and seven from bowls. In this last group, six rim sherds are represented, three with flat and three with rounded lips.

Twelve rim sherds have parallel diagonal lines around the rim in place of triangles. Three flat lip and two rounded-lip rim sherds are present in this group.

Another five potsherds, forming a miscellaneous engraved group, are small body sherds with small patches of random engraving on their surfaces. These most likely represent the *Sanders Engraved* type, but we cannot be certain about the identification.

The *Sanders Plain* Type

Seven reconstructed vessels and 89 rim and body sherds could be identified as the *Sanders Plain* type (originally described by Krieger, 1946: 185–192; see also Suhm *et al.*, 1954: 350). Of these, 63 sherds were tempered with small clay lumps and 26 with clay lumps combined with ground bone.

The reconstructed vessels will be described first. Vessel 1 (Fig. 23, I) is a partially reconstructed large, flat bowl of the type which has been found at the Sanders site on Red River (Krieger, 1946: Pl. 25 D). The lip is flat and notched, and a small rudimentary flange occurs on the interior just below the lip. Unfortunately, no basal sherds of this vessel were recovered. The original oral diameter is estimated at 10 cm. The surface is of a rather dark, reddish-brown color and ground clay lumps were employed as the tempering agent.

Vessel 2 (Fig. 22, C) is a small, simple bowl with a somewhat flattened base, convex walls, and a rounded lip. Its oral diameter is 14 cm., the average wall thickness is 5 mm., and the height 4 cm. The surface color is dark brown, and ground bone along with small clay lumps were employed as tempering agent.

Vessels 3 (Fig. 22, E) is a rather small cylindrical vessel or cup having a circular, concave base, relatively straight walls, and a slightly flattened lip. Its average oral diameter is 8 cm., the average wall thickness 5 mm., and the height 105 mm. The surface color is a mottled reddish-brown, and ground clay lumps were used as the tempering agent. The smooth surface evidences vertical striations which probably indicate polishing with a pebble or similar implement.

Vessel 5 (Fig. 22, D) is a medium-sized, low, shouldered bowl having a small flat base and a near vertical rim. The lip itself is rounded and somewhat inverted. The oral diameter averages 18 cm., the height of the rim 35 mm., the complete vessel height 8 cm., the average wall thickness 9 mm., and the basal diameter 75 mm. The surface is of a lustrous brownish red color and is well polished, seeming to indicate the surface floating technique of finishing. Small fragments of hematite, ground bone, and small clay lumps were employed as the tempering agents.

Vessel 6 (Fig. 22, G) is a large bottle with an elongated, gourd-shaped body and a straight-walled but slightly contracting neck. The base is somewhat convex and the lip is rounded. The oral diameter is 35 mm., the maximum diameter of the body 15 cm., the height of the body 17 cm., the height of the rim 9 cm., the total height 26 cm., and the average wall thickness 7 mm. The surface color varies from light reddish-brown to dark black, the latter color evidently caused by fire after breakage occurred. The surface is well smoothed but not polished, and small clay lumps were used as the tempering agent.

Vessel 7 represents the partially reconstructed lower section of a squat, shouldered bottle, the bottom half of which is hemispherical in shape and the top half conical. The base tends to be flat. Unfortunately the upper parts of the vessel are missing and we can tell nothing about its neck and rim shape. The maxmium body diameter is 16 cm., the diameter of the base 8 cm., and the thickness of the wall sherds 5 mm. The surface exterior is quite rough and is of a purplish-red color. Small clay lumps appear to have been used as the tempering agent.

Of the 89 potsherds definitely of the *Sanders Plain* type, 33 are from bottles of the form represented by vessel 6 (Fig. 23, H). The remaining sherds are from bowls or beakers (cylindrical pots) (Fig. 23, J, K).

Sixteen sherds with flat lips and 14 with rounded lips are from medium to large size cylindrical vessels probably like Vessel 1. Another 15 sherds belong to one or more large, flat bowls, have lips notched on the outside, and exhibit a prominent thickening of the interior wall surface immediately below the lip.

Two sherds with flat lips (Fig. 23, L) belong to a medium-sized carinated bowl. Another three sherds represent vessels with concave, or "recurved," rims and an everted rounded lip. The remaining two sherds of *Sanders Plain* are from simple, medium-sized, convex-wall bowls with rounded lips.

Miscellaneous Potsherds

In addition to the above-described types, various sherds were recovered which belonged to other categories. One of these is a punctated strap handle of a vessel of *Monkstown Fingernail Punctated* (Krieger, 1946: 185–191; see Suhm *et al.*, 1954: 330). Another nine are body sherds covered on one or both surfaces with a bright red ochre wash. These could have belonged to *Maxey Noded Redware*, *Sanders Plain*, or *Sanders Engraved* vessels.

Nineteen miscellaneous punctated body sherds could not be assigned to any type, nor could 28 flat basal sherds.

Of some interest are 10 undecorated body sherds which, except for their shell tempering, are like the other ceramics from the Yarbrough site. Although Krieger does not report shell tempering in Sanders Focus ware, several vessels tempered with shell and having a Sanders appearance have been reported from Spiro, Oklahoma (Duffield, personal communication).

A group of 392 miscellaneous body sherds could not be typed. These represent undecorated potsherds which come, most likely, from *Sanders Plain* vessels and from the undecorated part of vessels of the decorated wares. Of these, 263 have clay lump tempering and 129 have ground bone combined with clay lumps.

Bone Implements

Fourteen bone and antler implements, all of deer, were recovered in Area B. Seven of these implements (Fig. 24, E-G) represent worked tips of antler, and were apparently used as awls or, perhaps, as punches. Although similar specimens have been designated as pressure flaking tools in other areas, a certain amount of doubt exists about this identification. For example, the tips of these specimens are quite smooth and do not show gouges, scratches, or mutilations which would presumably be caused by flaking.

Six deer ulnae (Fig. 24, A-C) show modification of the forward sections. Although these specimens are extremely fragmentary, it seems likely that they were employed as awls or smoothing tools. A bit was fashioned on the two nearly complete specimens.

One large section of antler (Fig. 24, H), although not otherwise modified, has a small drilled hole which penetrates half the diameter. The remaining bone artifact was manufactured from a segment of long bone. This implement (Fig. 24, D) has been considerably smoothed and one end has been ground from both faces into a narrow bit. Similar implements found on the Plains have been identified as fleshing tools.

Area B, Summary Statement

In conclusion, it is possible to say that Area B was a small occupation area representing the Sanders Focus of the Neo-American (Formative) Stage. The material found here corresponds to Period 5 of the knoll, Area A. The people who lived here were potters, making cylindrical vessels (beakers), cups, large flat bowls, both simple and carinated bowls, and large vessels, which were decorated by incising or engraving, by punctating, or by applying a red wash. The only other tools encountered were awls of deer ulnae and antler tips, and a long-bone implement which may have served as a flesher. The absence of arrow points, scrapers, and other lithic tools is rather surprising, but perhaps reflects poor excavation techniques more than anything else.

The Yarbrough Site—Summary

The preceding site description and artifact analysis, as well as the studies of artifact provenience and distribution, enable us to make certain general statements about the aborigines who inhabited the Yarbrough site, and to comment upon the general history of the site.

To deal first with history, the deep stratigraphic columns from Area

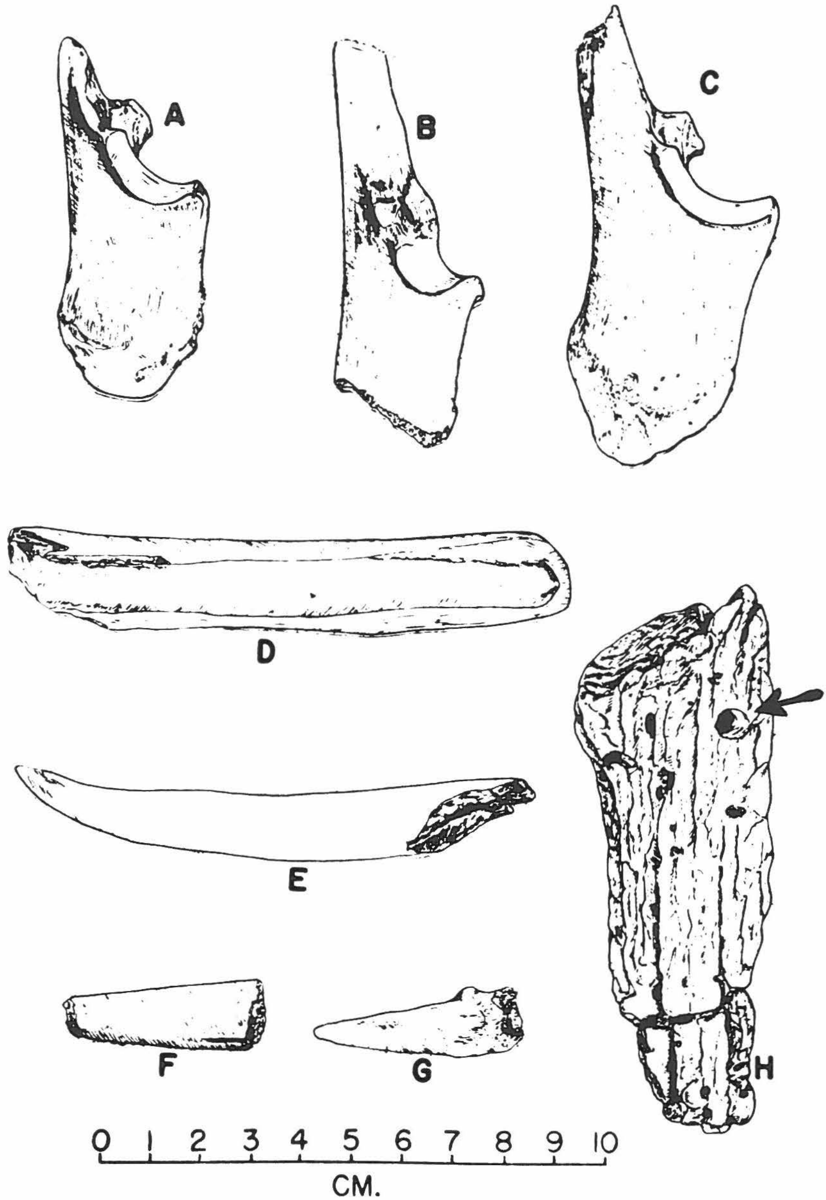


Fig. 24. Bome implements. A-C, deer ulnae awls; D, long-bone artifact; E-G, antler implements; H, drilled antler segment.

A give us evidence for various Paleo-Indian occupations of the site (Period 1), and for three "periods" (Periods 2, 3, 4) of occupation during the Archaic Stage. The uppermost excavation levels of Area A, and all of the artifacts from Area B, represent later occupations of the site by peoples of the Neo-American, or Formative, Stage (Period 5).

The Paleo-Indian materials, unfortunately, all come from an area of the site where the stratigraphy of the various artifact types is considerably mixed and confused. However, because of their stylistic peculiarities, the Paleo projectile points (representing *Clovis*, *Plainview*, *Meserve* and other types) could be factored out of the collection. In view of the numerous occurrences of Paleo-Indian points in archeological sites in eastern Texas and adjacent areas, I do not hold to the oft-cited idea that these artifacts merely represent materials which were collected and reused by later groups of aborigines. It seems much more reasonable to assume that they are the product of various brief occupations of these sites by highly nomadic Paleo-Indian peoples.

To deal now with the Archaic artifacts, there is good evidence in the lowest levels of the Yarbrough knoll that expanding stem dart points were the most popular early form. This early Archaic material has been designated at Period 2. There is some evidence (corroborated by data from the Manton Miller and other sites) for a third period representing the introduction into the area of contracting stem dart points. Unfortunately, the data on the straight-stem tradition does not allow it to be placed within any particular single period. Rather, the straight-stemmed points are found scattered throughout the vertical distribution column in small numbers. In Period 4 contracting stem dart points were the most common form, and simple, plain-ware ceramics made their appearance (*Williams Plain* and, perhaps, *Sanders Plain*). The peoples who belonged to the various periods of the Archaic Stage made and employed, in addition to dart points, other stone implements such as gouges, axes, grinding slabs, manos, flint scrapers, etc. All of these tools are characteristic of a hunting-gathering society. Polished stone artifacts, as opposed to those made by the knapping technique, were never popular at the Yarbrough site. In sharp contrast, at many sites of similar age and developmental position located farther to the east in Norh America, abundant polished stone artifacts occur in great numbers.

Finally, the data we have from the Yarbrough site (Area B and the uppermost levels of Area A) give evidence of an important change which took place in the region, namely, the shift from a vigorously nomadic or semi-nomadic mode of existence to a more settled way of life (Period 5), the latter represented by arrow points and an abundance of highly developed, complex, decorated ceramics. This is the Neo-American or Formative Stage.

The stratigraphic differentiation between Period 4 and the later Neo-American stage is not good at the Yarbrough site, but conclusive corroborative evidence for this break exists at other sites in the area.

Speaking now in terms of archeological taxa, the Archaic materials at the site (including most of the plain-ware potsherds) belong to the La Harpe Aspect, whose definition is presented later in this report. The arrow points and more elaborate ceramics seemingly represent the Sanders Focus of the Gibson Aspect, as well as one or more foci of the later Fulton Aspect.

THE MANTON MILLER SITE

Location and Description

The Manton Miller site (University of Texas No. 41DT), which is located within the proposed Cooper Reservoir in south-central Delta County of northeastern Texas, was excavated in 1959 as part of the Inter-Agency Archeological Salvage Program. The site occupies a knoll on the northern flood plain of the South Sulphur River. Over the surface of the knoll is scattered a large quantity of cultural refuse, including both ceramic and lithic artifacts.

The Miller site lies 3.5 miles south of the town of Cooper, Texas, adjacent to and on the east side of the Cooper-Peerless county road (Fig. 25). The site covers an area of approximately 4 acres on the summit and southern slope of the small knoll mentioned above, an erosional remnant situated approximately 750 feet north of the stream channel. This knoll, which is roughly 150 feet in diameter at the top, stands 15 feet above the level of the flood plain and is not seriously affected by the periodic inundations that occur in this area.

Two concentrations of cultural debris were located and partially excavated (Fig. 25). The first of these, designated as Area A, is located on the highest part of the knoll, while the second, Area B, is a small midden on the southern slope of the knoll, approximately 150 feet southwest of the summit and 6 feet lower in elevation than Area A.

A long river levee encroaches upon the eastern margin of the site, beginning on the eastern slope of the knoll and extending southeastward for a distance of a mile, in part paralleling the river. As far as could be determined, the construction of this levee did not appreciably

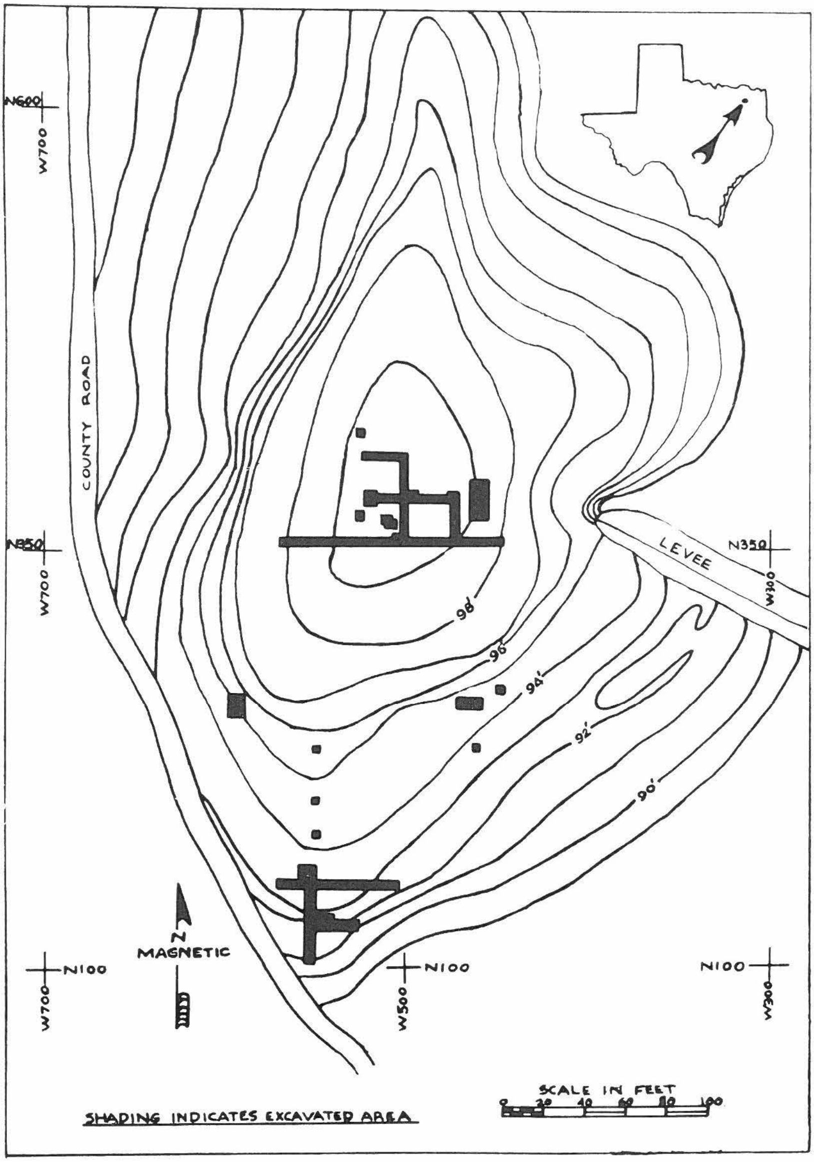


Fig. 25. Manton Miller Site, contour map.

damage the site. In addition to the levee, the eroded remains of two modern artificial contour terraces could still be seen around the western and southern margins of the knoll. These followed the 92 and 96 foot contours respectively (Fig. 25, 26). They were constructed, perhaps, in conjunction with the building of the levee or as an aid in contour farming. Unfortunately, they resulted in the utilization and removal of a great deal of the topsoil from the summit of the knoll, Area A.

During the first half of the present century the area covered by the site was cultivated intensively, but at the time of excavation it had been allowed to grow up in grasses and weeds. It appears that cultivation, along with rainfall and terrace construction, has taken away an appreciable quantity of soil from the surface of Area A. A burial (No. 1) in very poor condition was found eroding out of the surface of the knoll, as well as a rather large quantity of artifacts and occupational detritus.

Geologically speaking, the internal structure of the site is relatively simple. In Area B, the thin surface zone is a layer of midden soil composed, for the most part, of black, humus-stained sand that contains a considerable quantity of cultural refuse. This zone, which is entirely lacking on the eroded knoll, Area A, has a maximum thickness of 1.5 feet in Area B. The upper part of this stratum has been considerably disturbed by plowing. Below the dark, implementiferous midden soil, occurs a yellow and generally sterile, clayey subsoil, extremely hard and compact, which extends downward for an undetermined distance below the midden zone. In Area A this body has been exposed by erosion, and all of the cultural debris is confined to the plow zone.

The area between the knoll and Area B yielded very little cultural material, and appeared to be considerably eroded. In many spots the clayey subsoil was visible, and two burials (Nos. 2 and 3) were found eroding out of this area.

Discovery and Excavation of the Site

The Miller site was first discovered and recorded during the winter of 1951 by Edward B. Jelks and Edward H. Moorman while conducting a preliminary archeological reconnaissance of the Cooper Reservoir area (Moorman and Jelks, 1952). The survey was carried out by the Austin Office of the River Basin Surveys of the Smithsonian Institution. However, the planned construction of the dam and reservoir has been delayed several years, and although work on the dam is scheduled to begin in the near future, the U. S. Army Corps of Engineers reports that the exact specifications for the reservoir are still indefinite.

In order to re-evaluate the sites located during the 1951 survey,

L. F. Duffield and W. A. Davis made a brief visit to Cooper Reservoir in May of 1959, examining the sites reported by Moorman and Jelks (Duffield, 1959a). Since both the 1952 and 1959 survey reports emphasized the importance of the Manton Miller site as a potential source of valuable archeological data, and since the site is scheduled to be completely submerged by the Cooper Reservoir, steps were taken to provide for salvage excavations prior to its inundation.

In October, 1959, under terms of a contract (No. 14–10–333–528) between The University of Texas and the U. S. National Park Service, a field crew of the Texas Archeological Salvage Project was dispatched to the Miller site to carry out the rerommended excavations. Work was carried on from October 12 to November 9, under the direction of Edward B. Jelks, Executive-Director of the Texas Archeological Salvage Project. In addition to Jelks, the field crew consisted of L. F. Duffield and C. D. Tunnell, archeologists, and the following assistants: Richard E. Ross, John Ruegenberg, Chester Rogers, and W. C. Jones.

Excavation and Recording Methods

The excavation and recording procedures utilized at the Miller site were those generally employed by the Texas Archeological Salvage Project. A grid system, oriented on magnetic north and using 5-foot squares as excavation units, was imposed over the site (Fig. 26). A horizontal reference or control point was set up to the southeast of the site and was designated N0-W0, and all points on the site were measured from this datum. Each square in the grid was designated by the coordinates of its southeastern corner measured from the datum. For example, stake N350-W500 was located 350 feet north and 500 feet to the west of the horizontal control point; the 5-foot square with that stake at its southeastern corner was labeled Square N350-W500.

A large nail in the base of a telephone pole at the southern edge of the knoll was selected to serve as a vertical control point. This was assigned an arbitarary elevation of 100 feet, and the surface of the site, occupational features, and trench and pit floors were all recorded relative to this vertical control datum. No U. S. Geological Survey bench markers were located in the immediate vicinity, and it was not feasible to relate the arbitrary elevation system used at the site with sea-level elevation.

To seek any occupational features which might be present and to determine the stratigraphic composition of the site, test trenches were run through Areas A and B.

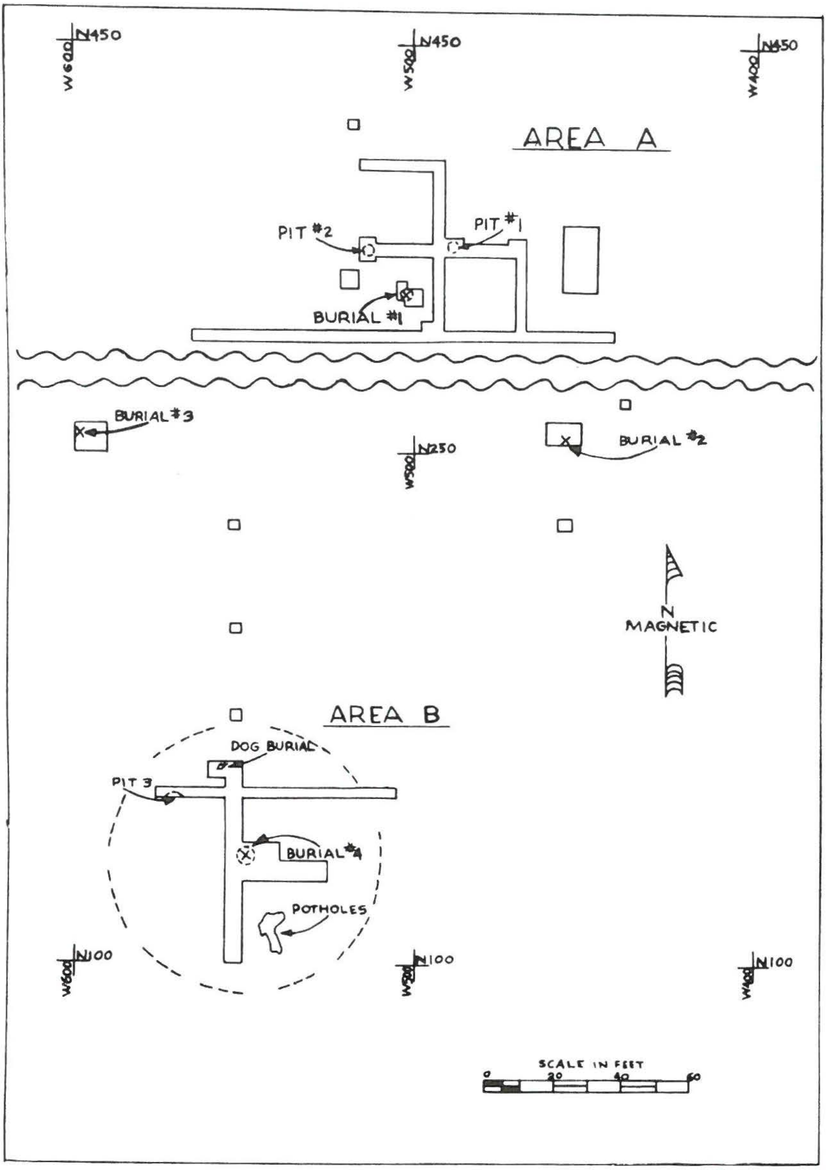


Fig. 26. Manton Miller Site, plan of excavation, showing Areas A and B.

In Area A—the top of the knoll—trenches 2.5 feet in width and of varying lengths were run east-west along the N350, N375, and N400 lines, and north-south along the W475 and W500 lines (see Fig. 26 for dimensions and extent of the excavations). At every spot where the presence of occupational features (hearths, post molds, burials, etc.) was suspected, the trenches were enlarged to expose them. As a general rule, the soil removed from the test trenches was not passed through screens, since the primary purpose of these initial excavations was to locate occupational features. In addition to the test trenches, a large block of 5-foot squares was excavated in Area A a short distance to the northeast of the trenches (Fig. 26). The soil removed during the excavation of these squares was passed through screens of half-inch mesh.

In Area B, a test trench 2.5 feet wide was dug in an east-west direction along the N150 line (Fig. 26). Since the purpose of the trench was primarily exploratory, the soil removed was not passed through screens. After the test trench was completed, a row of 5-foot squares was excavated both northward and southward from N150, following the W550 line which crossed the approximate center of the Area B midden. Several additional 5-foot squares were also put down in the midden area, both to the east and west of the W550 line, in places where further excavations were deemed advisable (Fig. 26).

All excavating was done in arbitrary half-foot vertical intervals and the artifacts recovered were bagged by their respective levels. In both areas, all the soil from 5-foot squares outside the test trenches was passed through screens having a half-inch mesh and the "floors" of all the half-foot levels were carefully troweled to facilitate the detection of features. The excavations in Area A did not penetrate more than 1 foot below the surface of the soil; those in Area B did not go beyond a depth of 2 feet.

Occupational Features

Four human interments, each containing one individual, a dog burial, three pits of medium size, and seven earthen hearths were encountered in various parts of the site (see Fig. 26) during the excavations. Neither post molds nor house patterns were found.

Dr. T. W. McKern, physical anthropologist at The University of Texas, examined the skeletal material from the Miller site and, where possible, made appropriate measurements and observations. Because of the fragmentary nature of the material and its poor state of preservation, he was only able to work with the skeleton from Burial 4.

Burials

Burial 1. This was encountered below the N365-W510 stake in Area A at a depth of 0.2 feet below the surface of the soil. A few bone fragments, however, could be seen eroding from the surface. The skeleton lay within the plow zone and rested on the sterile clayey subsoil. Because of its location near the surface, the bone material was badly broken and scattered by plowing; it was, therefore, not possible to determine with any accuracy the original orientation and position of the skeleton. Although most of the skull was missing, the mandible was found directly to the east of the main bone mass, suggesting an east-west orientation of the burial with the head toward the east. It appears that the skeleton rested on its right side and was tightly flexed, although the fragmentary nature of the skeleton precludes any certainty regarding the position.

Although the grave outline could not be traced accurately, the grave fill itself was black, humus-stained soil which was distinct from the brownish sandy soil into which the burial had been dug. No artifacts were found in association with the remains.

Burial 2. This burial consisted of an extremely fragmentary and badly disturbed human skeleton in Square N255-W465, in the eroded section of the site between Areas A and B. These skeletal remains, occurring just below the surface and extending to the base of the plow zone, were so thoroughly demolished by plowing that neither their orientation, position, nor the dimensions of the grave outline could be determined. Several small potsherds and animal bone fragments, obviously representing intrusive midden debris and not grave furniture, were found scattered among the human remains.

Burial 3. This burial consisted of another highly fragmented skeletal find encountered in Square N250-W510, between Areas A and B. Most of the burial was at a depth of 0.3 feet below the surface, although a few bone scraps were observed on the surface itself. This burial was also within the plow zone and had been almost completely destroyed, so that only a few skull fragments, one tooth, a few phalanges, and other small scraps remained. The original position of the skeleton, its orientation, dimensions, etc., could not be determined. Although one *Gary* type dart point and a plain potsherd were found among the bone scraps, they appear to represent only fortuitous midden debris.

Burial 4 (Fig. 27). This burial, a single human skeleton in an excellent state of preservation, was encountered in Square N130-W545, Area B, at a depth of 1.5 feet below the surface. The skeleton was semi-flexed with the hands drawn up toward the head, rested on its right side, and was oriented northeast-southwest with the head to the southwest. The long axis of the grave (northeast-southwest) measured 5 feet and the short axis, at the shoulders, 3.6 feet. Apparently the burial pit was dug from the base of the plow zone or higher. The grave fill itself was of a slightly darker, more humus-stained soil than the gray, compact sand into which the grave had been dug. No burial furniture was found in association with the skeleton remains; one plain potsherd found in the grave fill represented a seemingly accidental inclusion.

The following observations on the bone material from Burial 4 were made by Dr. T. W. McKern:

The skeletal remains, Bur. 4, from the Miller site are those of a fairly young and robust American Indian female of approximately 17 years of age. The skull is dolichocranic (71.9 mm.) with narrow facial and nasal dimensions. The cranial contour in normal verticalis is ovoid, parietal bosses are pronounced, the vault is keeled, and the mastoids are large for a female. The cranial contour in norma lateralis is distinguished by a pronounced occipital bun. Stature is approximately 5′ 4″.

The dental arcade is hyperparabolic, the gonions everted, and both genial spines and mylo-hyoid ridges are pronounced.

Fig. 27. Burial 4, Manton Miller Site.

Dental wear is pronounced for the indicated age but not unusually so when compared to known prehistoric Indians of the area. With the exception of an impacted lower left third molar, the general condition of the teeth is good.

Other than slight lipping of the anterior borders of the lumbar centra, there is no evidence of general or local pathology.

In addition to the human interments described above, one dog burial was found (Fig. 28). This was located in Area B, in the western edge of Square N155-W550 and extending into the eastern part of the square N155-W555, at a depth of 1.8 feet below the surface. The skeleton was oriented north-south with the head to the north, and rested on its right side facing west. These remains lay in the humus-stained midden soil just above the zone of contact with the clayey subsoil, and thus had not been disturbed by plowing. Although a grave outline could not be discerned, the remains nevertheless seem to represent a deliberate interment judging from the well-articulated skeleton and its neat placement. According to an identification made by the Vertebrate Paleontology Laboratory of The University of Texas, this animal is a domesticated dog. It was not passible to determine whether the dog burial dates from the aboriginal or the recent Anglo-American occupation.

Pits

The outlines of three medium-sized pits were encountered during the course of the excavations. The fill removed from the pits contained nothing but the usual midden debris and, from the limited evidence at hand, the use for which they were intended can not be determined.

Fig. 28. Dog burial, Manton Miller Site.

Pit 1. Located on the top of the knoll, in Square N375-W495, Pit 1 was a roughly basin-shaped, oval excavation having a maximum diameter of 3.5 feet. The pit was apparently dug from the plow zone or above, and penetrated the clayey subsoil. No ashes or other evidences of fire were encountered in or about the pit; thus the possibility that it served as a hearth for cooking purposes can be eliminated. Perhaps the purpose of the excavation was to acquire clay for the manufacture of ceramics or, when lined with a hide, the pit could conceivably have been used in the stone-boiling technique of cooking. The fill yielded only three dart point fragments, a knife, a few flint spalls, and several animal bone fragments—all common items of midden refuse.

Pit 2. This pit, located in Square N375-W520, Area A, was oblong in shape, with a maximum length of 2 feet, a maximum width of 1.5 feet, and measuring 1.5 feet in depth from the present surface of the site. The outline of the pit indicates that it was dug from the base of the plow zone or from above. Unlike Pit 1, which was more or less basin-shaped, Pit 2 had a flat bottom and relatively straight and vertical walls. In the fill removed from the pit were found four potsherds, three resembling the *Williams Plain* type, one unidentified; miscellaneous flint fragments; shells; and animal bone fragments.

Pit 3. This was found in the Area B midden, in Square N150-W570. This pit was basin-shaped, had a maximum diameter of 1.5 feet and reached a maximum depth of 2.5 feet below the present soil surface. Although the outline of the pit was easily discernible in the clayey sub-soil, it could not be followed clearly in the overlying dark midden soil; hence the level from which the pit was dug could not be determined. In the pit fill a bone awl, one *Kent* type dart point, two unclassifiable arrow points, an abundance of bone and shell fragments, and a few pecan hulls were found. This feature, like the two pits found on the knoll, evidenced no ash or other indications of fire.

Hearths

Seven shallow, basin-shaped hearths were found during the excavation of the site. They were simple, shallow depressions without linings of clay, stone, or other materials. The internal structure of the hearths was very consistent throughout the group, hence the detailed description of one (Hearth 3) should suffice for the entire group. Only general dimensions and location will be given for the other 6 hearths.

Hearth 3, encountered in the trench wall running from N125 to N130 along the W555 line, consisted of a shallow basin 1.5 feet in diameter and 0.2 feet thick at the center, thinning considerably, however, toward the edges. The top portion of the hearth was composed of the lumps of clay of a bright orange color, presumably the result of heat. Beneath this was found a very light gray ash, which lined the bottom and edges of the hearth. The top of this feature was encountered 0.5 feet below the present surface of the site; the bottom at a depth of 0.7 feet. The other six hearths had a similar internal structure with burned clay overlying a layer of almost white ash. Some of the hearths showed other minor lenses, but nevertheless retained the main compositional characteristics of Hearth 3.

Hearth 1 was located in Square N140-W550. It was approximately 3 feet in diameter, reached a maximum thickness of 0.5 feet, and occurred between the 1 and 1.5 feet depths below the surface.

Hearth 2 was found in Square N110-W550. It measured 2.5 feet in diameter and 0.5 feet in maximum thickness, occurring between 1.8 to 2.3 feet below the surface of the site.

Hearth 4, only half of which was uncovered, was discovered in Square N105-W550. Since the whole feature was not exposed, its diameter and maximum thickness could not be determined. The top of the hearth, however, was encountered at a depth of 0.7 feet below the soil surface.

Hearth 5, in Square N140-W550, was likewise only partly uncovered and its complete dimensions were not determined; its top portion was encountered at a depth of 1.4 feet below the surface.

Hearth 6 was located on the N120 line between W551 and W553.3. It measured 3.5 feet in maximum diameter, but its thickness was not recorded. The top portion of this hearth was encountered at a depth of 1.5 feet below the surface of the site.

Hearth 7, encountered at a depth of 0.5 feet below the surface, was located on the N130 line between W545 and W548. The entire surface of this hearth was exposed by excavation; its average diameter was 2.5 feet. Hearth 7 was like the others, except that it contained a larger amount of ash, charcoal, animal bones, and shell fragments.

No post-mold patterns were found surrounding the hearths to suggest that these features might have been located inside houses or other structures. Except for several fired daub particles, no indications of house structures were encountered at the Miller site. If the hearths were used for cooking purposes (and the bone and other refuse in and about them would suggest this) cooking was probably done in the open.

Description of the Artifacts

A total number of 1,046 artifacts was recovered from the Manton Miller site; this includes the following categories: chipped stone artifacts, ground stone artifacts, ceramics, bone artifacts, and shell artifacts.

Chipped Stone Artifacts

1. *Projectile Points*

In the following presentation of the projectile points recovered from the Manton Miller site, the usual references and descriptions will not be given for types and varieties which appear in the section of this paper dealing with the Yarbrough site artifacts. Rather, in as many instances as is possible, reference will be made back to the Yarbrough site descriptions. Dimensions, however, will be given in all cases.

DART POINTS

Like those from the Yarbrough site, the dart points from the Miller site belong to three stemming traditions—the contracting stem, straight stem, and expanding stem traditions.

THE CONTRACTING STEM TRADITION. Of the 144 dart points and dart point fragments recovered, 119 belong to the contracting stem tradition, which has been recognized in many parts of North America. The Miller site contracting stem specimens are all of the *Gary* type.

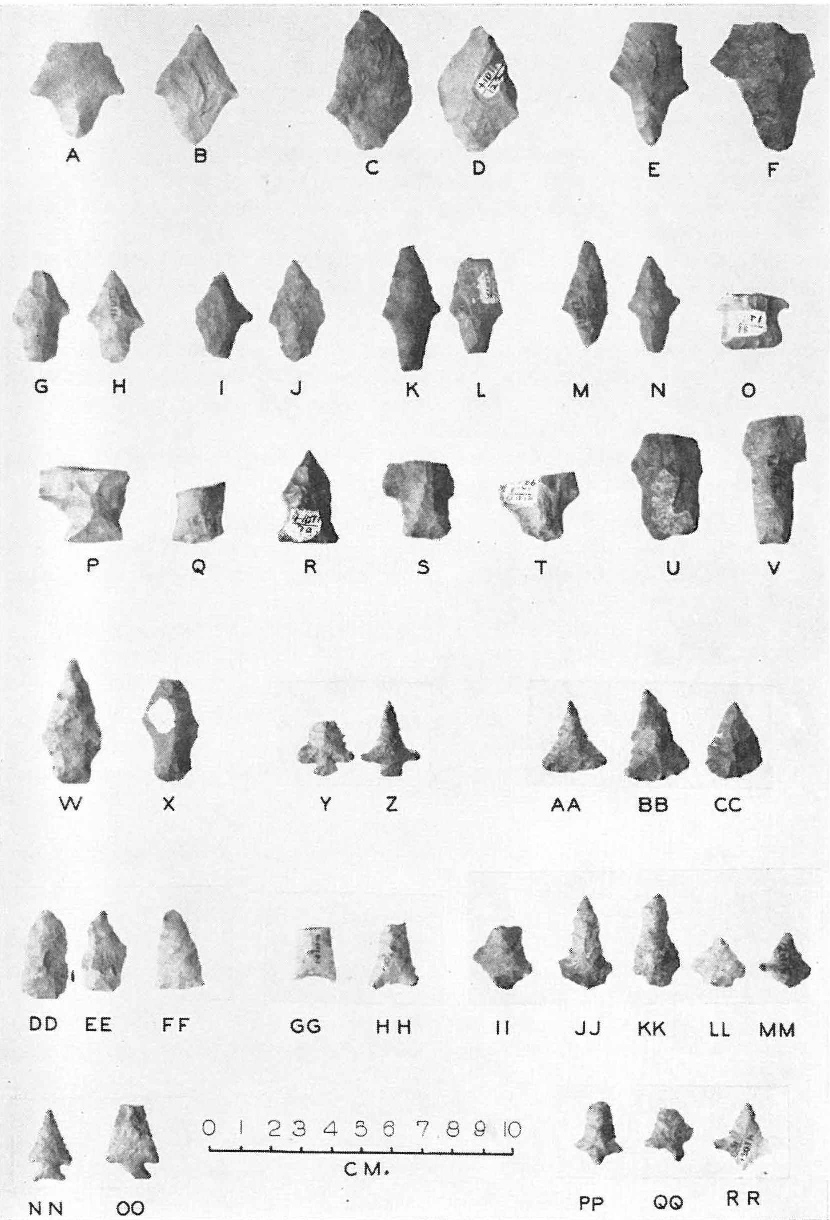
The Gary Type. The Gary point type, represented by 71 relatively complete specimens and 48 fragments, represents a wide range of variation within certain specific limits. The diagnostic attributes of the type are a contracting stem, roughly triangular blade, fair, but not excellent workmanship (at this site)—a trait governed probably by the poor quality of the chert which was used in manufacture—and well developed shoulders without barbs.

At the Yarbrough site nine varieties of the Gary type were recoginzed and named. The most common were *kaufman* and *hobson*, while the minor varieties were *alsa*, *runge*, *panna maria*, *kenedy*, *colfax*, *emory*, and *kemp*. In the Miller site artifact collection, the following varieties could be recognized: *kaufman*, *alsa*, *hobson*, *runge*, *colfax*, *emory*, and *kemp*.

Fig. 29. Dart points and arrow points. *Gary* type: A-B, *kaufman* variety; C-D, *alsa* variety; E-F, *runge* variety; G-H, *colfax* variety; I-J, *hobson* variety; K-L, *emory* variety; M-N, *kemp* variety. O, *Yarbrough* type. P-Q, *Yantis* type, *cook* variety. R, *Trinity* type. S-T, *Palmillas* type. U, *Morrill* type, *san pedro* variety. V, *Wells* type. W-X, *Kent* type, *phalba* variety. Y-Z, *Alba* type. *Fresno* type: AA-CC, *odas* variety; DD-FF, *fairlie* variety. GG-HH, *Talco* type. II-MM, *Minter* type. NN-OO, *Scallorn* type. PP-RR, Type X arrow points.

The *kaufman* variety—14 specimens (Fig. 29, A-B)

Dimensions: length—average 40 mm., range of variation, 37 to 56 mm.; width at shoulders—average 36 mm., range 26 to 40 mm.; thickness—average 8 mm., range 6 to 10 mm.



Material: reddish-gray chert with sand grain inclusions.

Remarks: In all other particulars the Miller site specimens of the *kaufman* variety are like those recovered from the Yarbrough site.

The *alsa* variety—9 specimens (Fig. 29, C-D)

Dimensions: length—average 46 mm., range of variation 42 to 48 mm.; width at the shoulders—average 29 mm., range 24 to 34 mm.; thickness—average 10 mm., range 8 to 15 mm.

Material: reddish-gray chert with sand inclusions.

Remarks: In all other particulars, the Miller site *alsa* points are like those from the Yarbrough site.

The *runge* variety—9 specimens (Fig. 29, E-F)

Dimensions: length—average 48 mm., range of variation 35 to 65 mm.; width at the shoulders—average 25 mm., range 21 to 33 mm.; thickness—average 7 mm., range 6 to 10 mm.

Material: reddish-gray chert with sand grain inclusions. Remarks: In all other particulars the Miller site *runge* points are like those from the Yarbrough site.

The *colfax* variety—3 specimens (Fig. 29, G, H)

Dimensions: length—Specimen 1, 30 mm., Spec. 2, 30 mm., Spec. 3, 36 mm. (est.); width at shoulders—Specimen 1, 19 mm., Spec. 2, 19 mm., Spec. 3, 21 mm.; thickness—Specimen 1, 5 mm., Spec. 2, 6 mm., Spec. 3, 6 mm.

Material: reddish-gray chert with sand inclusions.

Remarks: In all other particulars the Miller site specimens of this variety are like those recovered from the Yarbrough site.

The *hobson* variety—21 specimens (Fig. 29, I-J)

Dimensions: length—average 34 mm., range of variation 30 to 45 mm.; width at shoulders—average 18 mm., range 16 to 25 mm.; thickness—average 6 mm., range 5 to 8 mm.

Material: reddish-gray chert with sand grain inclusions (20), petrified wood (1).

Remarks: In all other pertinent particulars the Miller site specimens of the *hobson* variety are like those recovered from the Yarbrough site.

The *emory* variety—9 specimens (Fig. 29, K-L)

Dimensions: length—average 40 mm., range of variation 20 to 42 mm., width at the shoulders—average 21 mm., range 20 to 23 mm.; thickness—average 6 mm., range 5 to 7 mm.

Material: reddish-gray chert with sand grain inclusions.

Remarks: In all particulars the Miller site specimens of the *emory* variety are like those from the Yarbrough site.

The *kemp* variety—6 specimens (Fig. 29, M-N)

Dimensions: length—average 31 mm., range of variation 28 to 33 mm.; width at shoulders—average 6 mm., range 15 to 17 mm.; thickness—average 5 mm., range 5 to 6 mm.

Material: reddish-gray chert with sand inclusions.

Remarks: In all particulars these *kemp* dart points are like those recovered from the Yarbrough site.

Miscellaneous *Gary* Fragments

In addition to the points described above, 48 broken points were found which also seem to represent the *Gary* type, but which could not be assigned to any of the varieties because of their incompleteness. However, there do not seem to be any unusual forms present in the sample that do not also occur in the recognized varieties. Forty-six were made of the locally acquired reddish-gray chert, one of light gray chert, and one of pink, mottled novaculite.

TYPES INTERMEDIATE BETWEEN THE CONTRACTING STEM AND STRAIGHT STEM TRADITIONS

The Wells Type. One fragment of a *Wells* point (Fig. 29, V), including the medial and basal portions, was found. This specimen has well developed shoulders, but lacks true barbs. Its stem is long (26 mm.), contracts slightly, and has a flattened base. The edges of the stem have been well smoothed. The width at the shoulders is 20 mm., and the maximum thickness is 9 mm. The material used in its manufacture is local reddish-gray chert.

The Kent Type. Two crude examples of the *phalba* variety of the *Kent* type (Fig. 29, W-X) were recovered during the excavation of the Miller site. These have triangular blades (although that of Specimen 1 is broken and appears to have been reworked), shoulders without barbs, and approximately straight stems with convex bases. Specimen 1 measures 35 mm. long, 19 mm. wide at the shoulders, and has a maximum thickness of 9 mm. Specimen 2, whose blade is beveled on alternate sides, measures 40 mm. in length, 20 mm. in width, and 5 mm. in thickness. Both are of locally-acquired reddish-gray chert.

THE STRAIGHT STEM TRADITION

The Morrill Type. An incomplete *Morrill* point of the *san pedro* variety (Fig. 29, U) is made of local reddish-gray chert, has slight shoulders, a long stem with more or less straight sides and an irregular base. The width at the shoulders measures 23 mm., and the maximum thickness is 9 mm. The workmanship is quite crude.

TYPE INTERMEDIATE BETWEEN THE STRAIGHT STEM AND EXPANDING STEM TRADITIONS

The Yantis Type. Two specimens of the *cook* variety of the *Yantis* type were recovered at the Miller site (Fig. 29, P, Q). These rather crude specimens represent the medial and basal portions of points which have very sharply expanding stems with concave sides and flat bases. Specimen 1 is too fragmentary for accurate measurement. Specimen 2 has a maximum thickness of 8 mm. and a basal width of 21 mm. Both are made of a local, mottled gray chert that has abundant sand inclusions.

THE EXPANDING STEM TRADITION

The Yarbrough Type. One fragmentary Yarbrough point (Fig. 29, O) consisting of the basal and medial portions was recovered from the site. It appears to be of the *lindale* variety that has been established at the Fred Yarbrough site. Its shoulders are strong but lack barbs; the stem expands slightly and has straight sides, and the base is straight. The shoulder width is 24 mm., and the basal width 20 mm.; the maximum thickness is 8 mm. It is made of locally acquired reddish-gray chert.

The Trinity Type. One specimen of the *Trinity* type was found (Fig. 29, R). This small specimen has a short, triangular blade with straight sides, and slight, barbless shoulders. The stem is half the length of the entire specimen, expands quite sharply, and has concave sides and a flat base. The length is 30 mm., the width at the shoulders is 16 mm., the basal width 20 mm., and the maximum thickness measures 7 mm. This artifact was made from an impure variety of jasper.

The Palmillas Type. Two fragmentary *Palmillas* points (Fig. 29, S-T) (medial and basal segments) were found. These crude specimens, both made of a local, impure gray chert, have well-developed, barbless shoulders and expanding, bulbous stems with convex bases. Specimen 1 has a width (at the shoulders) of 23 mm. and a maximum thickness of 8 mm. Specimen 2 measures 25 mm. wide at the shoulders and has a maximum thickness of 18 mm.

Fragmentary Dart Points. In addition to the dart points described under the preceding categories, 81 dart point fragments were recovered. Fifteen are blades and medial sections lacking the base and stem, thus precluding any typological identifications. All but two of these fifteen were manufactured from impure, reddish-gray cert. The two exceptions are of petrified wood. Another 66 are tips, or distal fragments, of dart points and are made of reddish-gray chert.

Summary Statement Concerning Dart Points

A great majority of the dart points recovered from the Miller site are representatives of the contracting stem tradition and, more specifically, of the *Gary* type. The most common varieties of this type at the site are *kaufman* and *hobson.* The few examples of the expanding stem tradition include the *Yarbrough, Trinity,* and *Palmillas* types. Only one type of the straight stem tradition (the *Morrill* type), and a small number of types intermediate between the various traditions were found.

ARROW POINTS

A total of 109 arrow points and arrow point fragments was recovered from the surface and from the excavations at the Miller site. Both stemmed and unstemmed forms are represented. Many of these do not fall into existing arrow point types, hence it will be necessary to present several new type and variety names which, for the present, are to be considered tentative.

The Alba Type—48 specimens (Fig. 29, Y-Z)

Blade: varying from subtriangular to triangular to lanceolate; edges straight, concave, or convex; also present is the so-called "recurved" blade shape frequently found on points in the Caddoan Area which are convex near the tip and concave immediately above the shoulders; shoulders well developed and frequently outflaring; a few have slight barbs and many of the out-flaring shoulders terminate either in a sharp point or are blunt and "square."

Stem: approximately one-fourth the length of the entire point; subrectangular or expanding very slightly, although the overall outline tends to be somewhat bulbous; edges straight to slightly convex; base straight or convex with rounded corners.

Dimensions: length—average 26 mm., range of variation 16 to 32 mm.; width at the shoulders—average 18 mm., range 13 to 22 mm.; thickness—average 4 mm., range 3 to 5 mm.

Workmanship: fair, with pressure flaking.

Materials: reddish-gray chert with sand inclusions (46), homogeneous gray chert (2).

Remarks: In using the name *Alba* to describe this group of 48 points the original definition by Newell and Krieger (1949: 161–162, Fig. 56, A-H) has been followed. As mentioned earlier, a great deal of variation occurs within the sample of *Alba* points from the Miller site, yet the diverse attributes do not cluster consistently together forming varieties—as is the case within other types having even less internal consistency—but occur quite randomly throughout the sample. The diagnostic attributes of the *Alba* type as defined in this paper are triangular or "recurved" blade, sharp shoulders sometimes with slight barbs, and a rectangular or very slightly expanding stem.

The Fresno Type. The 13 points of the stemless, triangular type known as *Fresno* (Suhm *et al.*, 1954: 498, Pl. 128) fall into two rather discrete groupings, which are here provided with tentative variety names. Lest the reader be alarmed at our setting up varieties on such a small number of specimens, it should be stated that several collections of artifacts from related sites were reviewed, and that the two *Fresno* varieties are recognizable in other areas.

The *odas* variety—7 specimens (Fig. 29, AA-CC)

Shape: roughly triangular.

Edges: straight to slightly convex, or rarely concave.

Base: wide, convex with rounded corners.

Dimensions: length—average 26 mm., range of variation 20 to 30 mm.; width at the base—average 17 mm., range 15 to 20 mm.; thickness—average 5 mm., range 3 to 8 mm.

Workmanship: rather crude with little evidence of pressure flaking.

Material: reddish-gray chert with abundant sand inclusions.

Remarks: The diagnostic attributes of this variety are its wide, convex base and crude workmanship. The *fairlie* variety of *Fresno* is relatively longer and has a straight base.

The *fairlie* variety—6 specimens (Fig. 29, DD-FF)

Shape: triangular to subtriangular.

Edges: straight or somewhat convex.

Base: relatively narrow and straight.

Dimensions: length—average, 25 mm., range of variation 18 to 30 mm.; width at base—average 15 mm., range, 11 to 17 mm.; thickness—average 6 mm., range 3 to 8 mm.

Workmanship: fair; better than for the *odas* variety.

Material: reddish-gray chert with sand inclusions.

Remarks: The diagnostic attributes of the *fairlie* variety are its straight and relatively narrow base.

The *Talco Type*—3 specimens (Fig. 29, GG-HH)

Shape: subtriangular.

Edges: concave.

Base: concave.

Dimensions: length—Specimen 1, 18 mm.; Spec. 2, 21 mm.; Spec. 3, 25 mm. (estimate); width at base—Specimen 1, 16 mm.; Spec. 2, 14 mm.; Spec. 3, 15 mm.; thickness—Specimen 1, 3 mm.; Spec. 2, 3 mm.; Spec. 3, 3 mm.

Workmanship: good, with long transverse flakes removed, apparently by pressure.

Materials: novaculite (1), reddish-gray chert with sand (2).

Remarks: These points fit well the description of the type given by Suhm *et al.* (1954: 508, Pl. 133, A, B, C). Their definitive characteristics are concave lateral edges and concave base.

The Scallorn Type—4 specimens (Fig. 29, NN-OO)

Blade: triangular; edges straight to very slightly concave; shoulders barbed.

Stem: one-fourth to one-fifth the length of the entire specimen; short and sharply expanding; edges straight to concave; base straight to slightly concave.

Dimensions: length—average 27 mm., range of variation 23 to 30 mm.; width at the shoulders—average 15 mm., range 13 to 16 mm.; thickness—average 3 mm., range 2 to 4 mm.

Workmanship: very good, with evidence of secondary pressure flaking.

Material: reddish-gray chert with sand inclusions.

Remarks: These four examples conform well to the type description given by Suhm *et al.* (1954: 506, Pl. 132, A, B, C).

The Minter Type—16 specimens (Fig. 29, II-MM)

Blade: irregular, but approaching subtriangular; edges irregular, at times concave or convex; shoulders prominent, but lacking barbs.

Stem: one-fourth to one-sixth the length of the entire specimen; wide, short and extremely rudimentary, sometimes expanding slightly; edges irregular, but frequently straight or concave; base irregular, approaching straight or convex.

Dimensions: length—average 23 mm., range 16 to 30 mm.; width at the shoulders—average 18 mm., range 14 to 22 mm.; thickness—average 4 mm., range 2 to 5 mm.

Workmanship: extremely poor; the small amount of pressure flaking is crudely executed.

Material: reddish-gray chert with sand inclusions.

Remarks: These 16 points are representative of a type which has been recognized elsewhere in north-central and northeastern Texas, but not heretofore named. The most salient attributes of the *Minter* type are the irregular shape, resulting from poor and careless knapping, and the wide, short, irregular stem.

Type X—4 specimens (Fig. 29, PP-RR)

Blade: triangular or subtriangular; edges slightly concave; shoulders protruding and pointed, but lacking barbs.

Stem: one-fourth to one-third the length of the entire specimen; shape contracting; edges concave; base pointed or slightly rounded.

Dimensions: length—range of variation 18 to 23 mm.; width at shoulders—range 11 to 20 mm.; thickness—range 3 to 5 mm.

Workmanship: poor, with little evident pressure flaking.

Material: reddish-gray chert with sand inclusions.

Remarks: This small group of contracting stem arrow points has not been given a type name here because of uncertainty regarding its affiliations. It is most likely that when more evidence is available these specimens can either be given a proper name or included within an existing type. There are certain strong resemblances, for example, to the *Perdiz*, *Livermore*, and *Cliffton* types.

Fragmentary Arrow Points. In addition to the above-described types and varieties, 50 arrow points were recovered from the surface and from excavations which, because of their fragmentary condition, could not be assigned to any of the established categories. Most of these seem originally to have had expanding stems. They fall within the normal dimensions of the major types described in the present paper and, except for two of them, are all of locally-acquired impure reddish-gray chert. One of the exceptions is of milky quartz and the other of a light gray-brown homogeneous chert.

2. *Bifacial Artifacts*

A total of 68 bifacial artifacts (other than the projectile points) was recovered from the Manton Miller site. These generally crude and somewhat irregular artifacts exhibit, except for a few examples, at least one cutting edge prepared by the percussion flaking technique. Some of them have definite tips, probably for piercing, while others may have two well-defined cutting edges. The most distinctive feature of all is that they were worked from both faces, as opposed to the scrapers which were usually worked from only one face. Because of diverse shapes and the lack of adequate inter-site comparative data, it is deemed best not to attempt to classify these artifacts into named types at the present. Rather, the designation system established for similar materials at the Fred Yarbrough site will be employed. This consists of small, homogeneous groups labeled with Roman numerals. Future research, it is hoped, may show that these correspond to varieties and types.

Many of the bifacial artifacts were obviously intended to be used as knives (they have clearly distinguishable cutting edges), while others, though also worked from both faces, do not show such easily recognizable edges. The members of the first category will be designated as "knives," those of the second, "miscellaneous bifacial artifacts."

Knives

Group I knives were not found at the Miller site.

Group II (Fig. 30, A-B) is made up of five medium-sized knives which are trianguar or subtriangular in general outline. The edges are straight or slightly convex, and the bases are very slightly rounded (convex). The workmanship is rather crude, and no pressure flaking was used. The length varies from 32 to 55 mm., the width (at the base) from 23 to 40 mm., and the thickness from 8 to 15 mm.. All of these knives were manufactured from locally-acquired impure, reddish-gray chert.

Group III (Fig. 30, C-D) consists of two medium or small-sized knives which are ovate-acuminate in general outline. The edges are convex and the bases rounded. The workmanship shown on these speci-

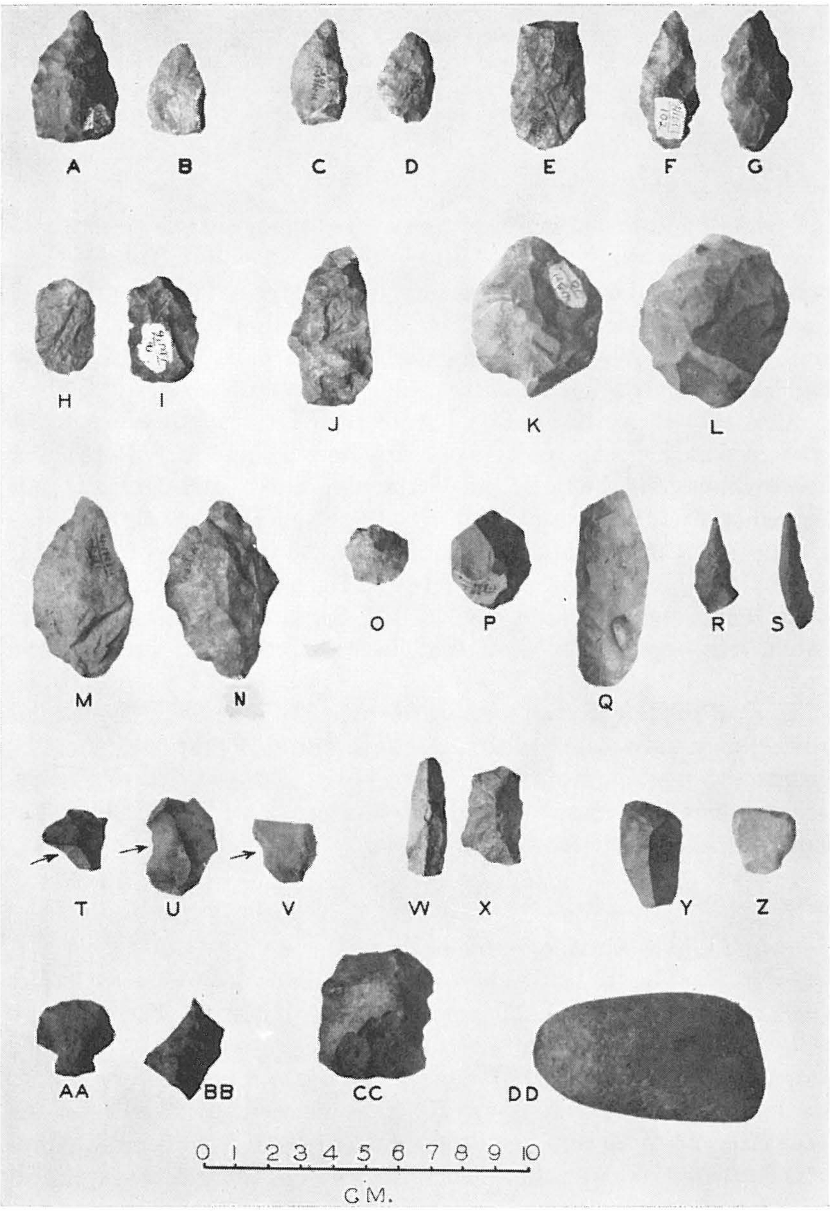


Fig. 30. Chipped stone artifacts and celt. Knives: A-B, Group II; C-D, Group III; E, Group IV; F-G, Group V; H-I, Group VI; J, Group VIII. K-L, miscellaneous bifacial artifacts, Group I. M-N, Knives, Group IX. O-P, miscellaneous bifacial artifacts, Group II. Q, Knife, Group IX. R-S, drills. T-V, spokeshaves. W-X, side scrapers. Y-Z, end scrapers. AA, stemmed scraper. BB, graver. CC, worked nodule. DD, celt.

mens is crude, and their shape tends to be somewhat irregular. Specimen 1 measures 32 mm. in length, 22 mm. in width, and has a maximum thickness of 8 mm. Specimen 2 is 38 mm. long, 22 mm. wide, and 10 mm. thick. Both are of local reddish-gray chert with sand inclusions.

Group IV (Fig. 30, F) is made up of three long, slender knives with a lanceolate form. Their sides are slightly convex and the bases are flattened or somewhat rounded. The length varies from 47 to 55 mm. (estimates), the maximum width from 25 to 27 mm., and the thickness from 10 to 13 mm. These artifacts appear to be somewhat better made than several of the aforementioned groups, although only the percussion technique seems to have been employed. All were made of local reddish-gray chert with sand inclusions.

Group V (Fig. 30, F-G) is composed of two bi-pointed knives of medium size. The edges are convex and contract at both extremities. Here again the flaking is of the percussion type and quite crude. The length of these two specimens is 51 and 49 mm., respectively, the maximum width 26 and 22 mm., and the thickness 14 and 11 mm. Both are of reddish-gray chert with sand inclusions.

Group VI (Fig. 30, H-I) is made up of four medium-sized knives which have an ovate outline. The edges are convex and the extremities rounded. The workmanship is quite crude. Their length ranges from 35 to 44 mm., the width (measured midway on the sides) from 19 to 25 mm., and the thickness from 5 to 10 mm. All are of local impure, reddish-gray chert.

Group VII knives were not found at the Miller site.

Group VIII (Fig. 30, J) consists of two medium-sized knives (one of silicified wood, one of reddish-gray chert) which are crudely formed into an approximate triangular or subtriangular outline. Each of these specimens has one pointed end and shows flaking on one or both edges. The bases are straight to slightly rounded. The length of specimen 1 is 54 mm., the width 29 mm., and the maximum thickness 24 mm.; specimen 2 measures 56 mm. by 31 mm. by 20 mm.

Group IX (Fig. 30, M-N) is a residual category composed of 48 irregular, fragmentary, or otherwise unusual specimens which could not be placed in the above-described groups. It is well to point out that it would be a mistake to consider the examples of Groups II–VIII as the major kinds of knives from the Miller site. On the contrary, 48 of the knives—Group IX—are irregular, crude, and unclassifiable in respect to geometric form, as opposed to the other groups. Among this group round, concave, and flat bases and all sorts of edges and tips are represented, but practically no two examples are alike. Many appear to be stones which were worked only slightly on one small portion of the specimen. One interesting and unusually well made example of this residual category is a long, thin, fragmentary knife (Fig. 30, Q) with a rounded end and almost parallel sides.

MISCELLANEOUS BIFACIAL ARTIFACTS

Group I (Fig. 30, K, L) is composed of two medium-sized, thick, bifacial artifacts with roughly circular outlines. The workmanship shown on these specimens is very crude, only percussion flaking having been used in their manufacture. Maximum diameter ranges from 51 mm. (Specimen 1) to 56 mm., and the thickness from 22 mm. (Specimen 1) to 32 mm. Both are made from the local reddish-gray chert which has numerous sand inclusions.

Group II (Fig. 30, O-P) is made up of five thick bifacial artifacts with circular outlines which, apart from their much smaller size, are like the specimens described in Group I. The workmanship here is likewise very crude and only the percussion knapping technique seems to have been used. The maximum diameter ranges from 20 to 39 mm., and the maximum thickness from 7 to 16 mm. All are made of reddish-gray chert.

3. *Scrapers*

End Scrapers. Eight triangular, snub-nosed end scrapers (Fig. 30, Y-Z) were recovered which have irregular, triangular outlines and which are plano-convex or concavo-convex in longitudinal cross-section. The bit, the thickest part of these artifacts, is located on the side opposite the apex. The bit itself varies from convex to almost straight and the sides are slightly convex. The sides are worked by pressure chipping on six of the eight scrapers. Six were made from impure reddish-gray chert, one from jasper, and one from agate. Their length ranges from 21 to 35 mm., maximum width at the bit from 14 to 28 mm., and the maximum thickness at the bit from 2 to 9 mm.

Side Scrapers. A group of 96 side scrapers (Fig. 30, W-X) is composed of irregular flakes which show small flake scars along one or more sides on one face of the specimen. The flakes themselves range from large, wide, crude flakes to—more commonly—thin, long flakes which may have been struck from prepared platform cores. Many of the latter have very faint flake scars along their edges, and experiments made in the laboratory have shown that unmodified flakes used for scraping wood easily develop identical small flake scars. On the other hand, several of the larger side scrapers have deliberate pressure flaking on their edges. These specimens vary from 20 to 53 mm. in length, from 12 to 35 mm. in width, and from 4 to 10 mm. in thickness. All but two specimens were manufactured from the local, impure reddish-gray chert. The two exceptions are of a light gray, homogeneous chert probably foreign to the immediate area of the site.

4. *Drills.*

Two small, irregular drills were found (Fig. 30, R-S). The bits of these elongated, slender specimens are diamond-shaped in cross section and are rather noticeably beleled on both faces. These drills, apparently worked by pressure flaking, measure 37 and 31 mm. in length, respectively, 10 and 12 mm. in width, and 6 and 4 mm. in thickness. Both are local, impure, reddish-gray chert.

5. *Spokeshaves*

Three thin and irregular flakes (Fig. 30, T-V) of impure, reddish-gray chert have marked concavities formed by pressure flaking on one edge, hence the name "spokeshaves." The diameter of these specimens, although irregular, falls between 21 and 31 mm., and the thickness between 5 and 7 mm.

6. *Gravers*

Two irregular flakes of impure, reddish-gray chert have short projections on one edge which seem to have been shaped by pressure flaking (Fig. 30, BB). The diameters of these gravers are 27 and 22 mm.; their thickness is, respectively, 8 and 4 mm.

7. *Stemmed Scraper or Bunt*

One small artifact (Fig. 30, AA) seems to be a stemmed scraper. The blade is short, wide, and has a rounded distal edge; the stem is narrow and moderately expanding; the base is convex. Although worked bifacially, the longitudinal cross section is plano-convex, hence the designation "scraper." Similar specimens, however, have often been called "bunts" and are presumed to have been used as projectile points. Made of reddish-gray chert, this artifact measures 25 mm. in length, 24 mm. in width, and 6 mm. in thickness.

8. *Worked Nodules*

A group of eight nodules all retain much of their surface cortex (patina). Apparently most of these are residue from knapping for the purpose of obtaining small flakes. However, several show some amount of use after flaking. Four have battered edges and were employed most likely as choppers or hammerstones, and one specimen (Fig. 30, CC) has a well defined gouge bit on one edge. The remainder do not appear to have been utilized after flakes were struck from them. Their diameters range from 40 to 76 mm.; and all were made of local, impure, reddish-gray chert.

9. *Celt*

One polished stone celt was found (Fig. 30, DD). This specimen has an irregular, polished bit which was worked bifacially, while the rest of the artifact surface shows small depressions made by the pecking technique. The length of this celt is 77 mm., the width of the bit 42 mm., and the maximum thickness 34 mm. It is made of a light-colored, non-siliceous, igeneous stone.

10. *Grinding Slab*

One multifaced grinding slab (Fig. 31, Q), made of sandstone, was recovered from the Miller site. This irregular artifact has one flat grinding surface on each face as well as a beveled grinding surface on one edge. The maximum diameter of the slab is 173 mm., and the maximum thickness measures 61 mm.

11. *Manos.*

Three rather crude manos or hand stones were recovered (Fig. 31, R). The smallest of these, which is fragmentary, is a utilized quartzite cobble with grinding surfaces on two sides. Each of the two complete, larger specimens, which measure 128 mm. and 111 mm., respectively, in maximum diameter, has only one grinding surface. Both were made of sandstone. All three of the manos appear to have been used with a rotary grinding motion.

12. *Pitted Stones*

Two bifacial manos were found in addition to the three described immediately above, both of which have small, pecked pits, or depressions in the center of their grinding surfaces (Fig. 31, S). Heretofore such artifacts have been called "nutting stones" or "nut stones" in various parts of eastern North America, but it has recently been suggested (Honea, MS) that they were used as anvils or base stones in the bipolar flaking technique, which has been defined archeologically in Africa and elsewhere.

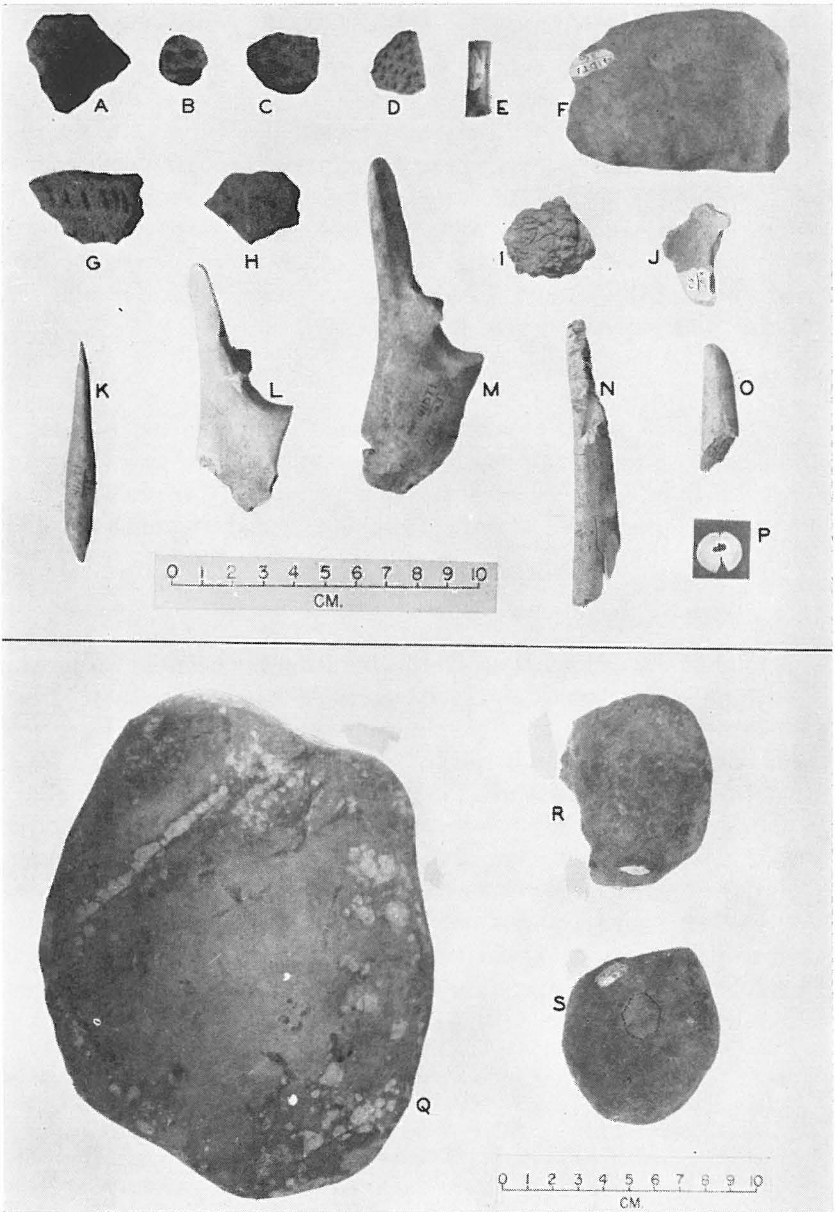


Fig. 31. Miscellaneous artifacts. A-D, punctated potsherds; E, pipe fragment; F, clay object; G-H, punctated potsherds; I-J, wattle-impressed daub; K, long-bone awls; L-M, deer ulnae awls; N-O, antler awls; P, shell button; Q, grinding slab; R, mano; S, pitted stone.

13. *Pebbles and Cobbles*

Twenty-seven river-turned pebbles and cobbles were recovered which, judging from their general absence from the local soils, we may assume to have been picked up and brought into the site by the aborigines. Such stones were used, we know from ethnographic accounts, for smoothing pottery vessels and for other purposes such as the stone boiling technique of preparing food. One of these specimens shows slight modification by pecking, but the others do not appear to have been intentionally altered. Two are of sandstone, 22 of quartzite, and three of other stones.

14. *Ochre*

Sixty-one fragments of ochre were found. This number includes 35 unmodified fragments of red ochre (hematite), 15 fragments of red ochre which have facets resulting from grinding, 10 unmodified fragments of yellow ochre (limonite), and one faceted fragment of yellow ochre.

15. *Ceramic Materials*

A total of 500 potsherds was recovered from the Manton Miller site. This number excludes, however, scores of extremely small sherds measuring 4 mm. or less in diameter which, because of their size, could not be accurately classified.

In describing the potsherds the usual presentation by types will not be followed. This deviation from standard procedure is necessitated by the relatively small number of specimens and by the absence of complete or reconstructable vessels. In view of these limitations, the sherds will be described primarily on the basis of the technique of surface treatment (engraving, punctating, plain surface, etc.). Nevertheless, an effort will be made in as many cases as is possible to show type affiliations or resemblances.

PLAIN POTTERY. The 449 undecorated potsherds form a very interesting, but in a certain sense confusing, group. The most difficult problem brought up by this material is that of typology. Many have paste, form, and other characteristics of the *Williams Plain* type (Fig. 32, A–C) of the Oklahoma Fourche Maline Focus (Bell, 1953; Proctor, 1957), while others appear to be fairly representative sherds of the *Sanders Plain* type (Fig. 32, D–E). Yet there is complete and uniform gradation between these two extremes (the coarse, thick *Williams Plain* and the thinner *Sanders Plain* with more compact paste) and it would be completely artificial and arbitrary to draw a line between the two groups, so complete is their intergradation at the Miller site. What we actually seem to have is a single ware which ranges in form, thickness, and other characteristics between two polar concepts represented by what heretofore have been called the *Williams Plain* and *Sanders Plain* types.

Of the plain sherds, 325 are tempered with lumps of clay and, rarely, with ground potsherds. Another 117 have considerable quantities of ground bone in addition to the tempering agents mentioned above, while seven show numerous ground shell particles.

Those sherds having only clay lumps or pulverized potsherds as tempering agents have exterior surface colors ranging from brownish-black to light cream or tan, depending on the amount of surface oxidation during firing. The interior surfaces are generally the same color as the exterior surfaces, or of a lighter shade of that color, while the cores tend to be a dark brown or black, indicating an incompletely oxidizing firing atmosphere. The cores are likewise granular and frequently porous. The surface texture is quite fine and uniform, but small cracks appear on several specimens, and 34 of this group have well burnished surfaces with a comparatively high luster; four additional sherds show a red slip on both surfaces. Thickness ranges from 5 to 14 mm., and, as has been pointed out before, the thinner sherds would be generally classified as *Sanders Plain* and the thicker specimens as *Williams Plain.* The surface hardness ranges from 2 to (rarely) 4 according to Moh's scale.

The plain sherds tempered with bone (117) and shell (7) are like the above specimens in all particulars except their tempering materials.

Looking at this group of plain body sherds as a whole, we can get some idea of the vessel shapes represented by examining, particularly, basal and rim sherds. The most common vessel form of which we can speak with asurance is the so-called "flower pot" shape commonly found in the *Williams Plain* type. This typically has a very heavy base with a thickened outer area where the body is attached, slightly expanding walls, and a very moderately everted or straight neck with slightly rounded or flattened lip.

DECORATED POTTERY. Fifty-one potsherds bear some form of surface decoration. Among the different techniques represented are incising, engraving (postfiring incising), punctating, and punctating combined with incising. Except for specific instances which will be mentioned, all of these sherds have the paste characteristics, surface texture, and color range of the plain potsherds. However, the thickness of the decorated specimens, varying from 4 to 9 mm., is somewhat less than the range given for the plain sherds.

Among the 17 incised sherds, two (Fig. 32, F) are of special interest because they show the grooved lip and inverted rim form characteristically encountered on vessels of *Coles Creek Incised* and *Chase Incised* types of the Mississippi Valley (Phillips *et al.*, 1951: 96; Cotter, 1952). The paste of these two sherds is fine-grained and contains small amounts of sand. The surfaces are well polished and have a hardness of 4.5, which is considerably harder than most of the sherds from the Miller site. The lips of these two sherds are flat; wide, parallel, horizontal incised lines occur just below the rims on the exterior surface. The incised lines, however, are not "over-hanging" as in the case of *Coles Creek Incised.* One of the sherds shows traces of diagonal parallel lines below the horizontal lines, a trait not found on *Coles Creek Incised.*

Twelve of the incised sherds (Fig. 32, G, H) are, for the most part, body sherds with widely spaced parallel lines, which can not be assigned to any specific ceramic

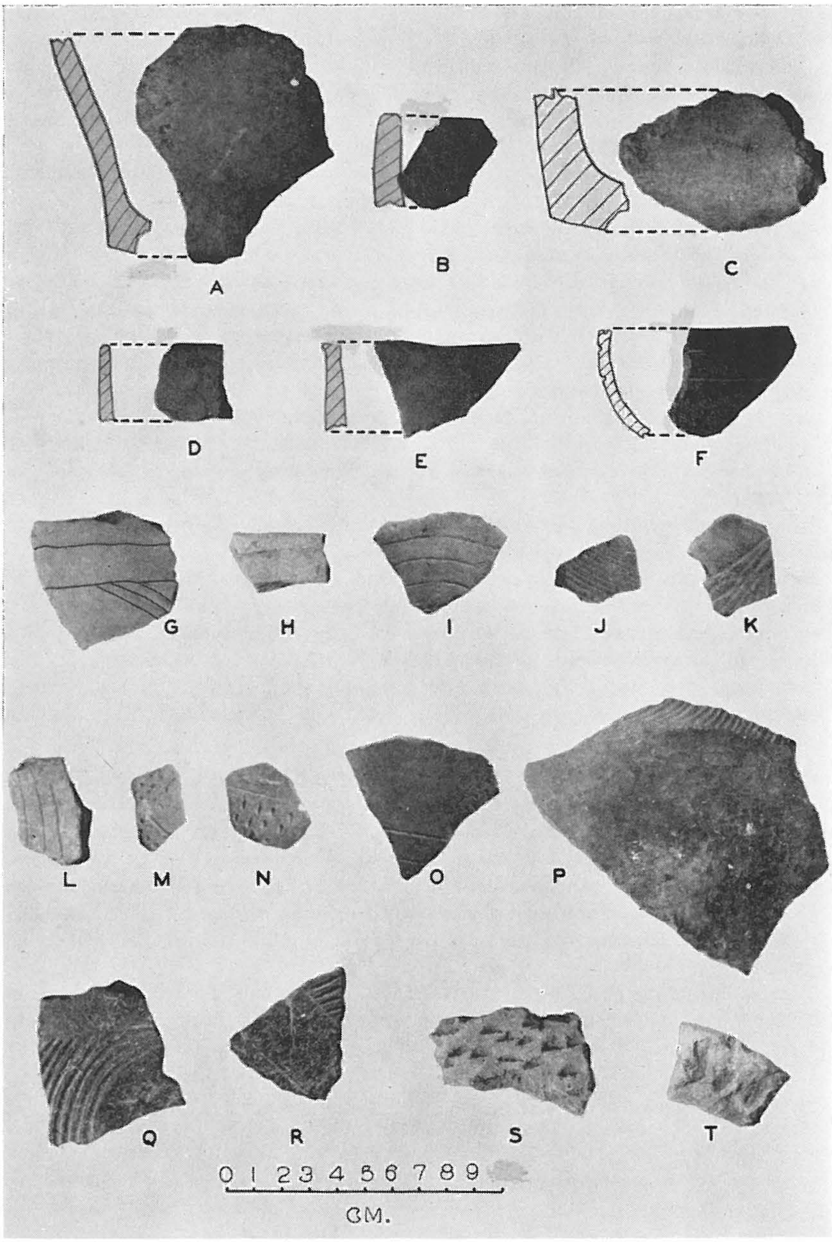


Fig. 32. Potsherds: A-C, *Williams Plain;* D-E, *Sanders Plain;* F, Coles Creek-like incised sherds; G-H, incised sherds; I-K, engraved sherds; L, *Sanders Engraved* sherd; M-O, *Pennington Punctated-Incised* (?) potsherds; P-R, *Crockett Curvilinear-Incised* sherds; S-T, punctated sherds.

types. Two of these have bone temper, and one contains a large amount of sand particles.

The nine specimens with engraved surfaces (Fig. 32, I–K) are small, nondescript body sherds about which very little can be said. The engraved lines are parallel to each other on all specimens, and are straight on six specimens and slightly curved on the remaining three. The width between the lines ranges from 2 to 6 mm. One of these (Fig. 32, L), a rim sherd with rounded lip, has a diagonal orientation of its parallel lines, and could easily represent the *Sanders Engraved* type. The paste and color ranges of the engraved sherds are like those given for the plain pottery above. Four have bone temper, whereas the others have only the usual clay lumps.

Three sherds having panels of small, circular punctations bounded by incised lines (Fig. 32, M–O) could well represent the *Pennington Punctated-Incised* type of the Alto Focus. The surface of these sherds is well polished and hard, ranging from 3.5 to 4 on Moh's scale of hardness. The surface color, although brown, has the typical reddish hue commonly found on Alto Focus sherds from the George C. Davis site.

Three additional incised sherds (Fig. 32, P–R), all from one large vessel, appear to be of the *Crockett Curvilinear-Incised* type or, if not, they are at least very closely related to it. These sherds are black, represent the carinated bowl form, and have triangular panels filled with slightly curved, equally-spaced lines. The surface is fairly well smoothed, but not highly polished.

A total of 19 punctated sherds exhibit several different techniques of surface treatment. Ten body sherds and one rim sherd (Fig. 32, S–T) show the so-called "fingernail" punctation which is crescent-shaped and sometimes has a ridge of clay on the flat or concave side of each punctation where the clay was pushed back and mounded. The arrangement of the closely-spaced punctations themselves is random with the exception of two potsherds on which they are arranged in a crude linear pattern. Of the remaining punctated sherds, five have random, closely-spaced triangular punctations (Fig. 31, A–C), one has round punctations (Fig. 31, D), and two have rows of short punctations formed by short incisions in the surface (Fig. 31, G–H).

MISCELLANEOUS CLAY OBJECTS. Twenty-eight pieces of fire-hardened, wattle-impressed daub (Fig. 31, I–J) were recovered. These are relatively small specimens, averaging about 2 to 3 cm. in diameter, and for the most part appear to be well oxidized by firing. Many of them are concavo-convex in cross-section, with the concave surface relatively smooth and the convex face rough and covered with many small impressions, probably of twigs or grass. We may assume, in construction of houses, that the smooth inside surface was formed by pressing the clay against fairly large, smooth poles, after which thatching was pressed into the outside of the clay. Perhaps thatch was held on in this manner.

One small, cylindrical clay object with one closed and one open end was found (Fig. 31, E). It is thought that this is a projection from the heel of a pipe bowl. The outside diameter is 8 mm., and the diameter of the aperture measures 6 mm. The closed end is flat, and the surface has been well smoothed, producing a noticeable luster. Similar pipe fragments, presumably belonging to the long stem variety of pipe, have been reported from the Texarkana Reservoir area (Jelks, personal communication).

The last clay object to be described is a large piece of fired clay (Fig. 31, F) which has on one side the impression of the inside surface of a bowl. Most likely this object represents potters clay (as yet untempered) which was stored inside a ceramic vessel and was later fired, perhaps by accident.

16. *Bone and Antler Artifacts*

In all, 43 fragments of worked bone and antler were recovered from the Manton Miller site. This number includes 16 small awl or needle fragments made from the long bones of very small mammals. These specimens (Fig. 31, K) range in length from 7 to 10 cm. and from 5 to 15 mm. in thickness or diameter. One end of all these artifacts has been cut down into an easily-recognized point which generally shows considerable smoothing and some evidence of use-wear.

Sixteen antler tips or tines (Fig. 31, N–O) show modification by man. These specimens for the most part have been rounded and blunted on one end. Although the sides of most are smooth, four show cuts and gashes suggesting use as flakers in flintknapping.

Eleven deer ulnae (Fig. 31, L–M) have also been considerably modified and were presumably used as awls or punches. Their distal ends have been removed and the shaft of the bone cut down and made smooth. Two have a sharp piercing end, while the remainder have blunt, rounded tips.

17. *Worked Shell*

One thin shell disc, or button (Fig. 31, P), about 12 mm. in diameter and 1 mm. thick, has a small perforation near its center. It appears to be made from mussel shell. This is the only shell artifact found at the Miller site.

Provenience of Artifacts

As a first step in the distributional analysis, the provenience of all the artifacts obtained from excavations at the Miller site was plotted by levels on a large graph according to individual 5-foot squares. However, since no stratigraphic differentiation in the occurrence of the various artifact categories was observed, the artifacts were then grouped together into three units representing those recovered from Area A, Area B, and from the surface (Table 4). The lack of cultural stratigraphy in Area A is not at all surprising because this area has been extensively eroded and excavation did not exceed one foot in depth. In Area B, however, where excavation and cultural debris reached a depth of two feet, there was, somewhat surprisingly, no discernible superposition of artifact types. Although most of the artifacts came from the upper one foot of soil in Area B, a few potsherds, dart points, and arrow points were recovered from the lower foot of the

TABLE 4

Provenience of the Artifacts, The Miller Site

	Surface	Area A	Area B	Unknown provenience	Totals
Gary, Kaufman	7	3	4	0	14
alsa	2	4	2	1	9
runge	7	1	1	0	9
colfax	2	0	1	0	3
hobson	10	5	3	3	21
emory	2	1	6	0	9
kemp	2	0	3	1	6
misc.	19	15	14	0	48
Yarbrough	0	1	0	0	1
Morrill, s. ped.	0	1	0	0	1
Wells	0	0	0	1	1
Kent	1	1	0	0	2
Yantis, cook	1	0	0	1	2
Trinity	0	0	1	0	1
Palmillas	0	1	1	0	2
Alba	13	1	28	6	48
Fresno, odas	0	2	5	0	7
fairlie	1	0	5	0	6
Talco	3	0	0	0	3
Scallorn	1	1	2	0	4
Minter	0	0	15	1	16
Type X	3	0	1	0	4
Knives, group II	4	0	1	0	5
group III	2	0	0	0	2
group IV	0	1	2	0	3
group V	1	0	1	0	2
group VI	2	1	1	0	4
group VIII	1	0	1	0	2
group IX	21	6	16	5	48
Misc. bifacial artifacts,					
group I	1	0	1	0	2
group II	1	0	4	0	5
End scrapers	4	0	4	0	8
Side scrapers	14	8	69	5	96
Drills	1	0	1	0	2
Spoke shaves	0	0	3	0	3
Gravers	0	0	2	0	2
Stemmed scrapers	0	0	1	0	1
Worked nodules	2	1	5	0	8
Celt	1	0	0	0	1
Grinding slab	0	1	0	0	1
Manos	0	0	2	1	3
Pitted stones	1	0	1	0	2

TABLE 4—Continued

Provenience of the Artifacts, The Miller Site

	Surface	Area A	Area B	Unknown provenience	Totals
Plain potsherds,					
clay temper	123	11	171	21	226
bone temper	48	1	57	12	118
shell temper	0	0	6	1	7
Coles Creek-like					
incised ware	0	0	2	0	2
Crockett-like					
incised ware	1	0	2	0	3
Misc. incised	3	0	8	1	12
Sanders Engraved	0	0	1	0	1
Misc. engraved	5	1	2	0	8
Pennington Punct. Incised	2	0	2	0	4
Misc. punctated	6	0	13	0	19
Daub	2	2	21	3	28
Pipe stem	0	0	1	0	1
Clay lump	0	0	1	0	1
Long-bone awls	0	0	15	1	16
Antler tips	0	0	14	2	16
Ulnae, worked	0	0	11	0	11
Shell bead or button	1	0	0	0	1

midden. These, however, were of the same types that occurred in the upper part.

In spite of the lack of vertical differentiation, a comparison of the artifacts from Areas A and B provides concrete evidence that there were at least three major components, or occupations, at the site. The most marked differences between the artifact assemblages from the two areas can be summarized as follows: (1) *Alba* and *Minter* arrow points—the two most numerous types—are confined almost exclusively to Area B; (2) a great majority of the potsherds for which there were provenience data (264 of 277) occurred in Area B; and (3) practically all of the wattle-impressed daub particles come from Area B. Conversely, most of the dart point types, and the other artifact classes as well, were more or less evenly distributed over both areas.

From this evidence, then, and from various comparisons with related archeological sites which will be dealt with somewhat more fully later, we may safely assume that an early occupation by a non-ceramic society is represented by Area A. This corresponds to Period 3 at the Yarbrough site. The most common items to be included on the trait list for this component are *Gary* points of the various varieties given in Table 1, knives belonging primarily to Group IX, and side scrapers. That this occupation represents, most likely, a single people may be inferred from the presence of only one main dart point type, *Gary*, and from the relative homogeneity of the artifact sample. Because of evidence which is to be presented in the following section, this component is thought to represent the later part of the Archaic Stage.

The artifacts from Area B pose something of a problem. Here we have the same artifacts found on the knoll, Area A, mixed with obviously later artifacts such as ceramics and arrow points. The question, then, is whether we are confronted with the survival of late Archaic stage elements in a later culture, or with a case of admixture—caused by erosion, plowing, etc.—of two separate and discrete components. The evidence at present is too inconclusive to allow for a definite answer to this question, but because of data from similar sites (Yarbrough, Davis, Limerick, Sam, Scott, and others) I am inclined to believe that Archaic elements survived into a later complex.

The *Alba* and *Minter* arrow points and the *Williams Plain-Sanders Plain* pottery occur in Area B. For reasons to be given in the succeeding chapter, this is thought to represent the late part of the Archaic Stage and the early Gibson Aspect of the Neo-American Stage.

Also occurring in Area B are potsherds of *Coles Creek Incised, Crockett Curvilinear-Incised, Sanders Engraved*, and *Pennington Punctated-Incised* types, as well as shell-tempered pottery and triangular arrow points.

Bone Refuse

From the surface of the site, from Area A, and especially from Area B, a great many animal bone fragments were found, which presumably represent general midden refuse (Table 5). These bones were identified by C. D. Tunnell, who used the collections of the Vertebrate Paleontology Laboratory of The University of Texas. The most common animal represented is deer, with several examples of ferret or weasel, skunk, raccoon, opossum, dog, various hares, bird, and fish. In all, 1,008 bone fragments were recovered, representing a minimum number of 227 individuals.

The Miller Site—Conclusions

The preceding description and analysis of the Manton Miller site allows us to draw certain limited conclusions regarding the cultural

TABLE 5

Bone Identifications, The Miller Site

Genus/species	Elements present	Min. no. indiv.	Total
Odocoileus sp. (deer)	hoof	2	9
	astragalus	12	23
	calcaneum	10	20
	medapodial	10	41
	phalanx	10	46
	mandible	22	43
	maxilla	8	15
	molar	8	39
	aud. bulla	11	22
	carp./tars.	8	25
	antler frag.	3	9
	vertebra	5	39
	scapula	4	7
	rib	1	9
	pelvis frag.	1	2
	ulna	2	4
	premax.	1	2
	humerus	5	10
	tibia	8	16
	femur	1	2
	radius	9	17
	nav./cub.	6	12
Mustela sp.	mandible	3	5
Scluridae (ferret)	mandible	2	4
Mephitis sp.	mandible	1	1
Geomyidae (skunk)	mandible	1	1
Procyon sp. (raccoon)	mandible	10	23
	maxilla frag.	3	5
	molar	1	4
Didelphis sp. (opossum)	mandible	1	2
	maxilla	1	2
Canis sp. (dog)	mandible	1	1
	carnassial	1	1
	tibia	1	1
Terrapene sp.	plastron frag.	ca. 8	30
	carapace frag.	ca. 20	261
	carapace	1	1
Sylvilagus sp. (cottontail)	mandible	8	16
	maxilla	1	1
	femur	1	2
	ulna	1	1
	scapula	2	4
	pelvis frag.	1	3

TABLE 5—Continued

Bone Identifications, The Miller Site

Genus/species	Elements present	Min. no. indiv.	Total
Lepus sp. (hare)	mandible	1	2
	maxilla	1	1
fish	misc.	1	5
bird (turkey?)	misc.	8	34
unidentified bone scraps			185
TOTAL		227	1,008

affiliations of the site and its temporal position in relation to general prehistoric trends in the region.

Three main occupational components seem to be present at the site, although the data for the last two are not particularly strong; however, supporting data occur at other sites in the area.

The first component consists of the Archaic materials from Area A. The virtual absence of expanding stem points in Area A excludes an early Archaic date, while the large number of contracting stem points (*Gary*) and the virtual absence of pottery and arrow points speak favorably for a late Archaic date corresponding to Period 3 at the Fred Yarbrough site. In fact, the presence of a more or less pure *Gary* component without ceramics at Miller gives support to the rather weak evidence for Period 3 (the pre-pottery *Gary* horizon) at the Yarbrough site.

The next two components occur mixed together in Area B of the Miller site, and are here separated on the basis of information from other sites (see discussion of the Scott, Sam, and Wann sites, in the following section). The first of these is thought to represent the terminal Archaic Stage in the area, and is characterized by crude, plain ceramics of *Williams Plain* type. *Williams Plain* is the earliest known ceramic type in parts of Oklahoma, where it apparently was adopted by local Archaic peoples at the Scott (Bell, 1953), Sam (Proctor, 1957), and Wann (Sharrack, 1960) sites of the Fourche Maline Focus. The second and later ceramic component is represented, it is believed, by sherds of *Coles Creek Incised* and *Crockett Curvilinear-Incised* pottery and, most likely, by the *Alba* and *Minter* arrow points from the site. Of course there is no way to be certain that these arrow points belong with this group of potsherds, rather than with the *Williams Plain* type, but it has been shown elsewhere (Newell and Krieger, 1949) that the *Alba* point generally belongs with the Gibson Aspect of eastern Texas and adjacent areas, which supposedly postdates *Williams Plain*. In addition, at the Scott site (Bell, 1953) *Williams Plain* is definitely shown to antedate arrow points.

The non-ceramic component at the Miller site corresponds, as mentioned above, to Period 3 at the Yarbrough site, while the early ceramic component at Miller (represented by *Williams Plain*) corresponds to Period 4 at Yarbrough, and both of these components may be assigned to the La Harpe Aspect of the Archaic Stage. The remaining component, separated from the *Williams Plain* material by means of extra-site evidence, belongs to the early part of the Neo-American Stage, the Gibson Aspect—Period 5 at Yarbrough.

Turning now to traits other than projectile points and ceramics, evidence of house structures or other occupational features at the site is lacking, but because of the eroded nature of the site we can not rule out the possibility of their former existence. It can not be definitely determined whether the flexed burials found at the site belong to the pre-ceramic component, but the absence of ceramic or other grave furniture, as well as a similiar pattern for burials at related Archaic sites, suggests that some or all of the burials derived from the Archaic occupation.

THE LA HARPE ASPECT

The comparatively deep stratigraphic column from the Fred Yarbrough site, as well as some of the archeological data from the Manton Miller site, provide excellent examples of several changes in artifact styles which occurred over a long period of time in a rather broad geographical area. On the western frontier of the eastern woodlands, in a belt reaching from the vicinity of Houston, Texas, into east-central Oklahoma, the following uniformities in prehistoric culture change during the Archaic can be recognized. (1) At the beginning or early part of the Archaic Stage there was a marked numerical prevalence of expanding stem dart points over those of other stemming traditions. (2) This was followed by a growth in the popularity of contracting stem dart points (represented principally by the *Gary* type), which development slightly preceded (3) the appearance of pottery vessels of various plain and often crude wares. For purposes of the present study, the Archaic Stage may be said to terminate in the area under consideration with the introduction of numerous arrow points and abundant decorated pottery, which accompanied, it is believed, the introduction of maize agriculture and a more sedentary mode of existence.

The Archaic culture or complex mentioned above we propose to label the "La Harpe Aspect," thus following the McKern system of nomenclature, which is well established in the literature dealing with this area. The term "East Texas Aspect," which has often been applied to much, but not all, of the material included within the La Harpe Aspect, has been rejected here because of its geographic limitations, particularly since components of the La Harpe Aspect are known to occur in Oklahoma and may be expected to be found in western Louisiana and southwestern Arkansas as well.

What we seem to have, then, in the La Harpe Aspect, is a rather far-flung Archaic Stage culture, or group of related cultures, which borders the western fringe of the eastern woodlands. The most salient material traits of this aspect are (1) flexed burials, usually without accompanying furniture; (2) pitted manos; (3) expanding stem dart points (early phase); (4) contracting stem dart points (later phase); (5) plain ceramics (terminal La Harpe Aspect); and (6) various polished and ground stone artifacts (axes, gorgets, etc.) which vary considerably in style and in abundance from locality to locality within the La Harpe Aspect area.

It seems probable that this culture complex should be divided, some day, into several foci on the basis of areal and temporal distributional data. All that we can safely do at this point, however, is to recognize three broad areal divisions of the La Harpe Aspect: (1) the Oklahoma Fourche Maline Focus; (2) a central area represented, in Texas, by the Yarbrough, Martin, Miller, and Limerick sites, and in Oklahoma by the Boat Dock and James sites; and (3) a southern area represented by the Sawmill site, the E. E. Runnells sites 1 and 2, and the Doering, Kobs, and Grisbee sites.

In spite of the fact that the temporal sequence of the various projectile point stemming traditions is uniform over the entire La Harpe Aspect area, some of the classes, types, and varieties of artifacts that make up the complex have much more limited areal distributions. Hence the Fourche Maline Focus is characterized by certain traits which do not occur as frequently (or not at all) in the remainder of the La Harpe Aspect: polished stone celts, *Williams Plain* pottery (later part of the aspect), stone gorgets, boat stones, double-bitted chipped stone axes, shell gorgets, bone atlatl hooks, and corner-tanged knives. The central area shows certain traits which can be found in the Fourche Maline Focus (double-bitted axes, triangular and oval knives, small stemmed drills, and triangular end scrapers), but has certain distinctive traits of its own: large numbers of gouges, full-grooved axes, many pitted manos and grinding slabs, and a scarcity of polished stone artifacts. In the southern area of the La Harpe Aspect, the early pottery is a distinctive plain, sandy ware, and knives and scrapers are crudely fashioned from pieces of petrified wood. Polished stone artifacts are rare in this area.

The inter-site comparative treatment to be given in this report will limit itself primarily to dart point stemming traditions, and to the early ceramics of the area. The sites of the Fourche Maline Focus to be dealt with here are the Sam, Scott, and Wann sites. Those belonging to the central area are the James and Boat Dock sites in Oklahoma, and the Limerick and Martin sites of Texas (the Fred Yarbrough and Manton Miller sites also belong to the central group). In the southern area the Sawmill, Runnells No. 1, and Runnells No. 2 sites at McGee Bend Reservoir, and the Doering, Kobs, and Grisbee sites at Addicks Reservoir will be considered.

The geographical limits of the La Harpe Aspect can not be set with any great degree of certainty, although as previously mentioned the constituent sites fall within a belt running northward from the city of Houston into east-central Oklahoma. The western boundary of the aspect is more distinct than the eastern, being set off by the Archaic cultures of central Texas and by the Great Plains area in Oklahoma. However, in the region of Tarrant and adjacent counties in Texas, we encounter difficulty in setting our limits, for the Carrollton and Elam foci of the Trinity Aspect seem to be intermediate, typologically and stylistically speaking, between the La Harpe Aspect and the Archaic of central Texas. The Elam Focus, particularly, might be included within our aspect, although this has not been done in the present paper. However, we should keep the door open, and when better data for the Elam Focus become available it may be advisable to include it.

A similar problem is encountered in northeastern Oklahoma with the Grove Focus (Baerreis, 1951; Shaeffer, 1957). This archeological unit, although it seems to show several of the developmental trends used to define the La Harpe Aspect, exhibits strong ties with Archaic complexes of Missouri, Tennessee, and Kentucky.

If the task of delineating the complex geographically seems difficult on the western front, the problem on the east is even more difficult. So little is known about the Archaic cultures of northwestern Louisiana and southwestern Arkansas that we are left with very little with which to work. On the Ouachita River in Arkansas, Harrington (1920: 103–110) reported a long Archaic occupation at the "Deep Deposit, Site No. 1, Hot Springs." The comparatively small number of contracting stem points at this site, however, as well as strong stylistic peculiarities, leaves some doubt as to whether it should be placed in La Harpe Aspect. Of course, when we go far enough eastward, we finally reach sites such as Poverty Point, sites belonging to the Archaic of the Tennessee Valley, and complexes which are very different from La Harpe.

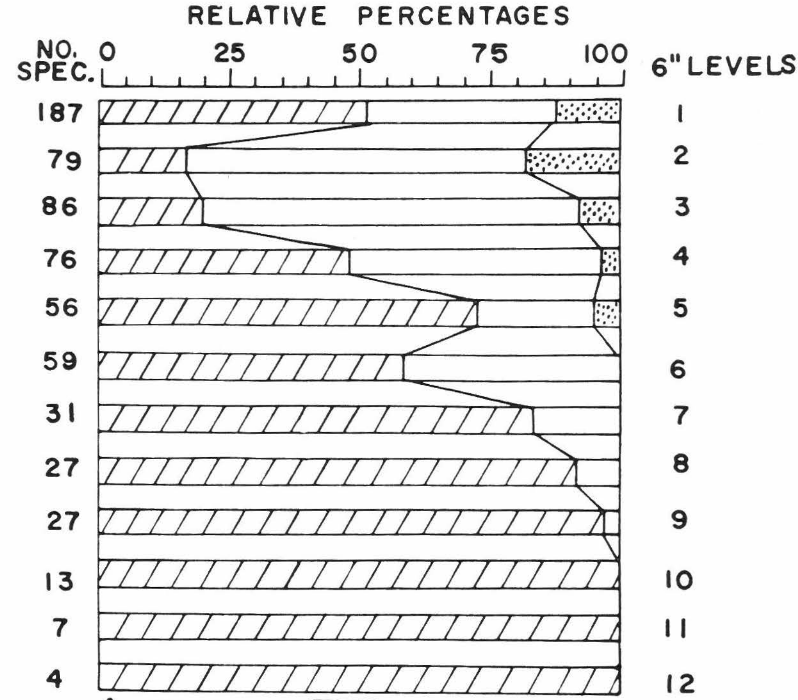
The sites which have been placed in the La Harpe Aspect will now be reviewed briefly, and specific comparisons will be made between these and the Fred Yarbrough site. In view of the fact that the Yarbrough site stratigraphic column (Fig. 16) is one of the longest, most complete, and clearest for the entire complex, it furnishes an excellent referential base for La Harpe.

Scott Site. Located in Le Flore County, Oklahoma, the Scott site (Bell, 1953) represents both ceramic and pre-ceramic components of the Fourche Maline Focus. At this site Bell found a deep, non-ceramic level at the very base of the occupation zone (Fig. 33, A), represented by a few miscellaneous, unclassified dart points. This is followed by the introduction into the site of simple ceramics (*Williams Plain*) and, near the surface, by arrow points and more complex ceramics. Although the numbers are somewhat statistically unreliable, expanding stem dart points are slightly more prevalent in the lower levels of the site (Fig. 33, B), while contracting stem points gain in popularity in the upper part of the stratigraphic column. The Scott site—up until the introduction of arrow points and complex ceramics—may be assigned to the La Harpe Aspect.

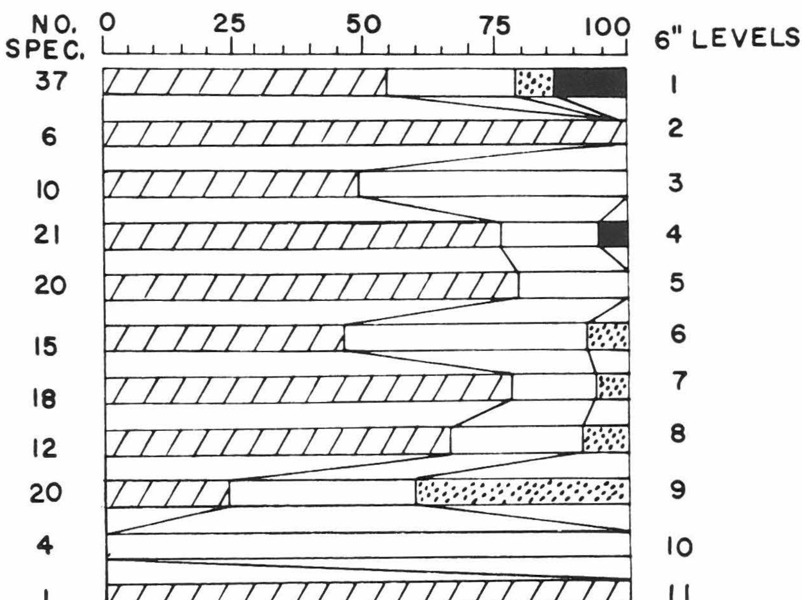
Sam Site. The Sam site (Proctor, 1957), also belonging to the Fourche Maline Focus and located in Le Flore County, Oklahoma, presents the same general picture as the Scott site, except that it has its beginning somewhat later in time than Scott. Dart points without ceramics are found only in the lowest level, but dart points are numerically more abundant in the lower and middle levels than in the upper. Potsherds increase in abundance near the surface, and arrow points are introduced into the site somewhat later than pottery (Fig. 34, A).

In respect to dart point stemming traditions, we have the same popularity trend found at Yarbrough, Doering, the Sawmill, and Runnells No. 1 sites, with the expanding stem most prevalent in the lower levels, and losing ground to the contracting stem tradition near the surface. Like the Scott site, the middle and lower levels of the Sam site may be assigned to La Harpe Aspect.

Wann Site. The Wann site (Sharrock, 1960), also located in Le Flore County, Oklahoma, and belonging to the Fourche Maline Focus, exhibits a stratigraphic sequence very similar to the middle levels of



A. PROJ. PTS. ▨, WILLIAMS PLAIN SHERDS ▭, SHELL-TEMP. AND SANDERS PLAIN SHERDS ▩



B. DART PTS.: CONTRACT. STEM TRAD. ▨, STRAIGHT STEM TRAD. ▩, EXPANDING STEM TRADITION ▭, ARROW POINTS ■

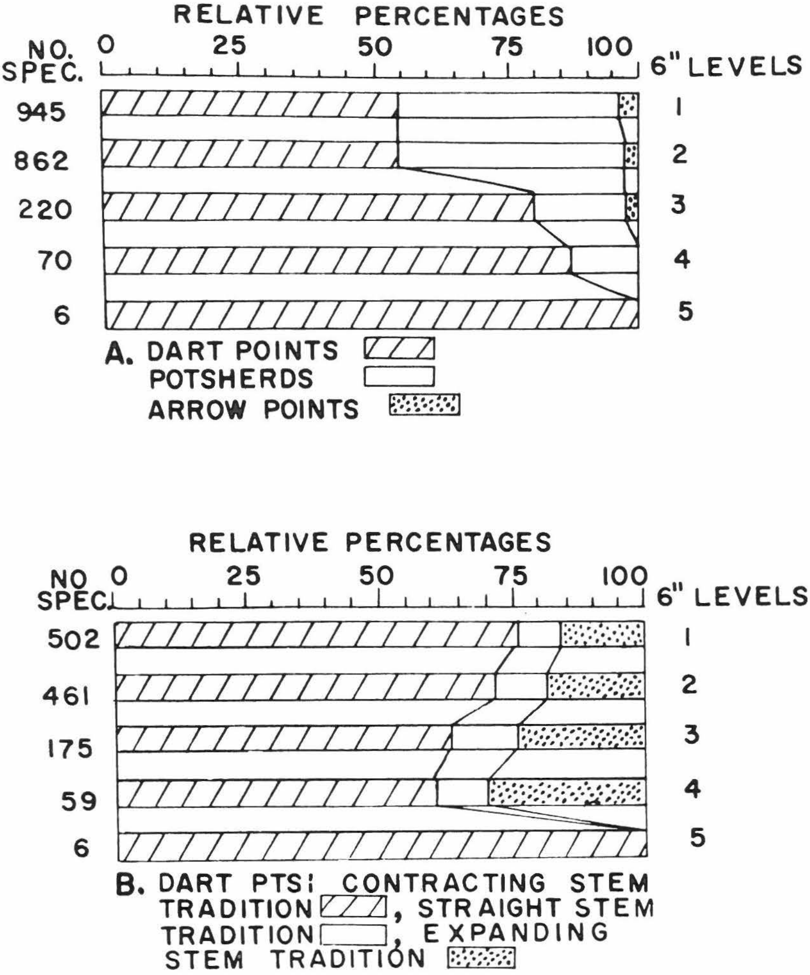


Fig. 34. Sam Site: A, relative percentages of dart points, potsherds, and arrow points; B, relative percentages of the dart point stemming traditions.

the Sam and Scott sites. In the lower levels of the Wann site dart points are more common than in the upper, while ceramics are more abundant near the surface (Fig. 35, A).

Turning to dart point stemming traditions (Fig. 35, B), contracting stem points lose a little in relative popularity in the lower levels, and

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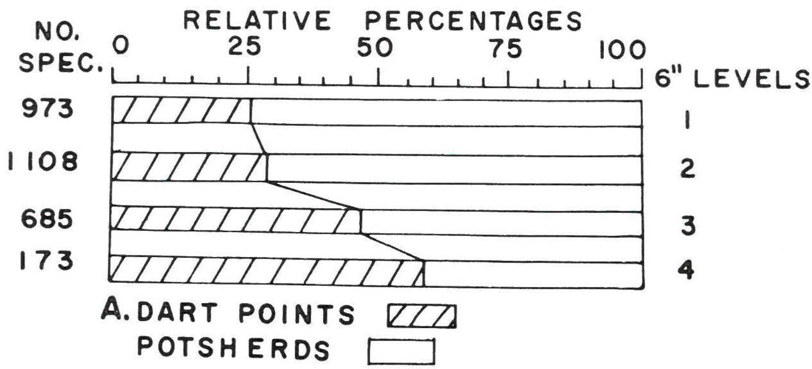
Fig. 33. Scott Site: A, relative percentages of projectile points and potsherds; B, relative percentages of dart point stemming traditions.

the expanding stems increase at the bottom, but not markedly so. My opinion is that the Wann site represents only a brief segment of the stratigraphic columns from the Yarbrough and Scott sites, and should be correlated with their middle levels, representing late La Harpe Aspect.

Limerick Site. Located in Rains County, Texas, on the upper Sabine River, the Limerick site (Duffield, 1961) has both ceramic and preceramic components. The cultural affiliations suggested by the assemblages of dart points and other artifacts in the lowest levels (Area C)



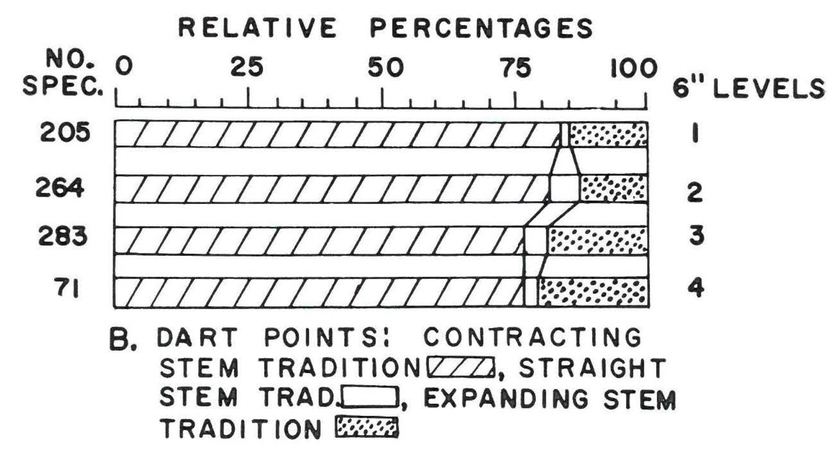


Fig. 35. Wann Site: A, relative percentages of dart points and potsherds; B, relative percentages of dart point stemming traditions.

have been thought to be primarily with the Elam Focus of the Trinity Aspect. Whereas the *Elam* point, *Gary* dart points, leaf-shaped knives, straight-edge gouges and "turtle-back" scrapers are present in these lowest levels, arrow points and pottery are lacking. Since a majority of the dart points from this early occupation are of the *Gary* type (which is relatively late in the Yarbrough site sequence, barely antedating and, later, occurring contemporaneously with ceramics), my own feeling is that the early material at the Limerick site is closer to the middle section (Period 3) of the Yarbrough column and Area A of the Miller site than to Elam. If this observation be correct, then we can include the lower levels of Limerick with La Harpe Aspect.

The other archeological materials at the Limerick site seem to represent several late components. This material includes *Alba, Minter* (my identification), *Bonham, Cliffton,* and *Perdiz* arrow points as well as potsherds of the *Sanders Plain, Canton Incised,* and *Sanders Engraved* types. The plain pottery may well represent late La Harpe, comparing favorably—with regard to general composition—with the upper levels of the Yarbrough site (Area A) and Area B of the Miller site.

Jake Martin Site. The Martin site (Davis and Davis, 1960) is located in Upshur County, Texas, at the edge of the valley of Cypress Creek. This site is entirely pre-ceramic, pre-arrow point in composition, containing, in a thin occupation zone, Paleo-Indian projectile points of the *Meserve* and *San Patrice* types (representing five per cent of the total dart point sample), numerous expanding stem points primarily of the *Yarbrough* type (representing 56 per cent), a few contracting stem or semi-contracting stem or related points (*Gary* and *Wells,* 17 per cent), a small number of straight stem forms (*Elam, Carrollton, Bulverde, Morrill,* and *Kent,* six per cent), and various types intermediate between the straight and expanding stem traditions (16 per cent).

Davis and Davis follow Suhm *et al.* (1954: 492) in assuming that the *Yarbrough* and *Yarbrough*-like points constitute a late Archaic type, this partly because they are sometimes found in ceramic sites. Thus Davis and Davis assume that their dominance at Jake Martin indicated that the site falls in the late Archaic. On the other hand, the new evidence from the Yarbrough site indicates to me that *Yarbrough* points and other expanding stem forms occur consistently earlier than *Gary* points, ceramics, and arrow points, although they admittedly may survive in very reduced numbers into later times (Newell and Krieger, 1949: 168). To reiterate, the picture we have at the Yarbrough site is that of (1) an early Archaic phase or period with *Yarbrough* and other expanding stem dart points, (2) a later Archaic phase characterized by *Gary*, (3) with the latter type continuing to increase in relative abundance during early ceramic (terminal Archaic) times—toward the end of the La Harpe Aspect. An early Archaic date for the Martin site—supported by the Yarbrough site stratigraphic column, and the early occurrence of expanding stem dart points in Addicks Reservoir and McGee Bend—agrees, I think, with the presence at Martin of *Meserve* and *San Patrice* points, as well as with the complete absence of pottery and arrow points at the Martin site (Davis and Davis, 1960: 58). The small *Gary* points at Martin, which are definitely Late Archaic, can be easily explained as representing a much later component or occupation.

A comparison of the Yarbrough site and Martin site by types and varieties of projectile points allows for a more specific dating of the latter than was possible at the time when the Martin site was originally analyzed. From all indications the main components represented at the Martin site are of an early Archaic date, comparable to the lowest levels (Period 2) of the Yarbrough site, Area A. The most significant items supporting this assessment are the following: (1) the prevalence at Martin of expanding stem dart points, as in the lower levels of the Yarbrough site, (2) the presence of *San Patrice* and *Meserve* points, which probably appear early at the Yarbrough site, (3) the presence of stemless (*Catan*) points at Martin (although in small numbers) which are very early at Yarbrough, (4) the presence of *Bulverde* points at Martin, which are early at Yarbrough, and finally, (5) the presence of the *Yantis* type at Martin (*ibid.*: Fig. 5, C), which is likewise early at the Fred Yarbrough site.

In summary, the Jake Martin site, which is primarily early Archaic, apparently belongs to the early part of the La Harpe Aspect.

Boat Dock Site, The Boat Dock site (Bell, 1958), situated in Marshall County, Oklahoma, has been assigned to the Bryan Focus, although materials suggestive of the Carrollton and Elam foci were recovered also. However, the exact cultural affinity of the site is still unsettled. Simple shell-tempered pottery (*Woodward Plain*) and several sherds of the *Sanders Plain* type clustered in the upper levels of the site, as did arrow points and contracting stem dart points (*Gary*). Expanding stem dart points occur in approximately even numbers throughout the various levels. According to Bell (1958: 47) many different occupations are present at the site (ranging from Paleo-Indian through Historic Chickasaw) and, assuming that the site built up slowly over a period of many years, we can understand the apparent mixture or lack of good stratigraphic differentiation in the various artifact classes and dart point stemming traditions. The site seems to represent the middle part of the La Harpe Aspect, as well as several later cultural units as well.

James Site. The James site (Ray, 1960) is located in Bryan County, Oklahoma, and has been assigned to the late Archaic and Early Bryan Focus. At this site *Gary* dart points constitute the major type, and begin in the lowest levels, increasing in popularity near the surface. Pottery, mostly of simple types, begins slightly later than *Gary* at the site while, in the upper levels, arrow points make their appearance. Because of the lack of numerous expanding stem dart points, we may correlate the James site with Periods 4 and 5 of the Yarbrough site stratigraphic column, representing the La Harpe Aspect in part.

Sawmill Site. Located in McGee Bend Reservoir, on a sandy ridge overlooking the Angelina River, San Augustine County, Texas, the Sawmill site (Tunnell, 1961) has components dating from Archaic to Neo-American times. The lowest levels of this site contain large percentages of various expanding stem dart points (as is the case in the lowest levels at the Yarbrough site), while *Gary* points (represented by only five specimens), arrow points, and potsherds are confined almost exclusively to the middle and upper zones. There is also some indication that ceramics were introduced into the site before arrow points, and that the percentages of sand-tempered potsherds (an early type), compared to the decorated clay-tempered sherds, increase with depth. This agrees with the general finding that late La Harpe Aspect ceramics are simple and almost crude in appearance. The whole sequence at the Sawmill site, then, up to the introduction of arrow points and abundant ceramics, is typical of the La Harpe Aspect.

Runnells Sites 1 and 2. The E. E. Runnells sites (Tunnell, 1961) are located in San Augustine County, Texas, not far from the Sawmill site, in McGee Bend Reservoir. At E. E. Runnells No. 1 we have a picture much like that presented by the cultural stratigraphy of the Sawmill site. Expanding stem dart points (representing a relatively early Archaic date) are common in the lowest levels of the site, decreasing in relative popularity toward the surface. Contracting stem projectile points (*Gary*) begin in the middle zones and increase in numbers toward the top of the column, as does the simple, sand-tempered pottery. Both clay-tempered (more complex) pottery and arrow points make their appearance later. This site, up until the introduction of arrow points and the abundant and rather advanced clay-tempered pottery, belongs to the La Harpe Aspect. Runnells site No. 2 seems to be identical to No. 1, but lacks adequate depth to allow for the meaningful stratigraphic differentiation presented above for site No. 2.

Doering, Kobs, and Grisbee Sites. The Doering site (Wheat, 1953) and certain materials from the Kobs and Grisbee sites, represent the La Harpe Aspect. These sites are situated in Harris County, Texas, near the city of Houston, in Addicks Reservoir. At the Doering site, which has a relatively deep stratigraphic column representing a comparatively long time period, Wheat found that dart points are strongly represented in the lower excavation levels, while pottery is rare and of the simple, sand-tempered type (Fig. 36, A). In the upper levels, however, the relative number of dart points decreases, pottery gains in popularity, and arrow points appear. In respect to dart point stemming traditions, expanding stem points are popular in the lower levels (Fig. 36, B) while contracting stem points (*Gary* and related types) are more popular in the middle and upper levels. Both the level-by-level change in the relative popularity of dart points, potsherds, and arrow points, and the popularity of the stemming traditions at various depths, agree with the column obtained from the Fred Yarbrough site. Hence the Doering site, up until the introduction of arrow points and numerous decorated potsherds, may be considered as La Harpe Aspect.

The Kobs and Grisbee sites present the same general picture except that they begin after the introduction of ceramics and have, in their upper zones, an abundance of arrow points and non-La Harpe elements. Their lower levels, however, may be assigned to this aspect, and agree in composition with the Doering site.

The La Harpe Aspect—Summary Statement

The above-mentioned archeological sites from Oklahoma and Texas have been grouped together under the La Harpe Aspect because they show all, or part, of a common sequential, prehistoric development which occurred on the western fringe of the woodland area from early Archaic Stage times (excluding here *Meserve* and *San Patrice* from the Archaic on stylistic grounds) to the time of extensive settlement with abundant ceramics and arrow points. This whole complex fits Willey and Phillips' (1958: 104–143) "functional" definition of the Archaic but, according to the classificatory system proposed by Suhm *et al.* (1954), would likely be classified in its latter phase as early Neo-American stage.

The present definition of the La Harpe Aspect constitutes only a rudimentary beginning at organizing this Archaic archeological ma-

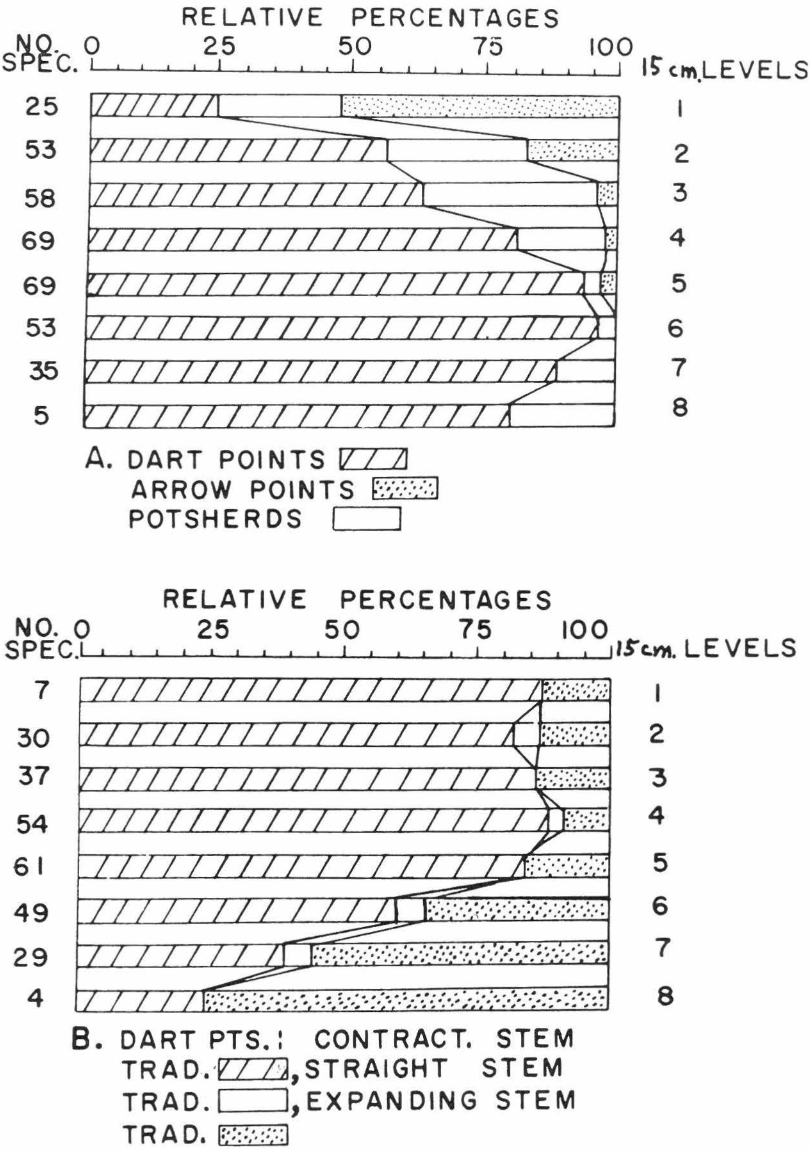


Fig. 36. Doering Site: A, relative percentages of dart points, arrow points, and potsherds; B, relative percentages of the dart point stemming traditions.

terial. Many problems remain to be answered, smaller taxonomic units remain to be defined, and typologies want definition. The dearth of site reports precludes any further, meaningful elaboration at this time, and we can now only point out certain problems and possibilities along which lines future investigators may wish to channel their energies.

For one thing, it will eventually be possible to subdivide La Harpe along two lines, one temporal, the other areal. Even in a brief treatment such as that embodied in the present paper, one can see certain specific differences between the materials found in Oklahoma, the central area (northern Texas), and the southern area (the sites near Houston and those from McGee Bend). It will probably be possible, at some future date, to recognize these areal differences by naming new foci within the La Harpe Aspect.

On a temporal level, it may be possible to express the differences between the early part of the La Harpe Aspect (with many expanding stem dart points), late La Harpe (with its contracting stem dart points), and terminal La Harpe Aspect (with plain-ware ceramics) by means of new taxonomic units. At the present state of knowledge, however, it seems most advisable to delay this breakdown until more data can be acquired. And this can only come about through a more determined campaign of field work in the area.

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The Culpepper Site, A Late Fulton Aspect Site In Northeastern Texas

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Introduction

The Culpepper site is located in the southwestern or Texas portion of the Caddoan Area, an area which includes northwestern Louisiana, southwestern Arkansas, southeastern Oklahoma, and northeastern Texas. As defined by Webb (1960: 35), the Texas portion of the Caddoan Area extends from the Louisiana-Texas boundary westward to the Trinity River and from the Red River southward to about the latitude of Jasper, Texas.

Suhm, Krieger, and Jelks (1954: 16–21) have recognized four stages of cultural development in northeastern Texas—Paleo-American, Archaic, Neo-American, and Historic. The Paleo-American Stage is poorly known and is represented primarily by surface finds of early styles of dart points, such as Plainview, Meserve, and Scottsbluff. For the Archaic Stage an East Texas Aspect has been defined (*ibid.*: 148–151), but not on the basis of published excavations. However, since 1954 one Archaic site in the Ferrell's Bridge Reservoir has been excavated and published (Davis and Davis, 1960). The Neo-American Stage in northeastern Texas is much better known and represents a series of occupations by Caddoan peoples in prehistoric and early historic times. Two aspects, Gibson (earlier) and Fulton (later) have been recognized, each being divided into foci representing regional variations. For the Caddoan Area as a whole, five foci have been defined for the Gibson Aspect (Alto, Gahagan, Spiro, Haley, and Sanders) and ten for the Fulton Aspect (Bossier, Frankston, Titus, Texarkana, Belcher, McCurtain, Turkey Bluff, Mid-Ouachita, Allen, and Glendora).

The Culpepper site, which is the subject of this study, appears to have been occupied during two stages—Archaic and Neo-American, with the Neo-American occupation attributable to the Titus Focus of the Fulton Aspect. The Titus Focus was originally defined on the basis of lithic and ceramic collections from sites that were not explored by carefully controlled excavations. Since 1954 five Titus Focus sites have been excavated: Harroun (Jelks and Tunnell, 1959), McKinney (Davis and Golden, 1960), Whelan (Davis, 1958), Segal (Davis and Davis, 1961), and Dalton (Davis and Gipson, 1960), with the result that the Titus Focus trait list has been expanded. The Culpepper site is significant, not so much because it adds new Fulton Aspect traits, but because its ceramic complex throws light on the time range of certain key pottery types of the Fulton Aspect and suggests that the Titus Focus extended into the historic period.

Excavations at Culpepper Site

This site is located on the H. L. Culpepper farm five miles south of Saltillo, Hopkins County (Fig. 1). This open burial site is associated with a sandy knoll located on the south bank of Stouts Creek (Fig. 2). It has had three site number designations, ET-34, 19D7-1, and 41HP1, the last being the currently used site number. It was excavated during the period of May 15 to May 19, 1931, by The University of Texas under the field direction of A. T. Jackson. Excavation was financed with funds from the Rockefeller Foundation. During the course of excavation eight burials were uncovered that contained 34 complete or restorable vessels, three arrow points, and one celt. Approximately 85 feet southwest of the burial area is a midden that probably represents a village. Excavation in this midden yielded a mano, a metate, five projectile points, and a flint knife. Various other lithic and ceramic artifacts were found on the surface and in exploratory digging in the vicinity of the burials.

Thirty years prior to these excavations human skeletons and pottery vessels were exposed by an overflow of Stouts Creek. Thereafter collectors dug at the site periodically. They are reported to have excavated 14 burials and 25 complete pottery vessels. In the fall of 1930 A. T. Jackson purchased 17 specimens from B. F. Perkins of Weaver, Texas, and this collection reputedly contains some artifacts from the Culpepper site.

The field notes on the Culpepper site are sketchy and inadequate by present standards. Texas archeology was in its infancy at that time and more emphasis was placed on collecting and displaying artifacts than on scientific analysis and interpretation. The collection and the field notes are at the Department of Anthropology of The University of

Fig. 1. Map showing location of the Culpepper site.

Texas. An artifact inventory is included in the field notes, Nos. 1 to 71 being given to artifacts found in the burials and in general digging. However, there are artifacts in the collection which have numbers higher than 71, and these are not listed in the field notes. The highest numbered artifact is No. 101.

Burial Area

A total of eight single, extended burials was found in the low sandy knoll adjacent to Stouts Creek. All of the skeletal material was in a poor state of preservation, and in some cases only teeth and traces of bone were found. Thus no data could be obtained on age, sex, or pathology. All of the burials contained artifacts.

According to local reports, 14 burials were removed from this site prior to excavation by The University of Texas. Burials 2, 3, and 7 showed disturbance by previous excavators, and Burials 4 and 8 had been disturbed by plowing. The burials were found at depths ranging from three to 31 inches below the surface. In seven of the eight burials the skeletons appear to have been oriented along an east-west axis, with head to the east. This is open to question, however, because most of the burials had been disturbed and were in a poor state of preservation. Burial 7 was definitely oriented northwest-southeast, with head to southwest.

The greatest number of pottery vessels was found in Burial 6, which contained seven. Most of the vessels were placed around the head and shoulder regions of the body. Only Burials 5 and 6 contained bottles, a Taylor Engraved bottle in Burial 5 and a Hodges Engraved bottle in Burial 6, both spool-necked. Burial 1 contained a celt, and Burials 4, 6, and 8 contained projectile points. No pipes accompanied any of the eight burials.

Burial 1. Portions of this burial had been washed away by flooding of Stouts Creek. A total of six artifacts accompanied this burial, which lay at a depth of 30 inches and contained only a trace of skeletal material. The head was oriented toward the east.

Five pottery vessels (Nos. 1–5) and a celt (No. 5a) were grouped near traces of the skull. Four of the vessels lay at the head of the grave and were arranged in a straight line that ran north-south. A fifth vessel lay to the left of the skull and a celt just south of this vessel. No record was made of the specific locations of individual vessels in any of the eight graves excavated. Specimens 3 and 5 are now missing from the collection.

Three of the vessels are bowls and two are pots (missing specimens identifiable in field sketches). Vessel No. 1 is of type Simms Engraved, Vessel No. 2 is Ripley Engraved, and Vessel No. 4 is La Rue Neck Banded.

Burial 2 (Fig. 3). Burial 2 was found at a depth of 19 inches below the surface and was 15.5 feet east-southeast of Burial 1. It had been disturbed by previous excavators. The skeleton was fully extended on its back with head to the east. In addition to the skull, eight teeth and fragments of the arms, pelvis, and legs were identifiable.

Six vessels (Nos. 17–22) were associated with this burial, four pots and two bowls. They were all placed east and north of the skeleton, three being arranged at the

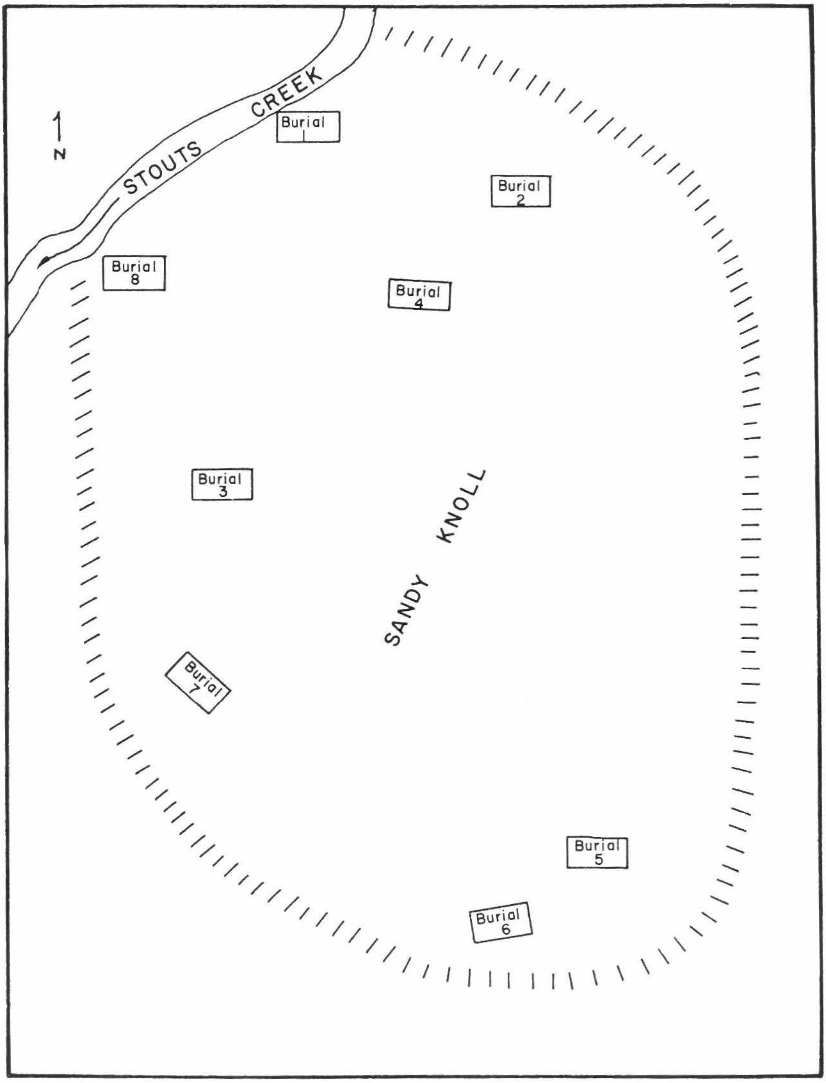

Fig. 2. Location of burials in the sandy knoll at the Culpepper site.

head of the grave in a north-south line, the fourth just to the right of the skull, the fifth to the right of the pelvis, and the sixth near the right knee. Two vessels are of Ripley Engraved type, one La Rue Neck Banded, and the remaining three of unknown types. Two flint flakes were noted near the pelvis.

Burial 3. This was located 33 feet south-southwest of Burial 1 and at a depth of 18 inches. No skull was present, and only small fragments of leg bones could be

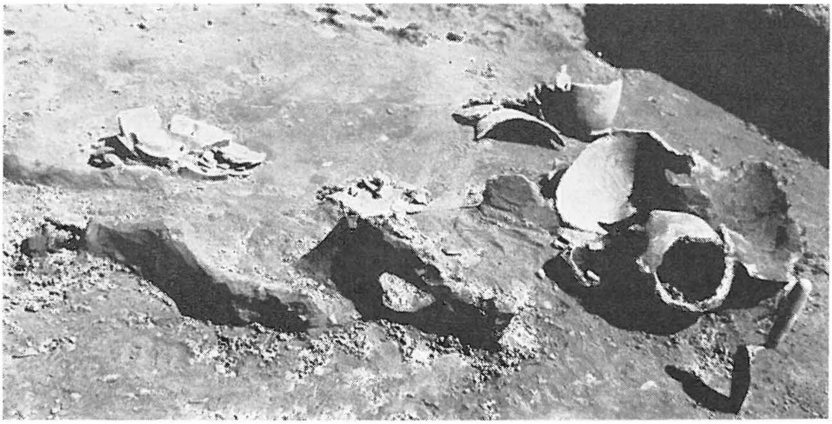

Fig. 3. Burial 2 at the Culpepper site.

identified. As this burial had been disturbed by previous excavation, orientation is uncertain. Three bowls and a pot (Nos. 24–26) were associated with this burial. Vessel Nos. 23, 24, and 26 are of Ripley Engraved type, and Vessel, No. 25 is of La Rue Neck Banded type.

Burial 4. This burial, which contained only fragments of the skull and leg bones, was found 8.5 feet southwest of Burial 2 at a depth of three to five inches. It was badly disturbed by plowing and also by floodwater erosion. Although the field notes state that only two badly crushed vessels were found, vessels numbered 27, 27a, and 27b are listed as coming from this burial. The three vessels are identifiable respectively as Taylor Engraved, Hodges Engraved, and Nash Neck Banded. Field records do not indicate where these vessels were located with respect to the skeleton.

Three arrow points accompanied this burial, but only one, a Talco point (No. 28), survives in the Culpepper collection. Although the points numbered 29 and 30 are missing, outlines drawn in the field notes indicate that they are also of Talco type.

Burial 5. This was located 73 feet southeast of Burial 1 and lay at a depth of 23 inches. The field record states that this burial was oriented east-west, with head toward the east; but this is questionable, since the record also states that only a trace of bone could be observed.

Five vessels (Nos. 31–35, none complete) were found in this burial. One of these is of Ripley Engraved type (No. 31), a second is a Taylor Engraved bottle (No. 32), and a third is an Avery Engraved vase (No. 35). Vessel No. 33 is missing from the collection and No. 34 is of unknown type.

A field sketch of the burial shows a vessel placed on each side of the presumed neck region, two on the chest, and another near the left hand. Two flint flakes were noted near the feet.

Burial 6 (Fig. 4). Burial 6 was located 7.5 feet southwest of Burial 5 and lay at a depth of 29 inches below the surface. It was oriented northeast-southwest, with head to the northeast. The only skeletal remains consisted of 12 teeth.

Seven vessels were associated with this burial (Nos. 36–42), only one of which was complete (No. 36). These include one vessel of Taylor Engraved, one of Hodges Engraved, two of Womack Engraved, one of Simms Engraved, one similar

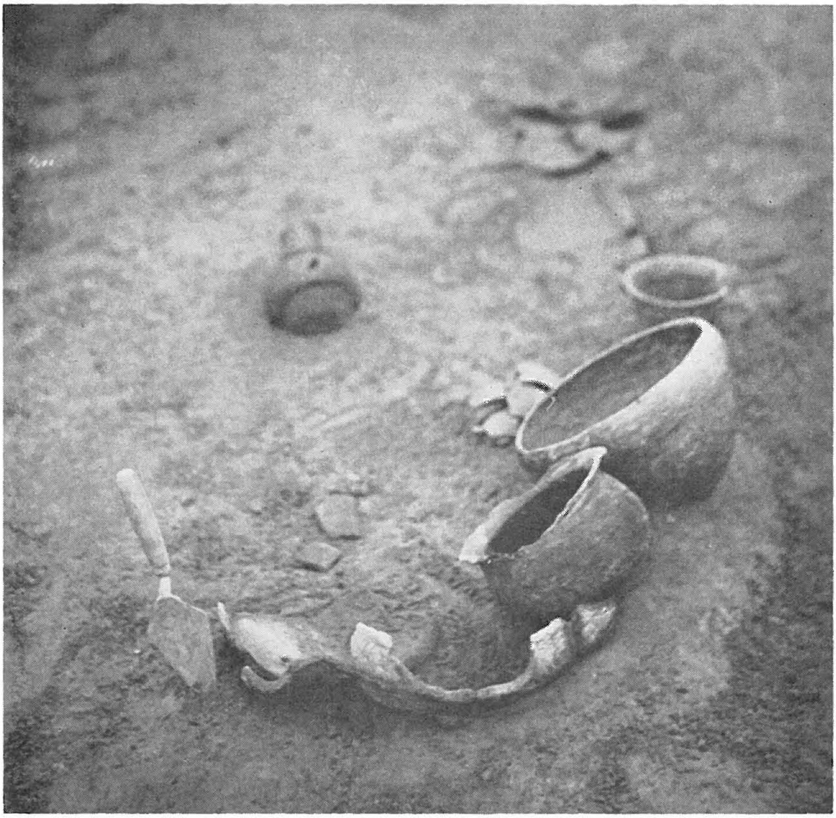

Fig. 4. Burial 6 at the Culpepper site.

to Avery Engraved, and one of unknown type. Three of these vessels were at the head of the grave in an almost north-south line, two were on opposite sides of the 12 teeth, and the remainder were on the right side of the body area. Two projectile points of Gary type (Nos. 43 and 44) were near the presumed knee region.

Burial 7. This disturbed burial was found about 32 feet northwest of Burial 6 at a depth of 31 inches. Its axis was northwest-southeast, with head to the southeast. Five broken vessels (Nos. 45, 45b, 46–48) were present, all of Ripley Engraved type except No. 46, which is missing from the collection, and No. 48, which is of Nash Neck Banded type. A small quantity of clay was found inside one of the bowls (specific bowl not identified in field record).

Burial 8. This was found 16 feet southwest of Burial 1 at a depth of 8 inches (shallowness due primarily to erosion and plowing). The head was to the east, the feet to the west. About half of the skull, most of the teeth, and miscellaneous leg bone fragments were present. With this burial four incomplete vessels were associated (Nos. 59a, 59b, 60, 61), one of Taylor Engraved type (No. 59b), two of Ripley Engraved type (59a, 60), and one of unknown type (No. 61, missing from collection). Positions of these vessels in the burial are not recorded.

Test Trench

A test trench (no dimensions recorded) was dug in the midden southwest of Burial 6, and this yielded a metate (depth 18 inches), a mano (depth 20 inches), a scraper (depth 23 inches), and some five to eight projectile points at various depths (12, 14, 20, and 37 inches specified). The projectile points from this test trench cannot be identified in the collection.

Pottery Vessels

A total of forty-nine pottery vessels, complete and incomplete, is now in the collection from the Culpepper site (see Table 1). Thirty-four of these were found in association with burials. They vary greatly in type, form, and shape. Only three bowls are of the true shouldered type (Fig. 5, C, G, J) described by Krieger (1946: 226). Most of the bowls are carinated, having steep sides and vertical rims. Two bottles were found in burials, both having short spool necks.

Nine purchased vessels are included in the collection. Five of these are Ripley Engraved, two are Taylor Engraved, one is Avery Engraved, and one is a Keno Trailed bottle, the only vessel of this type in the collection.

Most of the vessels are engraved (78%), and the majority are either of Ripley Engraved (39%) or of Taylor Engraved (15%) type. The scroll or spiral is the most common decoration motif, and designs are commonly repeated four times around the rim. Four vessels are neck-banded with appliqué design. Incising is rare and brushing is absent.

The majority of the vessels are clay or sherd tempered. Only one (No. 17) is shell tempered, and it is incomplete and of unidentifiable type. Buff is the most common color, but 16 vessels are red filmed. Most of the vessels are thick and quite heavy, and most of the designs are crude and poorly executed.

Ripley Engraved. The collection includes 19 vessels of Ripley Engraved type, 12 of which are from burials, all of the burials except Burial 4 and Burial 6 containing at least one vessel. Ten of these 19 vessels are red filmed. All are carinated bowls except for one shouldered bowl (purchased) and one small jar. Only the rims bear decoration, and all of the lips are rounded. The paste is compact in all of these vessels.

These Ripley Engraved vessels have been divided into three size groups: (1) small, with oral diameter not greater than 15 cm. or height greater than 10 cm.; (2) medium, with oral diameter between 15 and 20 cm. and height between 10 and 15 cm.; and (3) large, with oral diameter between 20 and 25 cm. and height between 15 and 20 cm.

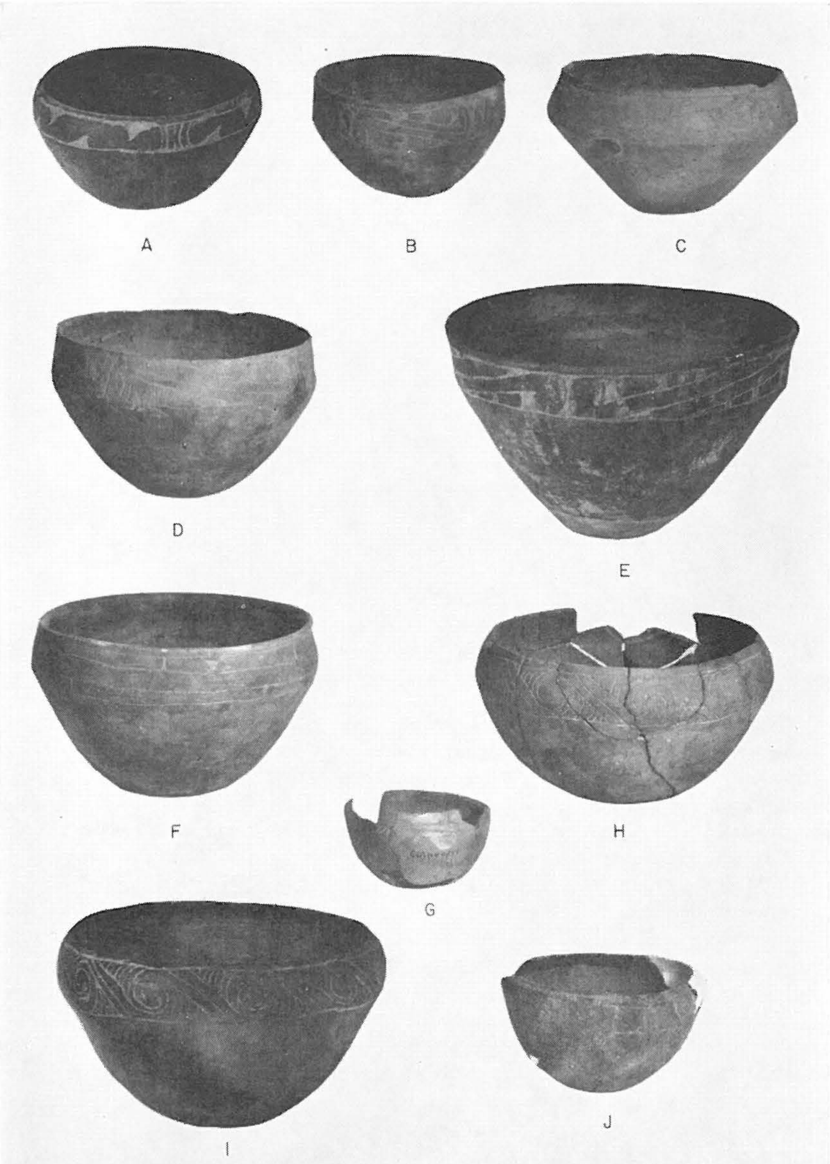

Fig. 5. Pottery vessels from the Culpepper site. A, Ripley Engraved (height 8.2 cm.); B, Ripley Engraved (height 9.75 cm.); C, Ripley Engraved (height 10.25 cm.); D, Ripley Engraved (height 7.96 cm.); E, Ripley Engraved (height 16.6 cm.); F, Ripley Engraved (height 15.2 cm.); G, Simms Engraved (height 6.5 cm.); H, Womack Engraved (height 14.2 cm.); I, Womack Engraved (height 15.3 cm.); J, Simms Engraved (height 9.7 cm.).

TABLE 1

Provenience of Pottery Vessels in the Culpepper Collection

	Burial 1	Burial 2	Burial 3	Burial 4	Burial 5	Burial 6	Burial 7	Burial 8	Trenching	Surface	Provenience unknown	Purchased	Total	Percentage
Ripley Engraved	1	2	3	.	1	.	3	2	.	1	1	5	19	39
Taylor Engraved	.	.	.	1	1	1	.	1	.	.	1	2	7	15
Womack Engraved	.	.	.	.	.	2	.	.	1	.	.	.	3	6
Simms Engraved	1	.	.	.	.	1	.	.	.	.	.	.	2	4
Hodges Engraved	.	.	.	1	.	1	.	.	.	.	.	.	2	4
Avery Engraved	.	.	.	.	1	.	.	.	.	.	.	1	2	4
Avery-like Engraved	.	.	.	.	.	1	.	.	.	.	.	.	1	2
La Rue Neck Banded	1	1	1	.	.	.	.	.	.	.	.	.	3	6
Nash Neck Banded	.	.	.	1	.	.	1	.	.	.	.	.	2	4
Keno Trailed	.	.	.	.	.	.	.	.	.	.	.	1	1	2
Other Engraved	.	1	.	.	1	1	.	.	.	.	.	.	3	6
Miscellaneous	.	2	.	.	.	.	.	.	.	.	2	.	4	8
Totals	3	6	4	3	4	7	4	3	1	1	4	9	49	100

(1) Small group (Fig. 5, A, B, D; Fig. 6, A, B; Fig. 9, A, B, D). Six specimens. Shape—carinated bowls (4 specimens), a shouldered bowl, and one jar. Decoration—two with excised triangles between two parallel lines on rim (almost identical in size; both red filmed, one each found in Burial 1—see Fig. 5, A, and Fig. 6, A—and Burial 2); stylized scroll (Fig. 6, B) and use of excised hour-glass symbols. Average rim thickness—4.7 mm. Provenience—four from burials; two purchased.

(2) Medium group (Fig. 5, C; Fig. 6, C; Fig. 9, E–G). Seven speciments. Shape—carinated bowls (Fig. 9, E–F). Decoration--stylized scrolls with excised hour-glass figures (three are red filmed)—see Fig. 6, C. Average rim thickness—6.2 mm. Provenience—five from burials, one of unknown provenience, one from surface.

(3) Large group (Fig. 5, E–F; Fig. 6, D; Fig. 9, N). Six specimens. Shape—carinated bowls (Fig. 9, N). Decoration—stylized scrolls and hour-glass (one red filmed); conventionalized scroll of parallel lines with hooked arms at the ends, repeated three times around the rim (one specimen)—see Fig. 6, D. Average rim thickness—6 mm. Provenience—two from burials, three purchased, one of unknown provenience. Remarks—two bowls have unusual shapes; one is illustrated by Suhm *et al.* (1954: Plate 58, D); the other is a very high (16.6 cm.), steep-walled, red-filmed vessel that tapers to a small base.

Two additional vessels, represented by red-filmed sherds decorated with engraved scrolls, were found in Burial 8. The sherd thicknesses average 7.5 mm.

Taylor Engraved. The collection includes seven Taylor Engraved vessels, four of which are bottles, three having bulbous necks (the neck of the fourth vessel is missing). Two other vessels are small, red-filmed jars, and the seventh vessel is a

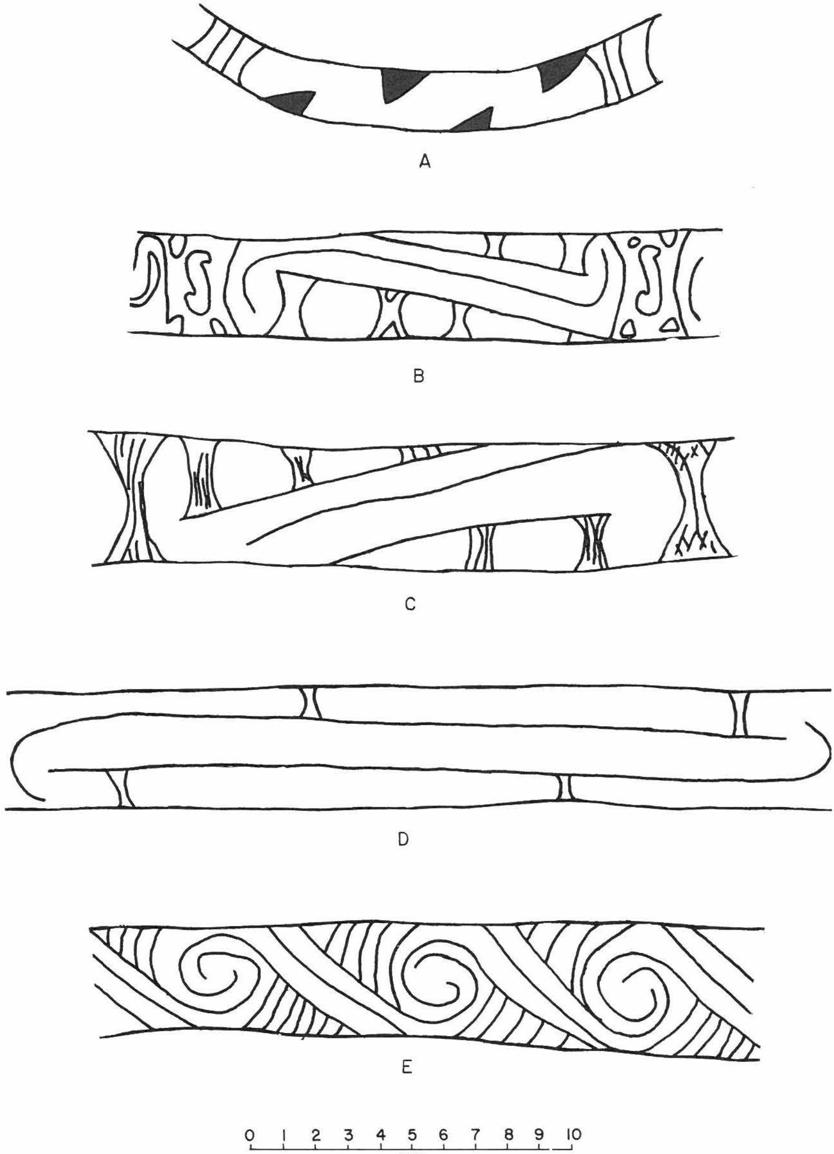

Fig. 6. Designs from pottery vessels at the Culpepper site. A-D, Ripley Engraved; E, Womack Engraved.

steep-walled bowl. All vessels are decorated with scrolls or spirals with their centers containing one, two, or three hooking arms. All have well-finished surfaces, and the bottles show evidence of having been polished. The paste is dark and compact.

(1) Bottles (Fig. 7, A). Four specimens. Shape—globular bodies, bulbous necks. Lip—flaring widely on two vessels, rolled out slightly on another. Decoration—walls bear tight spirals with hooking arms in center; red pigment in the engraved lines of the two flaring lip bottles; difficult to determine whether the design on one black bottle was incised or engraved—this vessel has two complete scrolls on its base; fourth bottle (incomplete) also black in color. Dimensions—height ranges from 15 to 18 cm.; oral diameter from 2 to 4.6 cm.; neck length from 4.9 to 5.75 cm. Provenience—two bottles purchased; two found in burials.

(2) Jars (Fig. 8, A; Fig. 9, H). One of the two jars has been restored and is illustrated in Suhm *et al.* (1954: Plate 65, D); the other is incomplete and only partially restored. Shape—steep-sided jars, rim flaring out slightly, lip rounded (see Fig. 9, H). Decoration—red filmed, tight scrolls engraved on rim with two arms hooking toward one another in center of the scrolls; white paste exposed by engraving contrasts sharply with the red filming. Dimensions of restored vessel—height 9.25 cm.; oral diameter 11.2 cm.; wall thickness 3 mm. Wall thickness of unrestored vessel—6 mm. Provenience—found in burials.

(3) Bowl (Fig. 8, A). Condition—restored but still incomplete. Shape—steep-walled carinated bowl, vertical rim, rounded lip. Decoration—tight, negative scrolls; hooking arms in center of scrolls; scrolls set between two parallel lines encircling rim (see Fig. 8, A). Dimensions—height 14.25 cm.; oral diameter 29 cm.; wall thickness 6 mm.

Womack Engraved (Fig. 5, H–I; Fig. 6, E; Fig. 9, I–J). Three vessels have been identified as Womack Engraved on the basis of definition by Duffield and Jelks (1961: 36–38). This type resembles Hodges Engraved and is commonly associated with protohistoric and historic sites in north central and northeastern Texas. Two of the vessels are heavy, squat bowls, while the third is a miniature duplicate of the larger two. The paste is gray, compact, and tempered with clay.

Shape—squat, rim incurved, walls slightly concave between base and rim, shoulder area rounded, base flat (see Fig. 9, I–J).

Decoration—engraved, negative meandering scrolls set between two horizontal lines that encircle the vessel, one at the lip, the other just below the shoulder (see Fig. 6, E); red pigment present in scrolls; vessel gray and shows firing clouds; area between scrolls filled in with arched parallel lines.

Dimensions—Height: large bowls, 14.2 and 15.3 cm.; small bowl 8.7 cm. Wall thickness: large bowls, 7.5 and 5 mm.; small bowl, 5 mm.

Remarks—Included with the two large bowls in Burial 6 were a Taylor Engraved jar, a Simms Engraved bowl, an Avery-like Engraved bowl, a Hodges Engraved bottle, a very unusual squat bowl with a wide flaring rim (to be discussed later), and two Gary points. The presence of these Womack Engraved vessels with Titus Focus and Texarkana Focus types indicates that perhaps these foci continued into protohistoric and perhaps even historic times. The presence of two Gary points may also be significant in extending the temporal range of this projectile point type further into the Neo-American Stage.

Simms Engraved (Fig. 5, G, J; Fig. 9, K–L). This type is represented by two vessels, one a miniature bowl, the other a small bowl. Both are dark gray in surface color and have a dark paste.

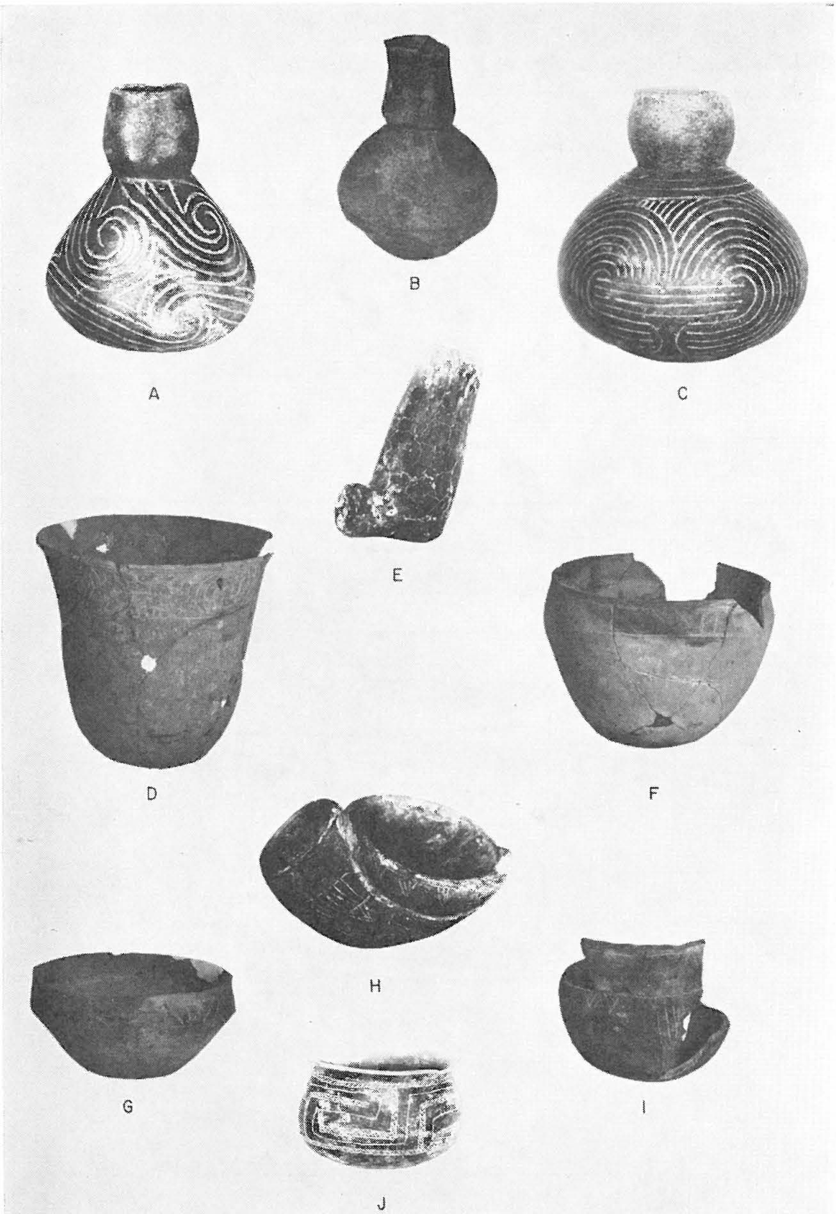

Fig. 7. Pottery vessels from the Culpepper site. A, Taylor Engraved (height 15 cm.); B, Hodges Engraved (height 15.9 cm.); C, Keno Trailed (height 11.7 cm.); D, Avery Engraved (height 20.1 cm.); E, pipe (height of bowl 7.1 cm.); F, Avery-like Engraved (height 15 cm.); G, engraved vessel (height 7.5 cm.); H, pipe (height of bowl 5 cm.); I, engraved vessel (height 12.2 cm.); J, engraved vessel (height 9.7 cm.).

Shape—steep-walled, shouldered bowls with incurving rims (see Fig. 9, K–L); the small bowl has an incurved rim that turns back upward in a vertical position.

Decoration—engraved lines on rim; use of ticked lines; small bowl has red pigment in the engraved lines; both have a ticked lip.

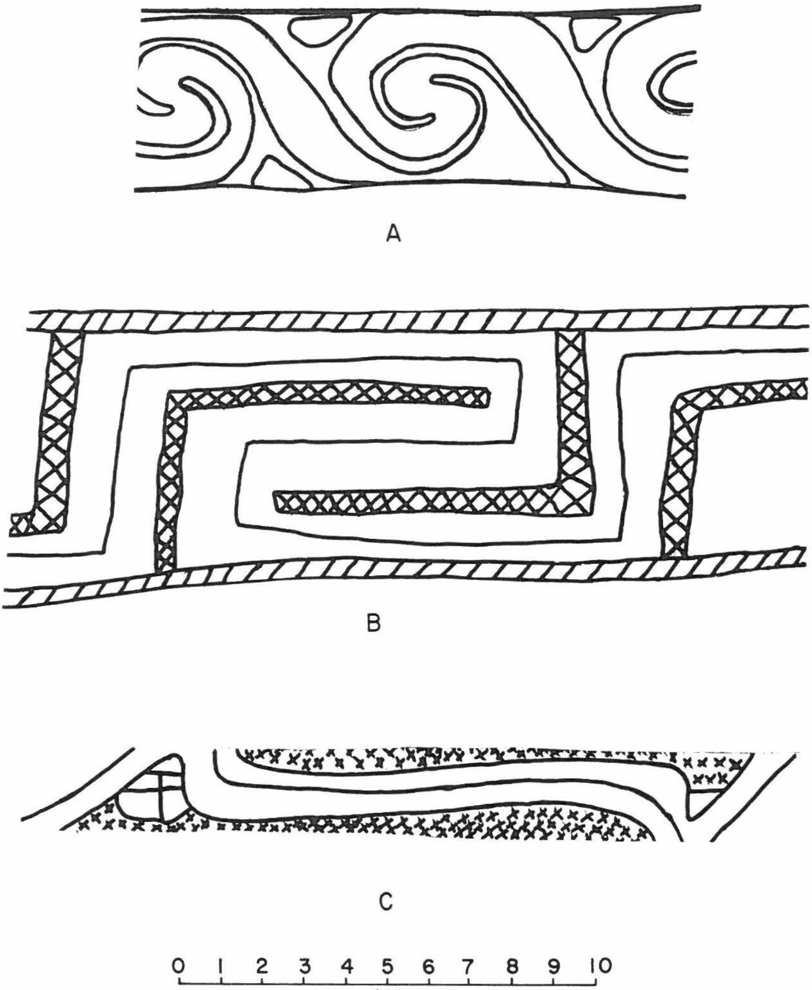

Fig. 8. Designs on pottery vessels from the Culpepper site. A, Taylor Engraved; B-C, unidentified engraved.

Dimensions—Height: small bowl, 6.5 cm.; large bowl, 9.7 cm. Oral diameter—small bowl, 8.1 cm.; large bowl, 13.5 cm. Wall thickness—small bowl, 3 mm.; large bowl, 6 mm.

Provenience—small bowl from Burial 6, large one from Burial 1.

Hodges Engraved. Only one of the two vessels, a bottle, is complete. The other is represented by 26 decorated sherds, part of the base, and portions of the rim.

(1) Bottle (Fig. 7, B). This polished gray bottle is quite light in weight and appears to have been tempered with shell, which has been leached out, leaving a pitted surface. Shape—spool-shaped neck, flaring lip, globular body, pedestal base. Decoration—negative scrolls filled in with engraved cross-hatching cover entire body; space around scrolls blank. Dimensions: height 15.9 cm.; height of neck 6 cm.; oral diameter 4.5 cm.; neck wall thickness 3 mm. Provenience—Burial 6.

(2) Sherds of second vessel (Fig. 9, M; Fig. 10, E). Shape—appears to have been a steep-sided bowl with slightly outcurving rim and lip (see Fig. 9, M). Decoration—scrolls filled with engraved cross-hatching; lip scalloped. Color—gray to buff. Wall thickness—4 mm. Provenience—Burial 4.

Avery Engraved (Fig. 7, D; Fig. 9, O). This type is represented by two red-filmed vessels, a large vase found in a burial and a purchased carinated bowl. Both have compact black paste.

(1) Vase (Fig. 7, D). Condition—restored and nearly complete. Shape—steep-walled vessel with flaring rim and lip; mouth much wider than body; lip rounded (see Fig. 9, O). Decoration—wide engraved lines cut into white paste, contrasting sharply with red filming; design consists of semicircular motifs with ticked lines and spirals set in between. Dimensions: height 20.1 cm.; oral diameter 27 cm.; wall thickness—6 mm. Provenience—Burial 5.

(2) Bowl (illustrated by Suhm *et al.*, 1954, Plate 1, F). Shape—heavy, squat; very similar to the two large Womack Engraved bowls; rounded shoulder and slightly concave body walls. Decoration—engraved semicircular motifs repeated five times around rim and set between two parallel horizontal lines, one encircling rim at the lip, the other just below the shoulder of the bowl; background filled with parallel lines. Dimensions: height 15.4 cm.; oral diameter 23.3 cm.; wall thickness 5.5 mm.

Avery-like Engraved (Fig. 7, F; Fig. 9, C). In Burial 6 was found a steep-sided bowl decorated with oblique straight lines and semicircles set between two parallel lines that encircle the rim. The rim slants in slightly and the lip outward (see Fig. 9, C). The core is buff, and the vessel is tempered with large bits of clay. Dimensions: height 15 cm.; oral diameter 17.7 cm.; rim thickness 6 mm.

Keno Trailed (Fig. 7, C). This purchased vessel, which is the only representative of Keno Trailed type in the collection, has been illustrated by Suhm *et al.* (1954: Plate 39, M). It is gray in color, polished, and shows excellent execution of design. Shape—globular body, spool neck, rounded lip, short pedestal base. Decoration—entire body covered with wide, shallow trailed lines consisting of parallel arcs and parallel horizontal lines. Dimensions: height 11.7 cm.; length of neck 3.4 cm.; maximum diameter of neck 3.6 cm.; oral diameter 5.2 cm.

La Rue Neck Banded (Fig. 9, P; Fig. 10, A). This type is represented by three incomplete, unrestored vessels. All are gray in color and have the characteristic crude neck banding. Two of the vessels have short, vertical fillets on the rim, one in a pair, the other in sets of three. One of these also has fillets set obliquely on the body. All have vertical rims (see Fig. 9, P). Average wall thickness is 6 mm. Provenience—one each in Burials 1, 2, and 3.

Nash Neck Banded (Fig. 9, R; Fig. 9, Q; Fig. 10, C, D). This type is represented by two vessels that are incomplete and unrestored. Both are gray-brown in color.

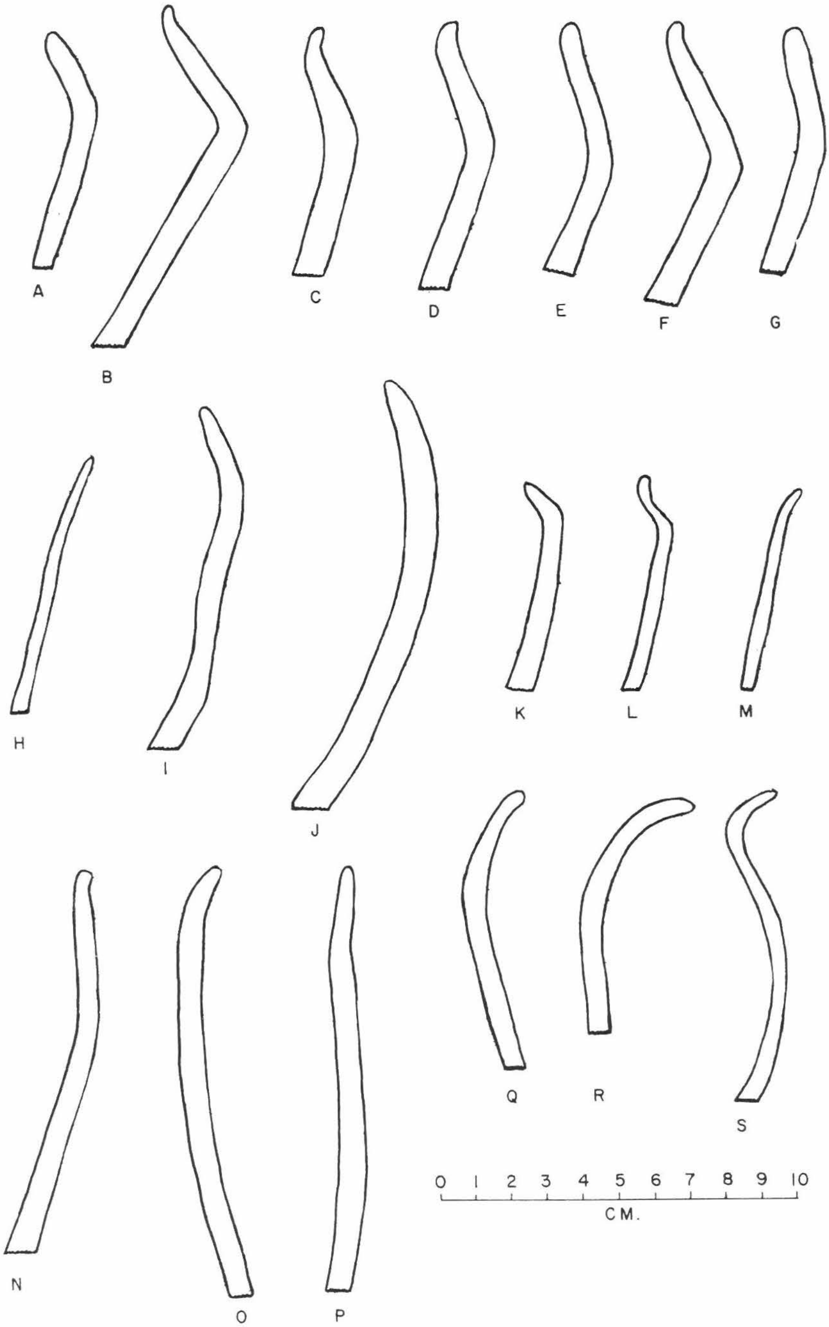

Fig. 9. Rim profiles of pottery vessels from the Culpepper site. A-B, D, Ripley Engraved (small); C, Avery-like Engraved; E-G, Ripley Engraved (medium); H, Taylor Engraved; I-J, Womack Engraved; K-L, Simms Engraved; M, Hodges Engraved; N, Ripley Engraved (large); O, Avery Engraved; P, La Rue Neck Banded; Q-R, Nash Neck Banded; S, unidentified engraved vessel.

One vessel has a sharply flaring rim (Fig. 9, R) width a node set just under the lip and repeated four times around the rim. Just below each node at the body-rim junction is a vertical fillet running down the wall (see Fig. 10, D). Wall thickness is 6.5 mm.

The second vessel has a flaring rim and rolled lip (Fig. 9, Q). The rim is decorated with four parallel lines formed by elongated and slightly oblique punctates (see Fig. 10, C). Wall thickness is 5.5 mm.

Other Engraved Vessels. In this group are two jars and one bowl.

(1) Jar (Fig. 7, J; Fig. 8, B; Fig. 9, S). This vessel appears to be unique in the Caddoan area. Its design shows some similarity to the designs of Barkman Engraved, but it cannot be classified as Barkman Engraved. Its shape cannot be duplicated in known Caddoan vessel forms. The paste is laminated and appears to have been tempered with shell, now leached out. The vessel is red filmed, and the engraved lines contrast sharply with the red film. Shape—squat, globular body; rim flares out almost horizontally (see Fig. 9, S). Decoration—combination of single engraved lines with cross-hatched panels, repeated four times; lip notched; slightly polished. Dimensions: Height 9.7 cm.; oral diameter 12.6 cm.; wall thickness 3 mm. Provenience—Burial 6.

(2) Jar (Fig. 7, I). Condition—incomplete. Shape—round body; high concave rim with scalloped lip; three-fourths of rim missing. Decoration—single engraved line encircling rim just below lip, another at junction of rim and body; extending down alternately from the lower line, and repeated four times, are an engraved triangle filled in with lines and a set of three parallel lines (these extend almost to base); vessel red filmed. Dimensions—height 13.2 cm.; oral diameter 10.8 cm.; wall thickness 5 mm. Provenience—Burial 2.

(3) Bowl (Fig. 7, G; Fig. 8, C). Shape—squat, carinated bowl rim slants inward slightly; lip rolled out and rounded. Decoration—engraved; stylized scroll filled in with cross-hatching, repeated three times on rim; red pigment in engraved lines (see Fig. 8, C). Dimensions: height 7.5 cm.; oral diameter 13.9 cm.; rim thickness 6 mm. Provenience—Burial 5.

Miscellaneous Vessels. Three vessels are represented by plain gray body sherds or incompletely restored vessels. The missing rims and absence of design render them unidentifiable as to type. A fourth vessel has appliqué work on the body, but its rim is also missing. The sherds of a fifth are unusually light in weight and have a peculiar orange color. Sherd thickness in these five vessels ranges from 5 to 7 mm.

Potsherds

A total of 94 potsherds was collected at the Culpepper site. Of these, 43 were found in the midden, but the remaining 51 are of unknown provenience. These sherds are clay or clay-grit tempered, some of the clay being white in color (probably kaolinite). Paste color ranges from buff to black (four sherds bear a red film). Design techniques include engraving, incising, appliquéing, punctating, and brushing. The sherds have been grouped on the basis of design technique and will be described under each of these headings.

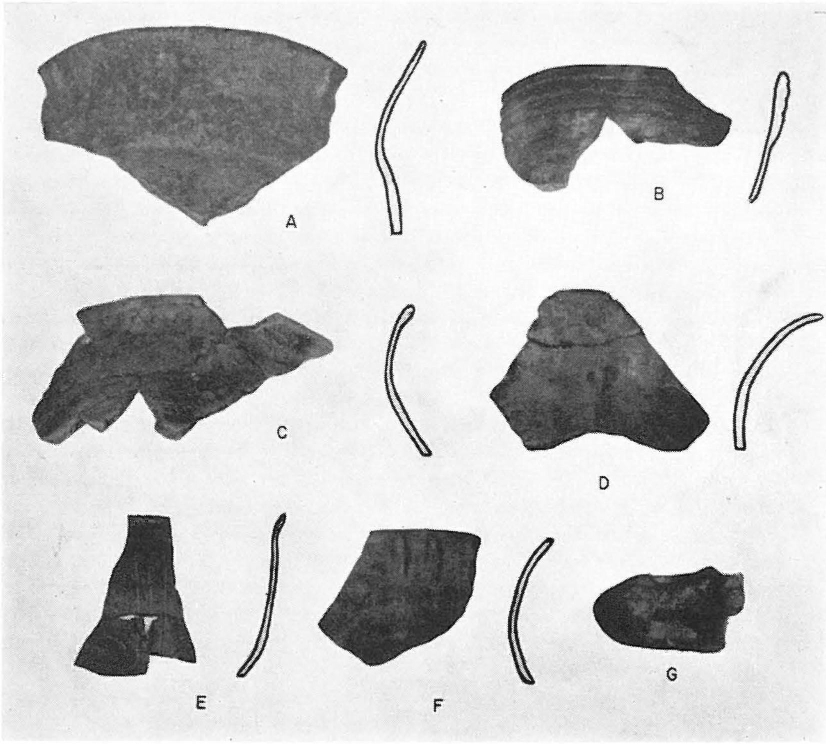

Fig. 10. Rim sherds (with profiles) and pottery figure from Culpepper site. A, La Rue Neck Banded; B, Coles Creek Incised; C-D, Nash Neck Banded; E, Hodges Engraved; F, Nash Neck Banded; G, dog (?) effigy from pottery vessel.

Plain Sherds. Among the 55 plain sherds are 40 which range in color from buff to red (five from midden, remainder of unknown provenience). These range in thickness from 5 to 13.5 mm. (one is a basal sherd). The reamining 15 sherds range from gray to black in color (11 from midden, remainder provenience unknown). One of these is a rim sherd (from the midden) with slightly flaring lip.

Engraved Sherds. These number 29, of which 11 are rim sherds from the midden, the remainder being body sherds of unrecorded provenience. Eight of the 11 rim sherds are of Ripley Engraved type (two are red filmed). All lips are rounded and either continuous with the rim or slightly flaring. One of the three remaining engraved rim sherds is decorated with two inverted chevrons that extend downward from the lip. The rim sherds range in thickness from 5 to 9 mm.

Two of the 18 body sherds are red filmed, six are dark gray in color, and the remainder buff. Six sherds are of Taylor Engraved type and one is Ripley Engraved. Thickness ranges from 4 to 8 mm.

Appliqué Sherds. Three body sherds bear a single appliqué fillet (two of these are from the midden). Two are cream in color, the third dark brown. The cream-colored sherds both have thickness of 7 mm., the brown sherd a thickness of 6.5 mm.

Punctate Sherds. One punctate rim sherd, found in the midden, is gray in color and has a thickness of 8 mm. The lip is rounded at junction with the rim and flat across the top.

Incised Sherds. A single deeply incised body sherd, brown in color and 7 mm. thick, came from the midden. It bears a pattern of several intersecting lines that are almost perpendicular. Four deeply incised gray rim sherds, all from the same vessel, were found in the general trenching. The rim is thicker (7 mm.) than the body (5 mm.), giving the rim an overhanging effect. The lip is flat, and three parallel incised lines encircle the rim. These rim sherds appear to be of a Lower Mississippi type, probably Coles Creek Incised (see Fig. 10, B). The sherds are clay tempered.

Brushed Sherds. One body sherd, provenience unknown, is buff in color and has a thickness of 7 mm. The brushing technique may be characterized as two directional and overlapping.

Summary. The majority of the decorated sherds are of Ripley and Taylor Engraved types. Brushing, appliqué, punctating, and incising occur in minor quantities. Red filming is rare (4.4%) and does not parallel the red-filmed vessel percentage (27.5%). However, the sherd sample is too small to be of much consequence. Over half (61%) of the sherds from this site are undecorated. Most of these are light in color and appear to be from vessels that were fired in an oxidizing atmosphere.

Clay Pipes

Two ceramic pipes, both purchased, are in the Culpepper collection. One (No. 1) is a low, massive elbow pipe; the other (No. 2) is a high-bowled, short-stemmed elbow pipe. Both are clay tempered and gray in color.

(1) Pipe No. 1 (Fig. 7, H). Shape—squat bowl; thick stem that curves up and grades into bowl. Decoration—combination of fine engraved triangles and encircling lines around both stem and bowl; triangles filled in with two lines; surface lightly polished. Dimensions—length 8.8 cm.; stem width 5.3 cm.; bowl diameter 5.8 cm.; bowl height 5.3 cm.; bowl wall thickness 8 mm.

(2) Pipe No. 2 (Fig. 7, E). Shape—high, narrow bowl; short stem; bowl makes about a 100° angle with stem, bulges near its base, and tapers at the rim and lip. Decoration—slightly polished. Dimensions—stem length 3.6 cm.; stem width 2.7 cm.; bowl diameter 1.4 cm.; bowl height 7.1 cm.; bowl wall thickness 5 mm. Remarks—a pipe of this same form, but made of Ouachita sandstone, was found at the Sanders site in Lamar County (Krieger, 1946: 325; Plate 22, F).

Zoomorphic Figure of Clay

A ceramic figure (Fig. 10, G), probably representing a dog, is among the purchased specimens. The figure, whose head is turned to its right, is standing on a platform that evidently projected from the lip of a pottery vessel. Such vessels have been found at various sites in northeastern Texas (Suhm *et al.*, 1954: 277; Plate 22, A, D, F, H). This specimen is clay-tempered and gray in color. It has a length of 5.9 cm. and a maximum height of 4.8 cm.

Projectile Points

At the Culpepper site 46 chipped stone projectile points were found, and of these 43 specimens have been located and described (the remainder are missing from the collection). This series includes 40 dart points and three arrow points. The dart points represent two stem traditions—contracting stem (Types Gary, Wells, and Kent) and parallel-sided to slightly expanding stem (Types Yarbrough, Carrollton, Trinity, Castroville, Pontchartrain, Edgewood, and Fairland-like). The arrow point types represented are Talco and Catahoula.

Gary Points (Fig. 11). At the Culpepper site 23 Gary points were collected (12 from the surface, nine from trenches, and two from Burial 6), and within this series five distinct varieties can be recognized on the basis of size and shape.

Variety 1 consists of nine specimens (Fig. 11, A–G) that are diamond-shaped, the shoulders, which are slight and rounded, occur just below the mid-section. Overall size: small to medium. Blade: triangular in outline, with convex edges in six specimens, slightly concave in three specimens. Stem: length one-third to three-eighths the length of the point, lateral edges convex to straight, and base rounded to slightly pointed. Dimensions: length 3.2 to 5.7 cm.; width at shoulders 1.8 to 2.6 cm.; thickness .5 to .8 cm. Remarks: roughly flaked, but better flaked than Variety 2.

Variety 2, represented by three specimens (Fig. 11, H–I), is similar to Variety 1 in outline, but the shoulders are more prominent and occur about four-fifths of the way down to the base from the tip. Overall size: medium to large. Blade: triangular in outline, with concave edges. Stem: length is one-fourth to one-third the length of the point, edges range from convex (in two specimens) to concave, and base is rounded. Dimensions: length 4.5 to 7 cm.; width at shoulders 2 to 2.7 cm.; thickness .8 to 1.2 cm. Remarks: roughly flaked, asymmetrical in outline; one found in Burial 6.

Variety 3 consists of four specimens (Fig. 11, J–L) that are uniform in size and outline. They are large, have prominent shoulders, and the stems contract to a point. Blade: triangular in outline with straight lateral edges. Stem: length is one-fourth the length of the point, the lateral edges are slightly convex, and the base is a rounded point. Dimensions: length 6 to 7.8 cm.; thickness 2.5 to 2.9 cm. Remarks: better flaked than Variety 2 or 3; shoulders quite prominent; lenticular in cross-section.

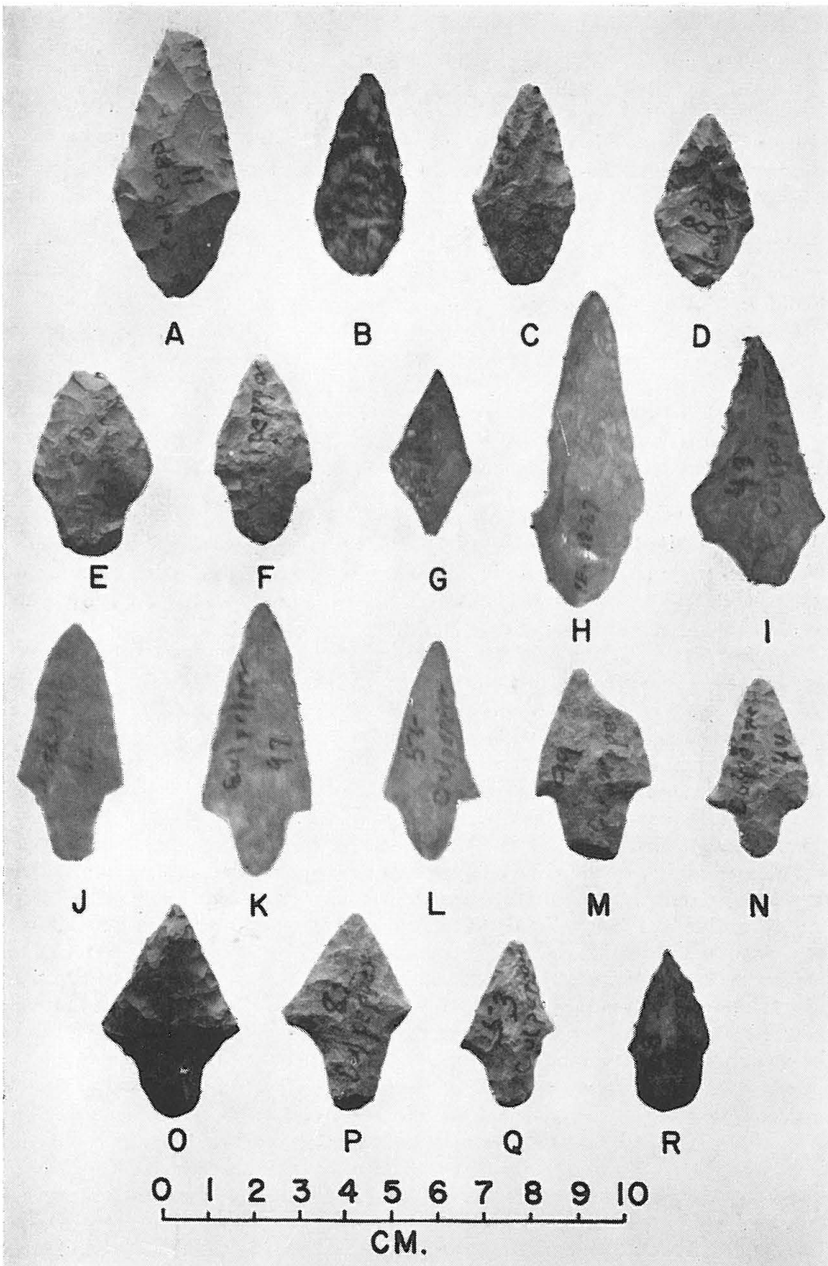

Fig. 11. Gary projectile points from the Culpepper site. A-G, Variety 1; H-I, Variety 2; J-L, Variety 3; M-Q, Variety 4; R, Variety 5. J-L not to scale; L approximately the same length as I.

Variety 4, represented by six specimens (Fig. 11, M–Q), includes small points with triangular blades, prominent shoulders, and narrow, tapering stems. Blade: triangular in outline with lateral edges ranging from slightly convex to slightly concave. Stem: length is one-fourth to one-half the length of the point, the lateral edges are convex, and the base is rounded. Dimensions: length 3.2 to 4.4 cm.; width at shoulders 2.8 to 4.9 cm.; thickness .6 to .9 cm. Remarks: roughly flaked; tend to be asymmetrical in outline; shoulders usually at right angles to the longitudinal axis; one found in Burial 6.

Variety 5 consists of a single point (Fig. 11, R) which is small and has moderate shoulders with a wide stem and rounded base. Blade: triangular in outline with straight edges. Stem: length is three-eighths of total length of the point; lateral edges are straight and parallel; base rounded. Dimensions: length 3.6 cm.; width at shoulders 1.8 cm.; thickness .7 cm. Remarks: a similar point, but with larger stem, is shown by Duffield (1961: 63; Fig. 3, L).

Wells Points (Fig. 12, A–B). Two points of this type were found at the Culpepper site, one on the surface and the other in the general trenching. One of these (A) is of medium size, has a triangular blade with straight lateral edges; a long stem (one-half total length of point) with convex lateral edges, and a rounded base; and the following dimensions: length 5.5 cm., width at shoulders 1.7 cm., thickness .9 cm. The other (B), which is made of chert, is asymmetrical in outline, has pronounced shoulders, and is roughly flaked. Somewhat shorter than A, it has a triangular blade with one lateral edge concave, the other convex. The stem is about five-eighths the total length of the point and has a rounded base. Its dimensions are: length 4.1 cm.; width at shoulder, 1.8 cm., thickness .7 cm.

Kent Point (Fig. 13, A). One Kent point was found in trenching, a medium-sized specimen having a triangular blade with uneven edges, a fairly short stem (one-third total length of point) with straight lateral edges contracting to a convex base, and the following dimensions: length 5.5 cm.; width at shoulders 2.3 cm.; thickness .9 cm.

Yarbrough Points (Fig. 12, C–F). The five points of this type all have slight shoulders, slightly expanding rectanguloid stems, and some degree of basal grinding. In size they range from small (1 specimen) to large (4 specimens). The blades are triangular and have slightly convex edges in most cases. The stems range from one-fourth to three-eighths the total length of the points, have lateral edges that range from concave to straight, and have bases that are slightly convex. The dimension ranges are: length 3.5 to 5.3 cm.; width at shoulders 1.8 to 3.1 cm.; thickness .7 to 1 cm. Three of the Yarbrough points were collected from the surface; the remainder come from the trenches.

Carrollton Points (Fig. 13, B–C). Of the two Carrollton points, one (C) is small in size, the other (B) medium in size and shows basal grinding on the stem. Both have blades that are equilaterally triangular in outline, the lateral edges being slightly concave. The stems, which represent about one-half the total length, have straight lateral edges and bases that are straight to slightly convex. Their dimensions are as follows: lengths 3.5 and 4.1 cm.; widths at shoulder 2 and 3.25 cm.; thicknesses .85 to .9 cm. One Carrollton point was found in trenching; the other is of unknown provenience.

Trinity Points (Fig. 13, D–E). These two points have triangular blades with convex edges and bulging stems with convex lateral edges and convex bases. Stem lengths are about one-fourth the total length of the point in each case. Dimensions:

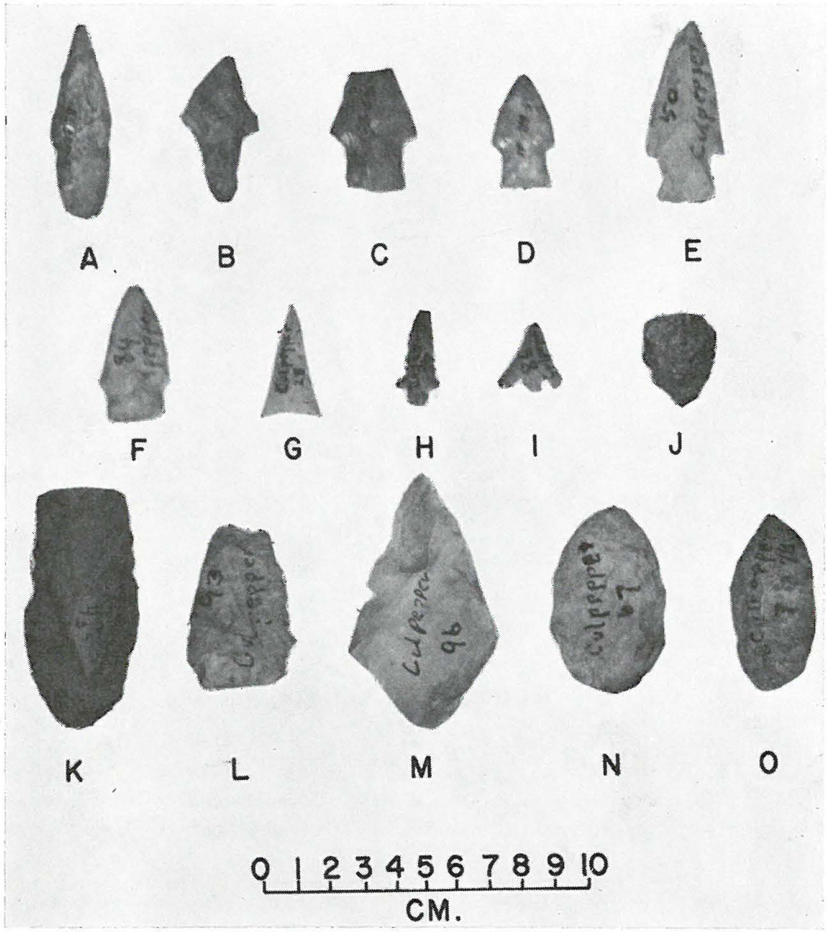

Fig. 12. Projectile points, gouges, and knives from the Culpepper site. A-B, Wells points; C-F, Yarbrough points; G, Talco point; H, unidentifiable point; I, Catahoula point; J-K, gouges; L, shouldered knife; M, knife shaped like a Gary point; N-O, oval knives.

length 5 cm. in both, width at shoulders 2.2 and 2.5 cm.; thickness .8 to .85 cm. Both specimens are from the trenches.

Castroville Point (Fig. 13, H). This single specimen from the surface collection has a triangular blade with convex edges and moderate barbs. The stem is short (one-fifth total length), has straight and slightly flaring lateral edges, and bears a straight base. This point has a length of 7.5 cm., a maximum width of 3.7 cm., and a thickness of .8 cm.

Pontchartrain Point (Fig. 13, I). One specimen, which is made of gray flint, appears to fall within the Pontchartrain type as described by Ford and Webb (1944: 54–55). It is rather narrow and one face bears a longitudinal ridge that

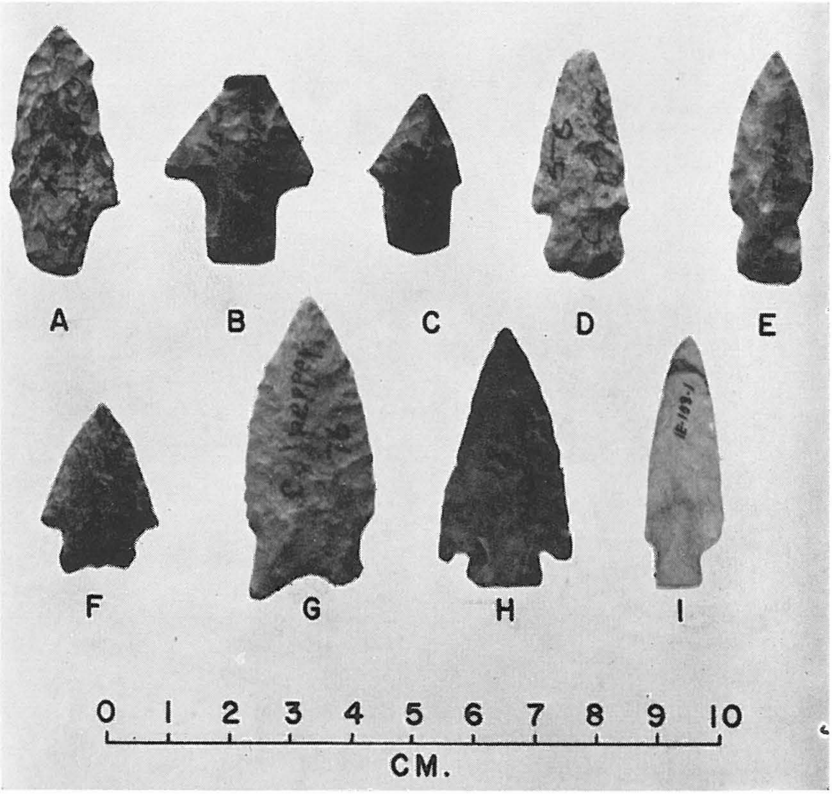

Fig. 13. Projectile points from the Culpepper site. A, Kent point; B-C, Carrollton points; D-E, Trinity points; F, Edgewood point; G, Fairland-like point; H, Castroville point; I, Pontchartrain point. H-I not to scale; I slightly longer than G.

extends from the shoulders to the distal tip. The stem appears to have been broken off squarely near the base. The narrow, triangular blade has straight lateral edges, as does the rectanguloid stem. The lateral edges of the stem have been ground. Dimensions: length 7.3 cm.; width at shoulders 2.25 cm.; thickness .9 cm. This point was found in trenching.

Edgewood Point (Fig. 13, F). One medium-sized Edgewood point has a triangular blade with convex edges and a short (one-third total length), flaring stem with concave base. Dimensions: length 3.6 cm.; width at shoulders 2.5 cm.; thickness .8 cm. This point was found in the trenches.

Unidentified Dart Point (Fig. 13, G). This large point, which came from the trenches and resembles some variants of Fairland type, has a blade with strongly convex, serrated edges. The stem, which is fairly short (one-fourth total length of point), has flaring, concave lateral edges that have been heavily ground. The base is deeply concave.

Talco Point (Fig. 12, G). This point was found in Burial 4 with two additional points that also appear to have been Talco points, judging from sketches in the field notes (these two specimens cannot be located). The surviving specimen, which is made of light brown flint, has lateral edges that are slightly recurved. Dimensions: length 2.4 cm.; maximum width 1.7 cm.; thickness .2 cm.

Catahoula Point (Fig. 12, I). The single specimen of Catahoula type (collected from the surface) is a very small point that has a triangular blade with concave, slightly serrated lateral edges and barbs that are broad and squared at the tips. The short stem, which is damaged, is about one-fourth the total length of the point and has concave lateral edges and a convex base. Dimensions: length 2.2 cm.; width across barbs 1.9 cm.; thickness .2 cm. This point is very similar to several illustrated by Bell (1960: Plate 8, E–F).

Unidentifiable Arrowpoint (Fig. 12, H). This small point from the general trenching has a long triangular blade with straight, serrated lateral edges. The short stem (one-fifth total length of point) has straight lateral edges and a convex base. Dimensions: length 3 cm.; width at shoulders 1.3 cm.; thickness .3 cm.

Knives

Three forms of chipped stone knives, all made of chert or quartzite, occur at the Culpepper site. Five knives are oval in outline (Fig. 12, N–O), have large flake scars, and appear to have been chipped by the percussion technique. In length they range from 5.1 to 7.6 cm.; in width from 2.6 to 3.7 cm.; and in thickness from .8 to 1.1 cm. A sixth knife (Fig. 12, M) is diamond-shaped in outline and resembles Variety 1 of the Gary type projectile point. It bears large flake scars that indicate percussion chipping. It has a length of 7.9 cm.; a maximum width of 4.5 cm.; and a thickness of 1 cm. The seventh knife is shouldered and has a stem that is approximately one-fifth the total length of the knife (Fig. 12, L). It has a triangular blade (the tip is missing) with moderate shoulders, and the base is straight. The large flake scars also indicate percussion flaking. Of the seven knives from this site, six were found in trenching; the seventh was collected from the surface.

Gouges

Two gouges were found on the surface, one of large Clear Fork type (Fig. 12, K) made of hematite, the other (Fig. 12, J) of small triangular form and made of quartzite. In both specimens the bit was formed by unifacial beveling. Dimensions: length 7.6 and 3.1 cm.; width 3.5 and 2.4 cm.; thickness 2 and 1 cm.

Celts

Three celts (Fig. 14, B–F) were obtained at the Culpepper site and three additional specimens were purchased. All of these celts are peta-

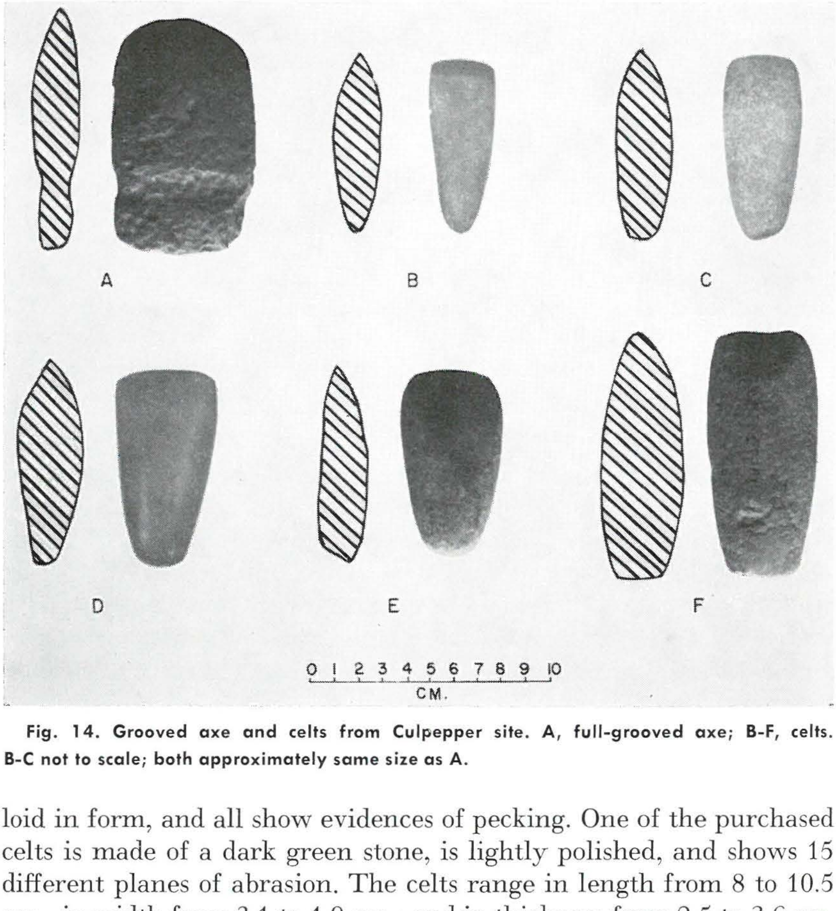

Fig. 14. Grooved axe and celts from Culpepper site. A, full-grooved axe; B-F, celts. B-C not to scale; both approximately same size as A.

loid in form, and all show evidences of pecking. One of the purchased celts is made of a dark green stone, is lightly polished, and shows 15 different planes of abrasion. The celts range in length from 8 to 10.5 cm.; in width from 3.1 to 4.9 cm.; and in thickness from 2.5 to 3.6 cm. One celt (Fig. 14, C) was found in Burial 1; the remaining two collected at the site are surface finds.

Stone Axes

Two grooved stone axes were purchased. One is large and well made, the other (Fig. 14, A) small and poorly made (the stone is badly pitted). Both axes are made of reddish-black hematite. Dimensions: lengths 13.4 and 10.1 cm.; widths 8.2 and 6 cm.; thicknesses 4.1 and 2.2 cm.

Comparisons

Although recent excavations by The University of Texas at the Iron Bridge and Ferrell's Bridge reservoirs have helped to clarify the Archaic and Neo-American stages in northeastern Texas, the archeological picture is far from being clear. A number of factors make it difficult to evaluate the materials from the Culpepper site—the relatively small amount of published field work in the area, the scarcity of sites that span the transition from Archaic to Neo-American, and the complexity of the Culpepper ceramic collection itself.

The Archaic artifacts from the Culpepper site, that is, most of the dart points, the stone axes, the knives, and the gouges, occur on the provisional list of traits given for the East Texas Aspect of the Archaic Stage (Suhm *et al.*, 1954: 149–151). Present in the Culpepper collection, and included in the East Texas Aspect trait list, are an abundance of Gary points (59%); Yarbrough, Wells, and Kent Dart points; gouges; full-grooved axes; a milling stone and a mano. Two common lithic traits listed for the East Texas Aspect, but absent from the Culpepper collection, are T-shaped drills and scrapers. As the Culpepper sample is small, these absences are probably not especially significant. The presence of Gary, Yarbrough, Edgewood, and Wells points suggest a late Archaic occupation at the Culpepper site (Davis and Davis, 1960: 51–52). At the Limerick site, a late Archaic-early Neo-American site in Rains County located 40 miles southwest of the Culpepper site, Gary points were abundantly found in association with Yarbrough, Edgewood and Trinity points (Duffield, 1961: 51–116). However, the pottery from the Limerick site is attributable to the Sanders Focus of the Gibson Aspect and is different from the pottery from the Culpepper site.

As two Gary points were found in Burial 6, it is possible that not all Gary points are associated with the Archaic occupation. This point type may have survived into late Neo-American times and possibly even into the historic period. This question has been discussed recently by Krieger (1955: 195–207). As the field notes are none too clear, it is also possible that these two points were in the fill of Burial 6.

The pottery in the Culpepper collection indicates a late Titus Focus occupation. Thus far only two Titus Focus sites have been excavated and published—the McKinney site (Davis and Golden, 1960) and the Harroun site (Jelks and Tunnell, 1959), both situated some 50 miles southeast of the Culpepper site. Three burials from the McKinney site yielded 18 Ripley Engraved vessels and seven Taylor Engraved vessels (25 out of a total of 32 vessels found). These frequencies (53% and 32% respectively) are comparable to the Ripley and Taylor frequencies at the Culpepper site (39% and 15%). However, the McKinney site is a "classic" Titus Focus site, for Harleton Appliqué, Bailey

Engraved, and Wilder Engraved vessels occurred in association with Talco points and Ripley and Taylor Engraved vessels. No Harleton Appliqué, Bailey Engraved, or Wilder Engraved vessels or sherds were found at the Culpepper site, and the Ripley vessels were not "classic" in shape or design as a whole (Suhm *et al.*, 1954: 346–359). By "classic" Titus Focus sites and "classic" Titus vessels I mean those sites and vessels which conform to those traits and vessel types listed for the Titus Focus in the *Handbook* (Suhm *et al.*, 1954: 189–195). This involves the association of Ripley Engraved, Taylor Engraved, and Harleton Appliqué vessels with Talco points. Early Titus Focus sites may be recognized by the presence of Pease Brushed-Incised, a carry-over from the Haley Focus, mounds over burned houses, mounds over burials, and Perdiz points (Jelks and Tunnell, 1959). The ceramic component at the Culpepper site, in my opinion, represents the late Titus Focus and is probably protohistoric in age. This is indicated by the presence of Womack Engraved, Simms Engraved, and Keno Trailed pottery types, all believed now to be late in time.

At the Harroun site only two vessels were found, and both of these are of Ripley Engraved type and occur in a mound burial (Jelks and Tunnell, 1959: 59). Identifiable potsherds showed Pease Brushed-Incised and Bullard Brushed to be the dominant types, with Ripley and Taylor occurring in minor quantities. Pease Brushed-Incised is an early Titus Focus trait, as shown at the Harroun site (Jelks and Tunnell, 1959: 59). No Pease Brushed-Incised vessels or sherds were found at the Culpepper site.

At the Pearson site in Rains County, 40 miles southwest of the Culpepper site and near the previously mentioned Limerick site, sherds of Womack Engraved type were found on the surface (Duffield, 1961). Also found were 86 dart points, attributed to an Archaic occupation, the majority being Edgewood (7 specimens), Trinity (16), and Gary (101) types. The Pearson site yielded many European artifacts, most of them coming from the surface, and this site has been placed in the recently defined Norteño Focus, representing the historic southern Wichita tribes (Duffield and Jelks, 1961).

The presence of trade ware (Simms, Hodges, Avery, and Nash) in the Culpepper collection denotes contact to the east or north with the Texarkana and McCurtain foci. These types have been found in protohistoric and historic sites. The Womack Engraved type and the Keno Trailed type, both represented in the Culpepper collection, are protohistoric or historic in age. The Womack type suggests trade with Norteño Focus sites to the southwest or to the north. It is important to note that two Womack Engraved vessels were found in Burial 6 with two Gary points, an Avery-like engraved vessel, a Taylor Engraved vessel, a Hodges Engraved vessel, and a Simms Engraved vessel, suggesting contemporaneity.

In summary, it may be said that the lithic materials in the Culpepper collection represent a late Archaic occupation, and that the ceramic materials represent a later occupation by peoples of a later or protohistoric Titus Focus origin.

Summary and Conclusions

The Culpepper site is primarily a late Fulton Aspect site located on Stouts Creek in Hopkins County, northeastern Texas. It consists of a midden that appears to represent a small Caddoan village and cemetery area. Sixty-five stone artifacts, mostly of types attributable to the late Archaic period of eastern Texas, were found scattered throughout the site.

Eight single, extended burials were found, all containing pottery, the dominant types being Ripley Engraved and Taylor Engraved. One vessel of Womack Engraved type came from the midden. Of 40 vessels found at the Culpepper site, 14 were of Ripley Engraved type and five were of Taylor Engraved type. Less common were vessels of Avery Engraved (2), Hodges Engraved (2), Simms Engraved (2), Womack Engraved (3), La Rue Neck Banded (3) and Nash Neck Banded (2). The use of red slip was common, especially on Ripley Engraved vessels. A common feature is the repetition of the design four times around the vessel.

Nine vessels were purchased and are believed to have come from the Culpepper site. These vessels are of the same types as those found in the burials, with the exception of a Keno Trailed bottle. Since the provenience of the Keno vessel is not certain, its significance is open to question. Of the eight other purchased vessels in the collection, five are of Ripley Engraved type, two are of Taylor Engraved type, and one is of Avery Engraved type. Also purchased were three celts, a grooved stone axe, two elbow pipes (one is engraved), and a ceramic figure possibly representing a dog.

Of the 94 potsherds found at the Culpepper site, 43 came from the midden, but the others are of unknown provenience. Twenty-nine sherds were engraved, three appliquéd, five incised, one brushed, and one punctated. Nine of these are identifiable as Ripley Engraved and six as Taylor Engraved.

Out of a total of 43 projectile points, 22 are of Gary type. Most of the Gary points were found in general trenching or on the surface, but two were found in Burial 6. Seventeen other points are identifiable as Carrollton (2), Castroville (1), Edgewood (1), Fairland-like (1), Kent (1), Pontchartrain (1), Trinity (2), Wells (2), Yarbrough (5), and Talco (1). The Talco point was found in Bureal 4. Two additional points, now lost, were associated with this burial, but field records indicate they are also of Talco type.

One petaloid celt was found in Burial 1, and two additional specimens were found on the surface. Three celts and a grooved axe were purchased. Seven bifacial knives were found, six of them in general trenching and one from the surface. Two gouges were also found on the surface. No post molds, fire pits, or other such features are reported in the field notes.

The Culpepper site can be assigned to the Titus Focus of the Fulton Aspect. Talco points and an abundance of Ripley Engraved and Taylor Engraved pottery are diagnostic of the Titus Focus. The methods of pottery decoration—engraving, incising, repetition of designs, and use of red slip—are other traits common to the Titus Focus, although not confined to that focus.

The remainder of the lithic material from the Culpepper site appears to represent an earlier pre-ceramic occupation, or more precisely the East Texas Aspect of the Archaic Stage. However, it is believed that Gary, Wells, and Yarbrough projectile point types may have survived into the Fulton Aspect of the Neo-American Stage see Suhm *et al.*, 1954: 193, 430, 488, 492). The presence of two Gary points in a burial, along with the high frequency of Gary points, suggests that the Titus Focus people were still making or using Gary points. On the other hand, if all of the lithic material represents a pre-ceramic occupation, and if a Titus Focus group later occupied the site, then the two Gary points may have been in the burial as part of its fill. No definite associateion of pottery with dart points in the midden is noted in the field notes.

The occurrence of pottery types Avery Engraved, Hodges Engraved, Simms Engraved, and Nash Neck Banded indicates trade outside the Titus Focus area. These types are associated with the McCurtain and Texarkana foci of the Caddoan area. The Womack Engraved vessel suggests trade with the newly defined Norteño Focus. However, this type might have had its origin in the late Titus Focus.

The Culpepper site represents primarily a late Titus Focus occupation during protohistoric or early historic times. The high, steep-walled bowls with incurving rims are absent from "classic" Titus Focus ceramics. However, such bowls are found at the Hunt site in Cass County and at the Womack site in Lamar County. Both of these sites yielded European objects, but no European objects were found at the Culpepper site. It is significant that no Pease Brushed-Incised or Harleton Appliqué pottery was found at the Culpepper site. The former is an early Titus Focus type, and the latter is a "classic" Titus Focus type.

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The Rammadyat of Northwest Africa and the Burned Rock Middens of Texas

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The purpose of this paper is to present a particularly striking example of a phenomenon that has resulted from convergent cultural evolution in two widely separated areas of the Old and New Worlds, between which any possibility of culture contact is precluded both by space and time. We refer to artificial accretions or accumulations of thermally fractured hearth-stones and assorted cultural debris. Known from many areas of the world, they are variously referred to as *kjoekken-moeddinger*, kitchen middens, burned rock mounds or middens, or simply middens. We shall present data on two specific forms of such middens that occur in quantity in Algeria, Tunisia, and Morocco of northwestern Africa and in the central and Trans-Pecos areas of Texas.

In northwestern Africa middens of this type are called *rammadiya* (plural form: *rammadyat*) in Arabic and *escargotière* in French. They are typical open camp sites of the predominantly Mesolithic Capsian industry, which is distinguished by the production of lamellar blades and certain highly specialized tools made on such blades (Balout, 1955: 391; Honea, 1958: 20). *Rammadyat* have a more or less flattish top, are oval to circular in outline and, as a rule, show considerable variation in size. Pond (1938: 95) estimates the diameter to range from 40 to 300 feet and the height from 2 to 15 feet. They are most commonly situated on ridges or hill tops in close proximity to a spring, stream, or lake.

Excavations have shown that an average *rammadiya* is composed, in descending order of frequency, of burned, broken hearth-stones; snail shells; mussel shells; animal bones; stone tools and debitage (waste flakes, cores, etc.); ashes and charcoal; and soil. Gobert (1937: 644), who has analyzed a large number of *rammadyat*, concludes that they are incidental refuse heaps and were accumulated through repeated use of one location as a camping site through a period of time. The proportional volumes of snail shells, mussel shells, and certain kinds of animal bones are thought to reflect the relative importance of each food item in the diet of the makers of the *rammadyat*.

Burials are occasionally found in *rammadyat*. The greater part of these burials are not in primary association and often date from the Neolithic period, as is shown by the presence of potsherds in the grave fill. In some cases only skeletal fragments are found, and Pond (1938: 105) interprets these as resulting from abandonment of dead bodies at the campsite. In his view, predatory animals fed off the bodies, leaving the skeletal fragments to be covered by some natural agency.

Detailed studies of *rammadyat* profiles indicate that they are composed of numerous, relatively small, component middens "which have been moulded into a single symmetrical unit by the wind and rain of many centuries" (Pond, 1938: 95; Balout, 1955: 392).

The presumed method of accumulation of a *rammadiya* may be stated as follows. Initially, a small, saucer-like depression was scooped out of the earth, and in this depression were placed alternating layers of firewood and flat rocks. After the fire had burned down, the heated stones were cleared of ashes; then snails, mussels, meat, and edible roots and tubers were laid on the stones to bake or steam. Successive firings of the hearth-stones eventually caused them to crack into smaller, less useful fragments, for which reason they were thrown onto an adjacent refuse heap, along with bones, shells and other waste. When the supply of game, snails, and mussels was depleted in the area, the site was abandoned for a time. Such sites thus represent *seasonal camps*. Assuming continuous or intermittent use of the same area for camping purposes, even a small *rammadiya* would soon develop a certain height above the natural level of the ground. Being of a porous nature and therefore well drained, it made a choice camping spot, particularly during rainy weather, or if located in a marshy area. Subsequent groups of campers would simply scoop out a depression on top of the existing *rammadiya*, prepare a hearth and fire, and proceed to cook their food in the manner described above. Their discarded hearth-stones and other items of refuse were thrown nearby until another heap was formed. In still later encampments, the process of individual component midden accumulation continued, so that over a period of time a fairly extensive area was covered with a series of superimposed and intersecting hearths and camping floors. As pointed out above, these would then be eroded into a seemingly uniform unit by the elements.

There has been some speculation as to the origin of the small holes found in snail and sometimes mussel shells that occur in *rammadyat*. Pond (1938: 95) offers a reasonable explanation for these holes:

> . . . heat from the stones on which the snails were cooked burned the small part of the shell in contact with the hot stones. This burning weakened the shell or made that small area soluble so that a little weathering would produce a small hole . . . Others have suggested that all such holes in the shells were produced by a bone point used to extract the snail for eating. In as much as these openings are quite often in positions not in line with the natural opening of the shell, "weakened by fire" explanation seems more logical.

The makers of the *rammadyat* occasionally manufactured their stone and bone tools at their camps, as is evidenced by the presence of hammerstones, cores and waste flakes in the deposits. The presence of tools and industrial debris, which marks a factory site, can be very useful to the archeologist in determining the cultural affiliations of the makers of the camp. It does not follow, of course, that *all* the component middens within a *rammadiya* must of necessity represent factory sites; some may, others may not.

Pond (1938: 99–100) has suggested a method for identifying individual camping floors and component middens. During occupation snail and mussel shells were broken on the "floor" of the camping area, and this shell debris, along with ash and soil, would accumulate in low places and become consolidated by rainfall after abandonment of the camp. Hence bands of ash, crushed shell, and soil that appear in *rammadyat* profiles may be interpreted as specific occupations. Although interpretation of the stratigraphy in a *rammadiya* is extremely difficult in view of the nature of the accumulated deposit, it may be possible for the archeologists, with the above in mind, to work out the different floors and component middens and perhaps ascertain whether the individual units are due to groups of campers who share the same or dissimilar culture traits. As Pond states (1938: 107):

> From the way these mounds are built up one would expect to find as much difference between any two sides as between top and bottom. The writer's experience seems to indicate that the [*rammadyat*] are each the product of one culture-bearing people although in a given region different mounds are often of different cultures.

Of great importance in the interpretation of *rammadyat* is the fact that at least two groups of people presently living in northwestern Africa still make them. One group consists of the Takrounian Berbers, who live in the Sahel region of Tunisia; the other is an unidentified Berber group living near Gafsa, also in Tunisia (Balout, 1955: 392; Choumavitch, 1949: 19–20; Gobert, 1937: 644). The composition of the *rammadyat* of these groups is very similar to that of the *rammadyat* of the Mesolithic Caspian peoples, even down to the identical species of snail consumed (the artifacts, of course, are different). These modern Berber groups not only bake foods directly on hearth-stones but they also boil or stew certain foods *in wooden vessels* placed between hot hearth-stones. Since the heated stones retain their warmth for a period of time, the campers cluster around the hearth area during the cool months of the years.

Practically all that has been said of the *rammadyat* of northwestern Africa can be applied, remarkable as it may seem, to the burned rock middens that occur in such great numbers in central and southwestern Texas. Kelley and Campbell (1942: 320) have succinctly described burned rock middens as "a complex assemblage of superimposed and intersecting hearths." As in Africa, they are made up of thousands of thermally fractured fragments of limestone or other available country rock. In addition, they contain varying quantities of charcoal, ash, snail and mussel shells, soil, animal bones, stone tools and debitage and, occasionally, human burials. Either oval or circular in outline, they may cover areas ranging in size from a few square yards up to several acres, and they sometimes attain a height of six to eight feet. The burned rock middens are usually situated near some source of water, such as springs, or on alluvial terraces along major or minor streams. The presumed method of accumulation of such middens, as described by Kelley and Campbell (1942: 320), is essentially the same as described by Pond, Balout, Gobert, and others for the *rammadyat* of northwestern Africa.

In view of these striking similarities, we suggest that it may prove of considerable interest to attempt interpretation of the burned rock middens of Texas along the lines cited for their African counterparts. Specifically, someone should determine whether or not the bands of soil and ash found in Texas middens represent camping floors of individual component middens. Are some of the component middens within a burned rock midden factory sites and others not? Are there differences in the types of food remains in the component middens? Are the snail and mussel shells associated with a given component of fairly uniform size, indicating preferences in collecting, or are they variable in size, pointing to the collection of everything that was available? Do all the component middens of a burned rock midden contain the same types of food remains, or are there indications of differential preferences? Are there differences in the *total lithic assemblages* of the component middens within a single burned rock midden, indicating the involvement of different cultural groups, or are the various assemblages within a given burned rock midden representative of a single cultural unit? Lastly, can woodworking tools, such as gouges or adzes, be interpreted as tools for making wooden vessels?

Answers to the above questions may be helpful in interpreting the burned rock middens of Texas and the cultures associated with them. In closing, we would like to point out that a knowledge of the excavation techniques used by archeologists on the African *rammadyat* might prove useful to Texas workers.

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Scored Pottery of the Texas Coastal Bend

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Many campsites in the Coastal Bend region yield sherds and vessels of Rockport ware and Goliad ware that bear striae, or scoring, in varied degrees of prominence. These striae appear on the interior surfaces, the exterior surfaces, and occasionally, on both surfaces. They are usually horizontal, but are often diagonal, and sometimes rows of them crisscross, forming a grid pattern. Scored sherds of Rockport ware occur in sites from Carancahua Bay to Corpus Christi Bay. They are apparently uncommon around Baffin Bay in Kleberg County, which is well outside the range of distribution of Goliad ware, and which is tentatively designated as the most southerly area in which Rockport ware was manufactured.

Few explanations have been offered for this feature. Potter (1930: 42) states that the "small grooves and ridges on the surface" of some specimens of Rockport ware were "probably made to reduce the slipperiness of the vessel and thereby lessen the danger of breakage." However, the scoring is more often observed on the interior surfaces rather than on the exterior. Also, vessels that were coated with asphaltum (a common feature of indigenous pottery of this region, shared by both Rockport and Goliad wares) might reasonably have been intentionally scored so as to provide a surface that would improve adherence of the asphaltum to the walls of the vessel. But this mechanical advantage was apparently unknown to, or generally ignored by, the aboriginal potters, since sherds displaying scored surfaces in combination with asphaltum coatings are in the minority among asphaltum coated sherds of both Rockport and Goliad wares. Suhm, Krieger, and Jelks (1954: 382) suggest that the scoring was produced by scraping with coarse grass or twigs.

It is the purpose of this brief paper to present evidence indicating that such scoring, whether fortuitously or by design, is the direct result of the utilization of a shell of a ribbed marine bivalve as an implement in the manufacture of many vessels of Rockport ware and Goliad ware.

Such shells are quite common in campsites along the Coastal Bend littoral, the animals having been collected for food from the shallow bays and nearby Gulf of Mexico. Generally speaking, the most abundant of the shells are those of the Ponderous Ark (*Noetia ponderosa*), the Scallop (*Pecten gibbus amplicostatus*), and the Great Heart Cockle (*Dinocardium robustum*). Examples of these shells are shown in Fig. 1 at A, B, and C. Other ribbed types frequently represented are the Angel's Wing (*Barnea costata*) and the Bent Mussel (*Mytilus recurvus*), but their use as tools seems doubtful considering their fragility.

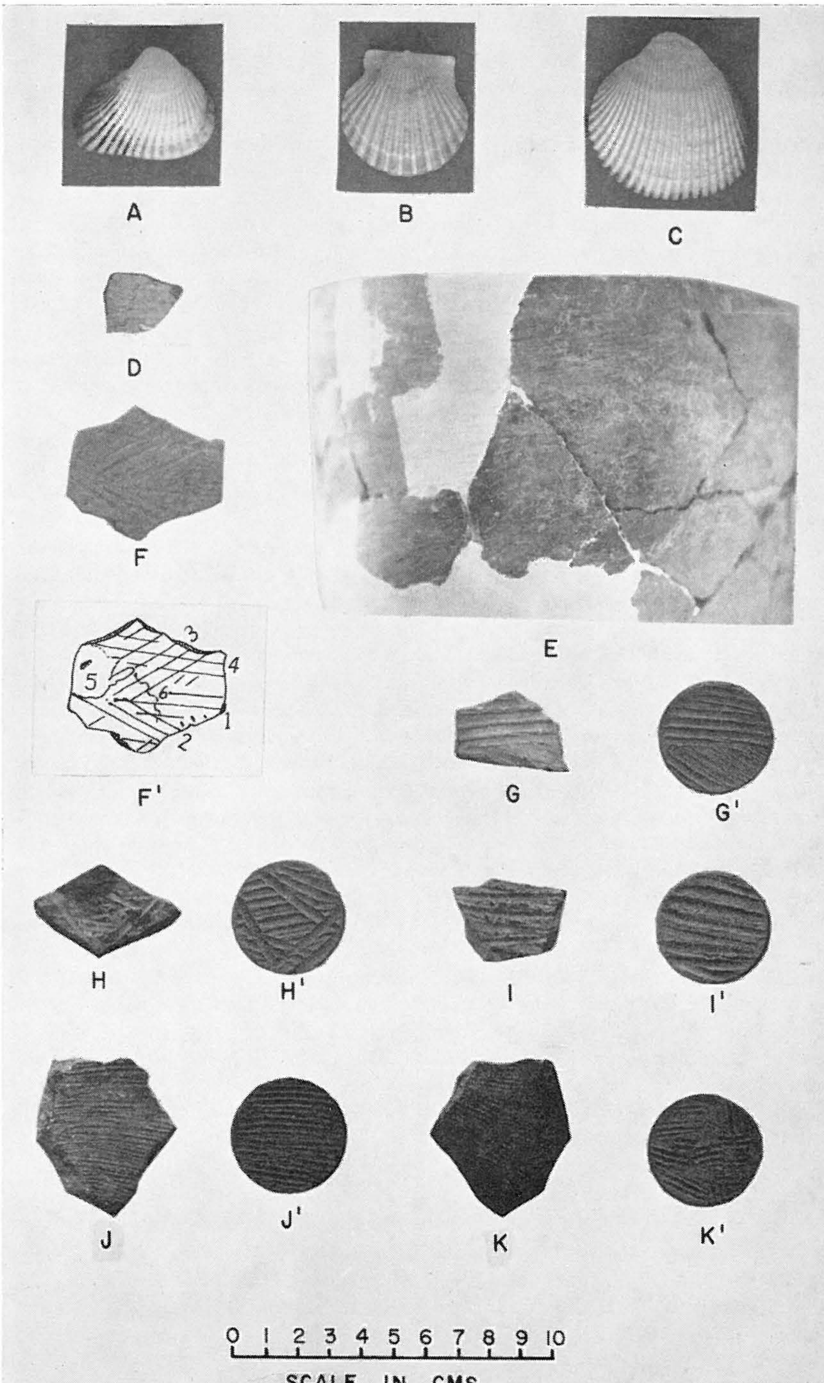
The advantages of such an implement are basic. They were readily available, they were efficient, they were durable, and they required no modification. The ribbed surface prevented build-up of excess paste ahead of the tool (especially if moistened) in a spreading or smoothing stroke. The convex surface of the shell made an efficacious trowel for evenly distributing the lumps or coils of clay, and the margin was adaptable for scraping and removing excess paste to attain a more uniform thickness and even surface.

The scoring itself, almost without exception, consists of units of multiple rows of neatly parallel ridges and furrows, each ridge the same width as the ones adjoining it, and each furrow or groove the same width as the next in its series. The width of the ridges and the width of the furrows is not necessarily always the same, i.e., the furrows may be wider than the ridges. Nor is the depth of the furrows and the height of the ridges uniform within their series, either transversely or longitudinally, the lateral grooves and ridges being less pronounced generally than the medial ones. All this supports the probability that the scoring represents scars left by the curved margin of a ribbed marine shell tool.

At the site of Mission Nuestra Señora del Rosario, about 2.5 miles west of present-day Goliad on the San Antonio River, are found sherds of Goliad ware and, in lesser numbers, sherds of Rockport ware. Many of the sherds recovered here are scored. This feature appears on sherds of both series of pottery types. The scoring appears to be identical with that exhibited by sherds occurring in sites nearer to and along the coast proper. Only two types of marine shells are thus far represented in the material from Rosario. One of these is the Panama Shell or Lettered Olive (*Oliva sayana*). Most shells of this type display workmanship indicating that they were used for ornaments. The other marine shell found here is the Great Heart Cockle or Heart Clam (*Dinocardium robustum* Solander), a rather large ribbed shell averaging between 5 and 14 cm. in length, with about 35 robust flat ribs, regularly arranged, and with a serrate margin. None of the unbroken valves of the Cockle, or fragments therefrom, show any workmanship or attempt at modification in any manner.

Recently this writer restored a vessel of Goliad Plain from Rosario. The sherds of this vessel display light scoring on both exterior and interior surfaces. The interior scoring is horizontal, and the scoring on the more evenly finished exterior forms a grid pattern of horizontal and diagonal strokes. Some areas of the vessel indicate that at one stage of its manufacture it may have borne heavier scoring that was practically obliterated at a few points by further finishing with a smooth object, possibly the moistened fingers and palms of the manufacturer. The tool selected for use as a spatula and trowel in this restoration work was the shell of a Great Heart Cockle. The shell was a small (5.5 cm. length) fresh one. The small shell was employed simply because it was more convenient to work with in conforming to contours rigidly dictated by the original vessel shape and dimensions determined by projection from the existing sections. As the void areas were reconstructed, and while the plaster was still formative, the surfaces were finished by gentle rubbing with water-moistened fingers, thus lowering the ridges and filling in the furrows somewhat. The lightly scored appearance of the reconstructed surfaces is strikingly similar to that of the sherds composing the original sections of the vessel (Fig. 1, E).

Fig. 1. Scoring on pottery from the Coastal Bend region of Texas. Marine shells used to produce scoring, A-C; scored sherds of Rockport ware, D, F-I; scored sherds of Goliad ware, E, J-K; plaques of modeling clay showing scoring produced by ribbed marine shells, G'-K'.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At the Kirchmeyer site, on the west bank of Oso Creek, in Nueces County, are found hundreds of sherds of Rockport ware. A high percentage of these sherds bear one or more scored surfaces in degrees varying from quite light to very heavy. One small body sherd deserves at least a brief mention here. This sherd is typical Rockport ware, brown in color, with a trace of asphaltum clinging to the exterior. The paste is fine, with tiny white inclusions (probably bone) and is very hard and unweathered, even though it is a surface find. It is approximately .5 cm. in thickness and 2 cm. in diameter. The exterior is smooth, but the interior is scored. This scoring consists of two series of striae at slightly different angles to each other. They are separated by a subtly curved dentate pattern which extends completely across the surface of the sherd. It was produced by depressing the margin of a ribbed marine shell about .1 cm. into the plastic clay and moving the concave side of the shell forward. This action resulted in a scalloped perpendicularity, forward of which the surface of the sherd was scored (Fig. 1, D).

In an effort to determine just what type of shell was used as a tool in manufacturing the vessel represented by the Kirchmeyer sherd, several marginal impressions of each type of ribbed shell that has been found on the site were made on modeling clay. The shells involved were the Ponderous Ark, the Great Heart Cockle, and the Scallop. There are certain minor, yet distinct differences between the margins of these three shells. The Ark was quickly eliminated, and after close examination and comparison of the sherd and the impressions, it became quite apparent that the tool which produced the scoring on this sherd was that of a Scallop shell (*Pecten gibbus amplicostatus* Dall), 4 cm. or less in diameter.

Plate 1, F, is a sherd of Rockport Black-on-Gray belonging to Mr. V. C. Branch of Victoria, who collected it from the surface of a campsite on the north shore of Copano Bay, in Refugio County. Under a low-power magnifying lens the more outstanding groups of striae, representing single strokes of the tool, are seen to overlap and pass through one another distinctly enough to establish the sequence of the strokes. To illustrate this more clearly, a line drawing (Plate 1, F′) was made and the consecutive strokes numbered 1 through 4. Feature 5 is an area of smoothing, wherein the striae, including those of stroke 4, are effected. Feature 6 is clearly a dentate imprint produced by the margin of a shell tool. This imprint is not so prominent as the one displayed by the sherd described above from the Kirchmeyer site. It was impossible to determine exactly where the stroke associated with this imprint belongs in the sequence; however, it appears to have begun at the upper right and swept diagonally towards the left, the imprint occurring at the termination of the stroke. It closely parallels stroke 3, though prior to it, and was made with the concavity of the tool (interior of the shell) forward. The spacing and shape of the "teeth" of the shell tool suggest that it was that of a Scallop (ventral margin), but the pattern is neither sharp enough nor complete enough to permit stating this with complete confidence.

Fig. 1, G–K, illustrates several typical scored sherds. To the right of each sherd is a small plaque of local clay, upon which the general characteristics of the striae represented on each sherd are duplicated by use of marine shell tools. No attempt was made to produce an exact replica of each sherd. However, by variance of the pressure applied to the tool, number, direction, and length of the strokes, the scored features of each sherd seem satisfactorily paralleled. Fig. 1, G, is a fine example of scored Rockport ware (from Oso Creek, Nueces County). Only the interior is illustrated. The exterior is very lightly scored. Fig. 1, H, is also Rockport ware (from Copano Bay, Refugio County), the interior of the sherd being shown. The exterior is quite smooth. The two dark areas are asphaltum. The single striae displayed on the sherd were reproduced on the plaque by breaking a Scallop valve (pedicle) in half longitudinally and employing the exterior surface of the rib adjacent to the fracture. Fig. 1, I, is Rockport ware with a coarser sand temper (from Lavaca Bay, Calhoun County). The exterior is also scored, but not as heavily as the interior. The grooves on this sherd are V-shaped in cross section. They were reproduced with the angular ribs along the posterior margin of a Cockle shell tool (see left side of Fig. 1, C), or the "side" of the tool. Fig. 1, J, is a sherd of Goliad ware (from Mission Valley, Victoria County) tempered with fine sand and, presumably, bone. Fig. 1, K, is the exterior of the same sherd. The scoring on the exterior appears to have been "paddled" rather than stroked into a previously smoothed surface.

It is not meant to imply that all vessels of Rockport ware and Goliad ware were fashioned in this manner, using a shell tool as an accessory. Such speculation would be unfounded and presumptious. More credible evidence of the relationship of scored vessels of the aforementioned types, and a ribbed marine shell tool, would possibly be the retention of residue paste by such a tool. It would have to be subjected to a high temperature for the paste to endure, and the heat of a fire would probably calcine the shell, or at least fracture it badly. Hence it is unlikely that a ribbed marine shell will be found with paste still adhering to its edge.

It is possible that the utilization of such shell tools was not confined to the Coastal Bend region. Among the relatively few sherds of Goose Creek ware examined by the writer, a number of similarly scored sherds were represented. Campbell (1957: 46), in describing sherds of Goose Creek Incised from the Caplen site, mentions "tool marks being plainly visible, especially on the interior." The *Handbook* (Suhm, Krieger, and Jelks, 1954: 378, 380) lists deeply striated parallel lines on the interior as an occasional feature of Goose Creek Plain.

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Significance of A New Radiocarbon Date from the Lewisville Site

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A new test of the charcoal from Hearth 8 at the Lewisville site in Denton County, Texas (Crook and Harris, 1957, 1958), has been released by the University of California at Los Angeles (Fergusson and Libby, 1962) with a date expressed as "greater than 38,000" years ago B. P.

This compares favorably with the previous Humble run on the same material of "greater than 37,000" (Brannon *et al.*, 1957). The specimen is reported as UCLA-110, whereas the Humble laboratory analysis was listed as 0–248. Milton Williams of Humble's Production Research Division, Houston, Texas, submitted the sample for cross-checking.

Four small logs, burned into excellent charcoal, from Hearth 8 produced the original dating as a check on the similar "greater than 37,000" result from charred fibrous vegetable material excavated in Hearth 1 at Lewisville (Humble sample 0–235). Relatively remarkable for an early site, and particularly so to be of an ideal quality for the radiocarbon technique, the Hearth 8 charcoal was so abundant that two full tins have been sealed and preserved in the writers' possession. This is available for possible future checks if further testing is desirable or when new techniques and innovations in dating arise.

Humble's original work appeared to be definitive when two different samples, of different materials and from different locations within the same site, corroborated each other. The UCLA determination almost completely removes any possible criticism of the radiocarbon method of dating in this instance. It will be recalled that Libby, then with the University of Chicago, developed the process to its first full application to unknown age materials of archeologic interest in 1950 (Johnson, 1951).

Unquestionably, in light of today's knowledge, this then is the approximate age of the Lewisville site and the Upper Shuler member or sub-formation of the Pemberton Hill-Lewisville alluvial terrace of the Upper Trinity River system, in which the site is contained.

From a paleontological view, it is also the approximate age not only for the species identified at Lewisville but for others found up and downstream in the same terrace formation along the Upper Trinity. Further confirmation of such a conclusion has already been received by the F-U-N analyses conducted on various fossil bone finds from the several sub-formations or members of the Pemberton Hill-Lewisville terrace by the University of London (Oakley and Howells, 1961, plus commentary by Crook, 1961). Not only were the bones essentially contemporary by the F-U-N tests from all alluvial terrace exposures, both up and downstream from Dallas, but also regardless of whether they came from the basal Hill gravels or the Lower Shuler sands and Upper Shuler sandy clays above.

In addition, this conclusion is further reinforced by the findings at the Clear Creek paleontological quarry in north central Denton County (Slaughter *et al.*, 1962). Here an exposure into a late, upstream remnant of the Pemberton Hill-Lewisville terrace of the Elm Fork of Trinity River has yielded a fauna indicative of approaching cooler conditions, though still relatively arid, and has been radiocarbon-dated by Mobil Oil Company's research laboratory near Dallas as being "greater than 28,850," based upon freshwater shellfish remains.

In short, everything—dates, fauna, flora, and geology—suggest a non-glacial (inter-stadial or interglacial, as it may be)—period for the T-2 or Pemberton Hill-Lewisville terrace of the Upper Trinity system. In Europe, there is accumulating evidence of such a period between about 28,000 and 42,000 years ago; this has been variously referred to as the Masurian or Paudorf interstadial.

American geologists generally recognize such a period prior to the last major glaciation of ca. 25,000 years ago, but there is vast disagreement currently as to the definition of what was formerly called the Wisconsin, and whether or not such a preceding non-glacial period is in truth the last interglacial or a major interstadial within a now-greatly-enlarged "Wisconsin." Paleontologically, the animal species match what was formerly considered Sangamon interglacial, but a southward-retreat, followed by a northward re-entry during a succeeding interstadial, is possible.

In any event, this was the time that man visited Lewisville repeatedly. Based not only upon the animals apparently captured and brought to the campfires at this site, but also upon many recent paleontologic discoveries from the same terrace deposits within the immediate area (Slaughter *et al.*, 1961), some interesting contemporaries bespeak warmer climate.

Foremost are the land turtles: *Geochelone* or giant tortoise is today confined to the tropics, and *Terrapene canaliculata* (huge direct ancestor of the living Carolina terrapin, itself confined to southern United States today) has Lewisville as its farthest-north recorded fossil occurrence.

The coyote from Lewisville has since been studied and deemed worthy of subspecies differentiation (Slaughter, 1961), with the very interesting circumstance of having only the living form from Honduras as being somewhat similar. Members of the armadillo family are highly suseptible to cold, and it is notable that three different large ones are present in the terrace: *Glyptodon* as reported by White for Lewisville itself; *Holmesina* from the Hickory Creek site upstream from Lewisville, and from Dallas downstream; and *Dasypus* from Dallas.

A 10–12 foot alligator has been found in the same terrace at Dallas; to reach such size today requires a climate comparable to the southern Louisiana bayous or the Florida Everglades. Finally, there are the palmetto stumps found beneath the terrace deposit near Grand Prairie some years ago.

Tapir, found today only in tropical regions such as Central America, South America, and Malaya, has been a fossil find in the Lewisville terrace deposits in three areas—Elm Fork of the Trinity near Lewisville, and twice near Dallas.

Of course the vast majority of the accompanying fauna is adapted to wide variations within the North Temperate Zone, and there are a few cool-suggestive forms such as meadow voles for paradoxes, but there are no downright boreal or arctic types at all. The warm group shows which way the wind blew in Lewisville times.

It is becoming evident that this was about the time of arrival in Europe of *Homo* *sapiens*, already fully developed from some place else. If "some place else" had been North Asia, it is not improbable that he migrated in the direction of America as well. Based upon his performance during last glacial times in Europe, his culture had advanced to where he could survive the bitter winters that must have prevailed even in inter-stadial-interglacial times, as today, in the Bering Strait region. Howells (1959) suggests that the "American Indian" type may have been the basic population of northeastern Asia before being submerged by the more specialized Mongloids that perhaps evolved later; isolated in America, they may have lingered on.

Incidentally, Wormington (personal communication) of the Denver Museum of Natural History has commented that the Lewisville chopper would be quite at home in a number of Siberian collections she has viewed.

Nevertheless, if man was indeed present at Lewisville at 37,000-plus years ago in a warm, non-glacial period, he could not have been unique. He was also present at other localities at least this far south in North America, and may well already have been found elsewhere, but without benefit of radiocarbon dating to back his credentials! His ancestors must have left even earlier campsites to the north on the migration route. In northern Texas, alone, there is suggestive evidence, based on geological provenience in the basal Hill gravels of the Lewisville terrace, that the Henderson County stone heads described by Sellards (1952) and a heavily-patinated scraper found by the writers at Pemberton Hill in Dallas, pre-date Lewisville by a few thousand years.

Already there is a growing trend among scholars to suspect the existence of an earlier, simpler level of Paleo-American culture as typified by non-projectile point sites bearing a blade-chopper-scraper-flake industry. Several such sites have been radiocarbon dated (Tule Springs, Santa Rosa Island) with earliest indications reaching the 30,000 years ago period. Many, including Wormington, would welcome Lewisville into this fold "were it not for that wretched Clovis point." Texas has a considerable number of blade-chopper-scraper-flake industry sites, unfortunately none datable as yet, that probably belong to this theory.

Thanks especially to the Lehner mammoth-kill site in Arizona and its 12,000-vintage radiocarbon dates, the Clovis point in Hearth 1 at Lewisville has almost become the "albatross" around the writers' necks. Friends in the profession have time and again worked up the courage to ask us point-blank, "Did you *really* find the point in the hearth?" Throw out the Clovis point and dissension almost vanishes today. But the truth is sometimes awkward to live with; in addition, to negate it for convenience is not scientific. The real problem is that we *did* find it in Hearth 1, and from the red clay in the cracks and interstices and the caliche coating over both faces, as found, it appears still to be a genuine inclusion. It is to be hoped that better explanations will come from future finds.

It is still significant that such early sites do not yield many, if any, chipped stone projectile points. As such obviously successful hunters at so late a period, this merely implies that the spears or javelins utilized were tipped with hardwood or bone points which do not survive in relatively open sites. The Aurignacians arrived in Europe with such a bone-tipped hunting technique, better-preseved in cave deposits. This supposition probably should be added to the inventory of the earlier-mentioned blade-chopper-scraper-flake industry in America.

In any event, considering the 9,000–11,000 years ago radiocarbon dates now available from all over the North American continent, plus several in South America all the way to Tierra del Fuego, it is apparent that by this time man had been in the New World so long that he had become widely adapted to local conditions throughout the length and breadth of the two continents. This, is in itself by logic, infers a tremendously long period previous to evolve such local specializations.

Lewisville may well cause the finding of new sites, theories, and datings that will yet far surpass its own value.

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Origins of Pottery Types from the Coastal Bend Region of Texas[1]

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Thus far six pottery types have been defined for the central section of the Texas coast, often popularly referred to as the Coastal Bend region of Texas. Three of these types, all attributed to the Rockport Focus of late prehistoric and historic times, have been formally described by Suhm, Krieger, and Jelks (1954: 382–385) and are known as Rockport Plain, Rockport Black-on-gray, and Rockport Incised. The Rockport Focus, at least in part, is linked with the Karankawa Indians of the Texas coast (Campbell, 1960: 150, 168). Three additional pottery types have recently been defined by Mounger (1959: 163–177) in an unpublished M.A. thesis at The University of Texas. These three types, based upon pottery from excavations at the Espiritu Santo Mission of Goliad, Texas, are attributed to the Aranama Indians for whom the mission was established. This of course implies that the pottery types are of historic age. The names assigned to these types are Goliad Plain, Goliad Red-on-buff, and Goliad Black-on-buff. Each of these two series of types can be regarded as representing a distinctive pottery ware, and we can conveniently refer to them as Rockport ware and Goliad ware respectively. In this brief paper the principal identifying characteristics of each of these six types will be summarized and speculations on their probable origins will be presented.

Rockport Ware

The type descriptions of Rockport Focus pottery presented by Suhm, Krieger, and Jelks were based primarily on laboratory examination of a number of miscellaneous surface collections. Since 1954 some 10,000 potsherds from excavated sites have been analyzed by Campbell (1956, 1958), and this permits us to make a few minor modifications of the type descriptions.

Rockport Plain. This pottery has a fine-textured paste, commonly with no recognizable tempering material; but some sherds have fine white inclusions believed to be bone. Surface color is rather variable, but shades of gray and brown predominate. Core color tends to be the same as surface color. Vessel surfaces are smoothed, often rather unevenly. In the vicinity of Corpus Christi vessels are frequently deeply brushed or scored on one or both surfaces. Asphaltum coating is rare on identifiable Rockport Plain sherds.

Vessel wall thickness usually ranges from 2 to about 6 mm., and a considerable

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number of sherds indicate remarkably thin-walled vessels for their size. Rim sherds seem to indicate hemispherical bowls; deep, wide-mouthed pots; and wide-mouthed jars that have straight, incurved, or slightly outcurved rims. The base form is believed to range from rounded to bluntly conical. Lips are either rounded or flat, the latter occasionally deeply notched or diagonally incised. Occasionally rims are slightly thickened near the lip, and a slight exterior overhang of the lip also occasionally occurs. Some undecorated body sherds bear round loop handles perpendicular to the vessel wall, but these may have come from other types in the Rockport series.

Rockport Black-on-gray. This type (Fig. 1, A-M) differs from Rockport Plain only in the following characteristics.

The vessel forms also include bottles with relatively short, vertical necks; bowls with slightly outcurved rims; and globular ollas without necks. Lip notching (A) is much more common, ranging from mere nicks to deep V-shaped notches. Rims occasionally have a slight ridge paralleling the lip on the vessel exterior.

Decoration is principally in black asphaltum paint, but occasionally widely spaced vertical rows of tiny punctates accompany the painted decoration (M). A very few sherds show what appears to be a thin, fugitive paint or stain, suggesting that a polychrome tradition may have existed. The main design elements are large dots, narrow bands, and straight or wavy lines of varying width. Large dots are arranged in vertical rows (L) or randomly in broad horizontal bands on the upper part of the vessel. Bands commonly occur just below the lip (B), and from this band wavy or straight lines extend downward either vertically or diagonally (C-E, G-J). A very common design is a series of widely spaced, wavy or straight lines extending downward from the lip (F). Many vessels appear to have paint only on the lip itself (A), and occasionally the asphaltum so used was thick and ran down the walls of the vessel. Many Rockport Black-on-gray sherds bear an interior coating of asphaltum, and this material also seems to have been used for mending cracks in vessel walls.

Rockport Incised. This is the most poorly defined pottery type from the Coastal Bend region. It is rare or absent in the southern portion of this region and not very common elsewhere. It is believed to be of the same basic ware as Rockport Plain and Rockport Black-on-gray, inasmuch as plain sherds from sites showing all of these types are indistinguishable. It therefore differs mainly in the type of decoration. The incised designs (Fig. 1, N-X), which are confined to the rim region, are best described as geometric, and in general these designs are poorly executed. The most common motifs include a band of horizontal parallel lines (P-Q), below which sometimes appear pendant triangles or pairs of fringed lines (R-S); horizontal crosshatched bands (T); a single zigzag line just below the rim (O); and diagonal hachured panels (U). Occasionally a sherd will show closely spaced scalloped lines, apparently produced by using the edge of a ribbed marine shell like a rocker stamp. Lip notching occurs on a few sherds.

Considering Rockport ware as a whole, one of the most important future objectives is to obtain whole vessels or at least enough sherds from single vessels to permit reconstruction of vessel form.

Goliad Ware

A new series of pottery types, now referred to collectively as Goliad ware, has recently been described by Mounger, as noted above. This series is based upon the

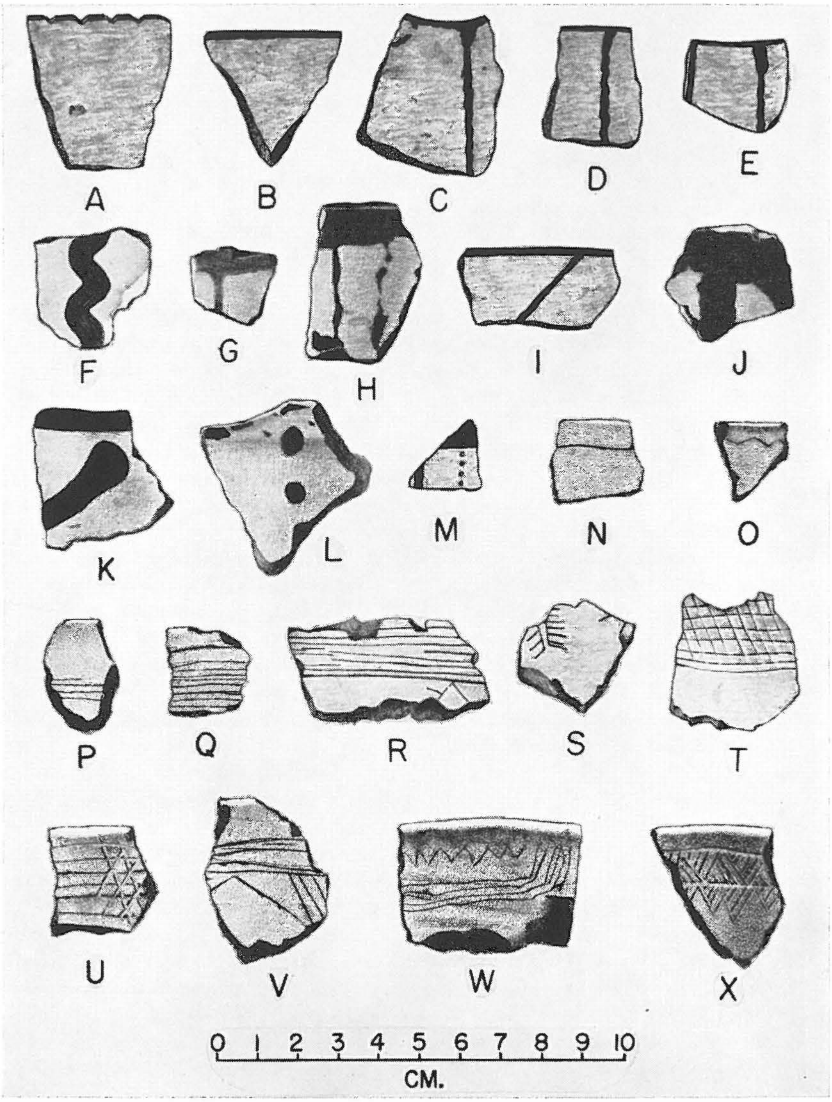

Fig. 1. Pottery associated with the Rockport Focus. A-M, Rockport Black-on-gray; N-X, Rockport Incised. Provenience: Kent-Crane site, R-S; Live Oak Point site, A-J, M; Mustang Lake site, N-Q, U-X; Webb Island site, K-L, T.

analysis of approximately 22,000 sherds from the Espiritu Santo Mission at Goliad. The types are known as Goliad Plain, Goliad Red-on-buff, and Goliad Black-on-buff. As Mounger plans to publish the results of her analysis, no illustrations are given here. The following brief descriptions of the three types will serve until her more detailed presentation appears in print.

Goliad Plain. This type is based upon 187 rim sherds and 21,425 body sherds. However, as Goliad Red-on-buff and Goliad Black-on-buff vessels were decorated only on the upper part of vessel exteriors, an undetermined number of the above body sherds is undoubtedly from decorated vessels. Eleven Goliad Plain vessels have been reconstructed.

Goliad Plain has a dark gray paste with varying quantities of bone temper. The surface color ranges from grayish buff to dull orange, and the white bone temper is visible on both interior and exterior surfaces. Both surfaces are fairly well smoothed and some vessels are polished. Wall thickness ranges from 5 to 13 mm. Rims vary from slightly incurved to moderately outcurved, occasionally with angular eversion. Lips range from round to flat, the latter occasionally having an exterior flange or overhang. All vessel bases are well rounded. Vessel forms include shallow bowls; hemispherical bowls, sometimes with two small round loop handles just below the lip; both small and large jars and globular ollas with thick, round loop handles that are usually at right angles to vessel walls but sometimes parallel to the wall near the lip; very small short-handled ladles; and elbow pipes. Fragments of what appear to be single handles occur occasionally; these are round in cross section, sometimes as long as 60 mm., are straight or slightly curved, and occasionally have an angular bend at the distal end. A few sherds have numerous wall perforations and appear to represent some sort of colander.

Goliad Red-on-buff. This type is based on 11 rim sherds and 85 body sherds. It differs little from Goliad Plain except that the vessels are decorated with designs in a thin red paint. Vessel walls are thinner, ranging from 4 to 6 mm. All lips are rounded. No vessels can be reconstructed, and no basal sherds have been recognized. One painted handle fragment indicates that Goliad Red-on-buff vessels sometimes bear loop handles. Decoration is limited to vessel exteriors and consists of simple but rather bold designs in a rather dull red paint. The most common design elements are large dots and broad straight or wavy lines. Some sherds bear a single horizontal band below the lip, and this may be straight, zigzagged, or scalloped. Other sherds show a single horizontal row of large red dots a short distance below the lip. Still others show a series of widely spaced but broad vertical lines extending downward from the lip, and in one instance a vertical row of large dots occurs in the spaces between the vertical lines. One sherd bears a large circle with a central dot. In general, the designs on this type resemble the designs on Rockport Black-on-gray pottery.

Goliad Black-on-buff. This type is based on 11 rim sherds and 77 body sherds. It too is similar to Goliad Plain, but vessel walls are thinner (4–6 mm.). No base sherds or handles have been recognized. One fragment of a bottle neck indicates that this vessel form occurs. Decoration, which is in black asphaltum paint, is confined to vessel exteriors and is almost identical with decoration on Rockport Black-on-gray vessels. Small dots and narrow wavy or zigzag lines are especially common. A few sherds show broad horizontal bands below the lip, and one sherd shows a series of solid triangles pendant from this band.

Origins of Rockport and Goliad Wares

Of the two wares here described, Rockport ware is believed to be the earlier, since it occurs in prehistoric as well as in historic sites. Goliad ware, however, is thus far known from a single Spanish mission site.

At the present time it would appear that the pottery-making tradition first reached the Coastal Bend region from the east, probably being derived from peoples who made the incised, sand-tempered pottery of extreme southeastern Texas. Ring's (1961) radiocarbon dates from the Galena site near Houston indicate that sand-tempered pottery goes back to well before the time of Christ. The vessel forms and incised decoration of unpainted Rockport pottery have counterparts in southeastern Texas in the culture commonly referred to as the Galveston Bay Focus. Furthermore, there is a zone of overlap between Rockport ware and Goose Creek ware (Galveston Bay Focus) in the coastal area lying between Matagorda and Galveston bays.

The Rockport painted pottery, which is the only prehistoric painted pottery extensively made in the Texas area, constitutes a separate problem. Painting must be derived from another source, for painted pottery is not found in the lower part of the southeastern United States. The tradition of painting pottery is probably derived from the Huastecan region of eastern Mexico, where black-on-white and polychrome pottery types have substantial prehistoric age and persisted into the historic period (Ekholm, 1944: 431–432). Huastecan pottery vessels, presumably trade specimens, have been found as far north as the Rio Grande delta area (Mason, 1935: 34–39; Ekholm, 1944: 433), and Rockport Black-on-gray pottery has been reported as far south as the Rio Grande (Anderson, 1932: 30). The scant evidence of polychrome pottery from the Coastal Bend region conveniently fits this interpretation, although one tiny sherd of polychrome pottery from Chihuahua has been found on the surface at a Rockport Focus site near Corpus Christi (Campbell, 1956: 41). It is doubtful if the idea of painted pottery reached the Texas coast from the Southwest. In designs there is very little correspondence between Rockport Black-on-gray and painted pottery anywhere in North America. The idea of painting pottery is probably all that diffused, and the proximity of the Huastecan area makes it the most likely source. We therefore derive incised decoration from an eastern direction and painted decoration from a southern direction.

As for Goliad ware, in temper and surface color there is a notable resemblance to Leon Plain pottery of central Texas (Suhm *et al.*, 1954: 386); but in its painted decoration, and particularly in types of designs, it is strikingly similar to Rockport Black-on-gray pottery from the central section of the Texas coast. Goliad Black-on-buff is indistinguishable from Rockport Black-on-gray except for surface color and a tendency toward thicker vessel walls. Sherds of Rockport Black-on-gray were also found at Espiritu Mission, but there is no difficulty in distinguishing it from Goliad Black-on-buff. Goliad Red-on-buff, however, is unique, for it is the only red-painted pottery in the Texas area, if one ignores the faint evidence of polychrome pottery in the Rockport Focus. Red painting may be the result of Spanish mission influence, because it occurs on Spanish majolica and china from Espiritu Santo mission.

It would appear then that Goliad ware is the result of influences from two sources, from central Texas (Leon ware) and from the nearby coast (Rockport ware). It is of interest to note that the Aranama Indians, who made Goliad ware, frequently deserted the mission and lived with the Tonkawa Indians in central Texas. This seems to imply earlier friendly relationships with the Tonkawa who, some believe, may have made Leon Plain pottery. Karankawa Indians were frequently at Espiritu Santo Mission, for a special mission built for them was located nearby. Thus we have diffusion mechanisms to support this interpretation of Goliad ware origins.

According to the hypothesis presented here, Coastal Bend pottery is the result of diffusions from three directions—from the east, from the south, and from the interior of Texas to the north and northwest. It will be of interest to see if this interpretation is verified by future archeological investigation.

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