THE FORT SAM HOUSTON PROJECT:
AN ARCHAEOLOGICAL AND HISTORICAL ASSESSMENT

Andrea Gerstle, Thomas C. Kelly
and Cristi Assad

With contributions by:

Philip Dering, Anne A. Fox, Daniel E. Fox,
Augustine Frkuska, Carol Graves, Joel D. Gunn,
Jerry Henderson, Thomas R. Hester, James E. Ivey
and Sara E. Kleine

Center for Archaeological Research
The University of Texas at San Antonio
Archaeological Survey Report, No. 40

1978

Submitted in fulfillment of the terms of Contract #DACA 63-77-6-0081 between the Fort Worth District, U.S. Army Corps of Engineers and the Center for Archaeological Research, The University of Texas at San Antonio.

This report was edited by Carol Graves, Cristi Assad, James E. Ivey and Thomas R. Hester. Proofreading and editorial assistance were provided by Elizabeth Branch and Jane Smith.

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PREFACE

The archaeological and historical investigations reported here result from a contract between the Fort Worth District, U.S. Army Corps of Engineers, and the Center for Archaeological Research, The University of Texas at San Antonio (Contract #DACA 63-77-6-0081).

During this project, I was privileged to serve as principal investigator, with Dr. Joel Gunn as co-principal investigator. The archaeological field director, Thomas C. Kelly, his co-workers Andrea Gerstle and Cristi Assad, and the other members of the archaeological field and laboratory staff (see Acknowledgments) were faced with a challenging task in the assessment of cultural resources on properties controlled by Fort Sam Houston. Most challenging of all was the systematic sampling of cultural resources at the 28,000-acre Camp Bullis military reservation. Before the project began, there was much discussion as to the kinds of survey procedures that might be successfully employed in the diverse and rugged terrain of Camp Bullis. I believe that the survey strategies that evolved from these discussions (see Research Methods, III.A.4) are highly useful ones, and may possibly have broad applicability in similar surveys along the eroded margin of the Edwards Plateau in south-central and southwestern Texas. Another significant aspect of the survey and subsequent surface and subsurface site sampling was the use of specially designed computer-coded forms for data recording. These supplemented standard record-keeping procedures (III.A.4) and, during analysis, proved highly valuable in studying the variability of sites and assemblages within the Camp Bullis area. Additionally, the site information became part of a computer data bank that can be tapped in further problem-oriented research in the region.

Other strong elements of the project were ethnohistory, history and historic archaeology. These avenues of inquiry provided a framework within which to evaluate the cultural resources found during the project and, in the case of historic archaeology, yielded important new information on the 19th and early 20th century human utilization of the Camp Bullis area. Anne Fox, Sara Kleine, James E. Ivey and Daniel E. Fox worked diligently in collaborative efforts in all of these areas of investigation.

There have been a number of criticisms leveled recently at public service archaeology, particularly in the areas of what some consider excessive cost and lack of long-range benefits to scientific research. I believe that in the Fort Sam Houston project such critical comments are negated by the data presented here. This report contains the information needed by the Corps of Engineers for future planning at Fort Sam Houston properties, it provides a wealth of new data--both descriptive and interpretive--important to research into the history and prehistory of the region, and it represents the hard work and long hours (far exceeding the monetary value of the contract) of dedicated and concerned archaeologists and historians. All of these elements will serve to better insure the protection and interpretation of cultural resources in the study area.

Thomas R. Hester
Director
Center for Archaeological Research

ACKNOWLEDGMENTS

Thomas C. Kelly

The Fort Sam Houston project was highly successful because of the close coordination, cooperation and plain hard work of a considerable number of people with multidisciplinary and complementary skills.

The initial planning phase was the product of Ms. Susan Hazen and Mr. Jack Swafford, Project Management Branch, Engineering Division, Army Corps of Engineers, Fort Worth District.

The detailed implementation plan was prepared by Dr. Thomas R. Hester, principal investigator and project administrator, Dr. Joel D. Gunn, Jack Eaton, Andrea Gerstle and Thomas C. Kelly.

The necessary military coordination with Fort Sam Houston, the Canyon Lake Recreational Facility, the 22 USAR Centers and Camp Bullis was provided by the Directorate of Facilities Engineering, Fort Sam Houston, in the persons of Lt. Col. Martin B. Carson, Director, Capt. Thomas R. Kruthers, Environmental Officer and Capt. William T. Melton, Operations Officer. Survey crews were consequently expected and courteously received at the Canyon Lake Recreational Facility, on Fort Sam Houston, and at each of the Reserve Centers.

The main thrust of the survey was at Camp Bullis, where only the closest coordination and positive attitude of Lt. Col. Paul E. Manna, Camp Bullis Commander, and the Operations Sergeant, SFC Richard K. Simmons, enabled the survey crew to accomplish its mission (a most refreshing change from the brusque and fruitless encounters with Fort Sam Houston and Camp Bullis authorities on these properties in past efforts to save important archaeological resources).

M. E. Brunes, the Conservation Officer at Camp Bullis, also was most helpful in locating a resource the survey had missed. He is presently making plans to preserve archaeological resources discovered by this survey.

Two consultants, Dr. C. M. Woodruff and Philip Dering, participated in and contributed their specialized knowledge to the Camp Bullis survey. Dr. Woodruff, Bureau of Economic Geology, The University of Texas at Austin, provided field appraisal of the geomorphology. Mr. Dering, Palynology Laboratory, Texas A & M University, collected and analyzed soil samples from the tested sites at Camp Bullis.

Radiocarbon dating was provided by Dr. E. Mott Davis, Radiocarbon Laboratory, The University of Texas at Austin, and by Radiocarbon Ltd., Lampasas, Texas.

Specialized snail analysis was performed by John Clark, Jr., Texas State Historical Commission, Austin. Jerry Henderson of Texas Archeological Survey, The University of Texas at Austin, provided analysis of the faunal material.

The historical survey was directed by Anne A. Fox, assisted by Sara E. Kleine, Daniel E. Fox, James E. Ivey and Vicki Holloway, who provided photographic coverage.

The following individuals were particularly helpful in expediting the historical research for this report:

Katherine McDowell and the Staff of the Research Library of the Daughters of the Republic of Texas,
The Deputy County Clerks in the Deed Record Department at the Bexar County Courthouse,
Mrs. Elizabeth S. Doss, Real Property Officer for the Facilities Engineer, Fort Sam Houston,
William M. Harris, Chief, Engineering Plans and Services Division, Fort Sam Houston, and
Capt. José N. Uranga, Jr., Environmental Law Specialist, Office of the Staff Judge Advocate General, Fort Sam Houston.

Special credit is due to the field survey crew, who, in addition to covering Fort Sam Houston, the Canyon Lake Recreational Facility and the 22 USAR Centers, spent long hours hiking the rugged terrain of Camp Bullis. The crew consisted of Thomas C. Kelly, field director, Cristi Assad, Augustine Frkuska, Andrea Gerstle, Thomas E. Miller and Erwin Roemer (who was also in charge of survey photography).

The Camp Bullis archaeological resources proved to be more than the field crew expected, and the important sites more than could possibly be tested, given time and monetary constraints. The shortage of personnel was made up by the following volunteers from the Southern Texas Archaeological Association and archaeology students from The University of Texas at San Antonio: June Carter, David Cox, Mary Daamsgard, Bryan Forester, Joyce Pratt, Margaret Reasor, Tom Saunders, Elaine Saunders, Kay Simpson, Laura Simpson, Cliff Simpson, Terry Stevenson, Kate Vaught, Carol Walker, Margaret White and Max Witkind. The following students from The University of Texas at San Antonio Summer Archaeological Field Course took a busman's holiday to work one weekend with the crew and other volunteers: Santiago Escobedo, Andy Hofling and Betty Guntharp.

Elizabeth Cantu Frkuska assisted Augustine Frkuska in mapping the Camp Bullis sites, recording excavation data, and analyzing and computerizing lithic data in the laboratory. Lynn Highley, Royce Mahula, Thomas Miller, Margarita Vázquez and Shirley Van der Veer assisted in limited testing at Camp Bullis.

Andrea Gerstle supervised preparation of the report, organizing and integrating the report for continuity and lucidity. She also carried the heaviest writing workload. Cristi Assad handled the processing and sorting of the constant volume samples, did partial analyses of bone samples and artifacts, and wrote several sections of the report.

Thomas C. Kelly, field director of the project, served as liaison in matters of scheduling on Camp Bullis, and insured the timely completion of the field investigations. In addition, he was responsible for researching and writing several sections of the report.

Shirley Van der Veer was an invaluable member of the write-up team, translating handwritten and largely illegible papers into typewritten copy. Along with Lynn Highley and Margarita Vázquez, she processed and catalogued the vast multitude of artifacts, site reports and computer forms that were constantly being submitted to the laboratory.

James E. Ivey provided advice and suggestions pertaining to the statistical analysis of site types, enabling clear and logical results to be obtained. He accomplished all computer programming, with Lynn Highley's assistance in keypunching. He was also in charge of the historical archaeological field work.

INTRODUCTION TO THE PROJECT

Thomas C. Kelly

In March 1977, a contract was effected between the Center for Archaeological Research, The University of Texas at San Antonio (CAR-UTSA), and the Fort Worth District Army Corps of Engineers to conduct an archaeological and historical survey of Fort Sam Houston and its south-central Texas properties. This contract (DACA 63-77-6-0081) is part of an overall Environmental Impact Statement required by the National Environmental Policy Act of 1969, implementing Department of Defense Directive 6050.1 and Army Regulation AR 200-1.

The survey was designed to provide an inventory and evaluation of rapidly disappearing archaeological and historical resources and to evaluate impacts and effects of planned activities on these resources. Where warranted, individual sites or districts were to be nominated to the National Register of Historic Places.

SCOPE OF SURVEY

Fort Sam Houston in San Antonio, Texas, with 3287 acres, the Canyon Lake Recreation Area with 110 acres, and 22 USAR Centers, totalling 99 acres, required 100% surveys (Fig. 1).

The Fort Sam Houston portion of the survey came many years too late with only two new archaeological sites recorded. It was also discovered that a site present in 1974 (41 BX 194) had been completely destroyed. No sites were recorded at the Canyon Lake Recreation Facility or at any of the USAR Centers.

The bulk of the survey activities took place at Camp Bullis just north of the San Antonio city limits. A 15% survey of the installation's 28,021 acres was the minimum requirement set forth by the Corps, with 100% examination required of areas planned for construction or impact. Limited testing was carried out where warranted.

The actual survey covered a little over 20% of Camp Bullis. An additional 10 days of testing at 41 BX 36, a large midden, was accomplished with the help of volunteer UTSA archaeological students and members of the Southern Texas Archaeological Association. The policy of the Center for Archaeological Research has always been to secure as much archaeological knowledge as possible from contract archaeology, and Camp Bullis, with its 72 recorded sites, presented the best (and possibly the last) opportunity to study a large and comparatively undisturbed archaeological area in Bexar County.

PROBLEMS

The nature of the Camp Bullis survey was bound to create some logistical problems. A small caretaker force at Camp Bullis provides facilities and scheduling for 150,000 to 250,000 people per year for military and medical training. A special problem was that one of the largest areas, Zone 9, is the impact area for 12 firing ranges spaced around a 180° arc. Part

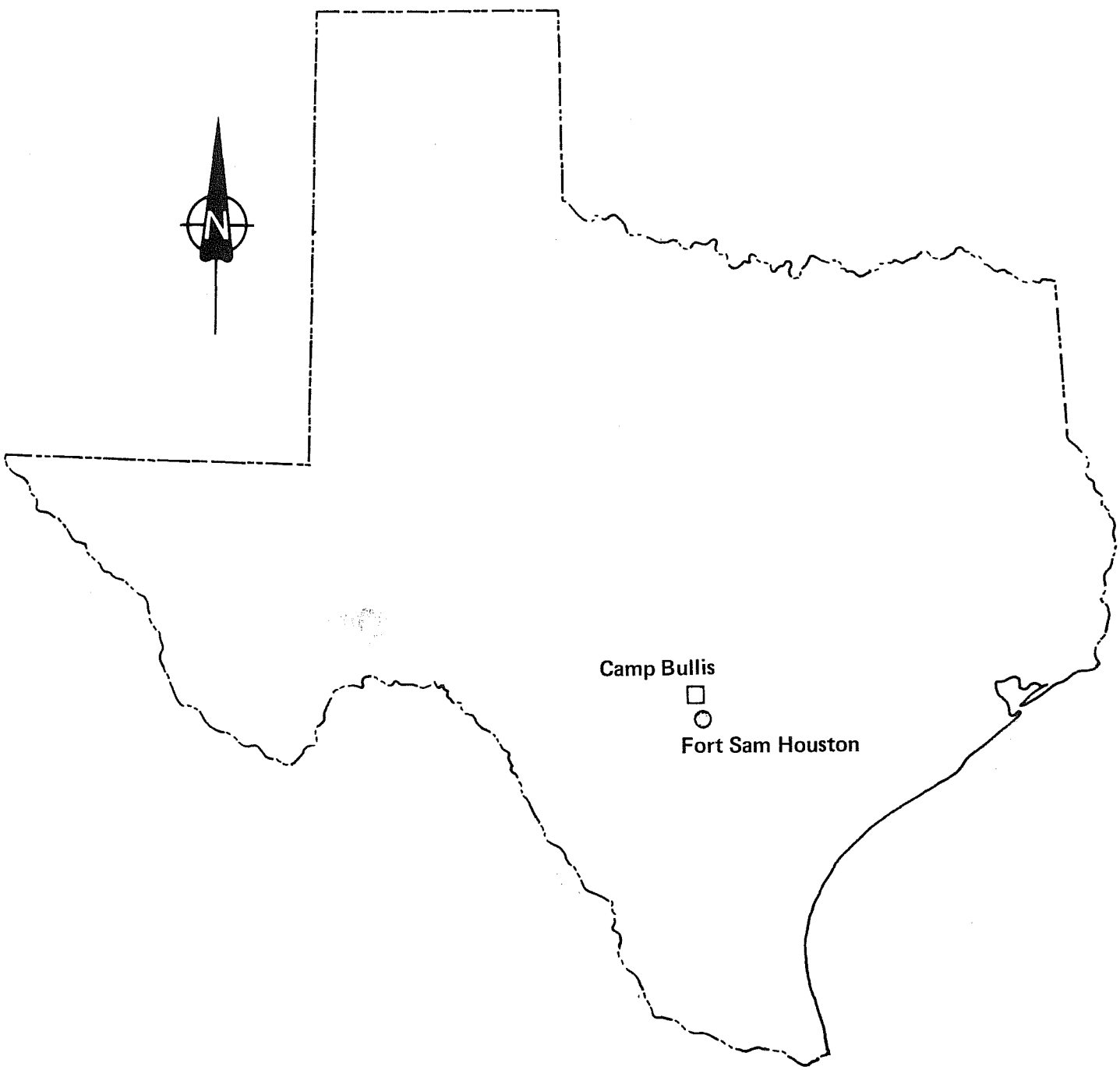

Figure 1. *Locations of Fort Sam Houston and Camp Bullis, South Central Texas.*

of this area has unexploded grenades with sensitive fuses. The northern portion of Zone 9 also has an area where Southwest Research Center tests explosives. For this reason, Zone 9 was necessarily slighted.

Having to contend with both English and metric systems of measurement poses minor problems for archaeological reports. All of our maps had elevations expressed in feet above mean sea level. Similarly, the odometers on our vehicles were often used to measure longer distances in the field to establish site locations in reference to landmarks in the verbal descriptions on site survey forms. Road miles and elevations in feet were not converted to metric figures. Metric measurements were used for all excavations, controlled surface collection, intra-site measurements and map site locations.

REPORT ORGANIZATION

The report is presented in sections which are geographically defined, i.e., Camp Bullis, Fort Sam Houston, and the U.S. Army Reserve Centers and Canyon Lake Recreation Area. Within each of these sections, both the archaeology and the history are presented. This was done to facilitate the evaluation of each of these areas in terms of its history and prehistory.

The bibliographies (Part VII), however, are presented differently from the report contents. The Ethnohistory Bibliography (VII.A) references sources consulted for Part I. The History Bibliography (VII.B) pertains to sources from Part II; Part III, Section C; Part IV, Section B; and Part V, Section B. The Archaeology Bibliography (VII.C) is relevant to sources from Part III, Section A and B; Part IV, Section A; and Part V, Section A.

PART I

A STUDY OF ETHNIC GROUPS IN THE REGION

Daniel E. Fox

I.

A STUDY OF ETHNIC GROUPS IN THE REGION

Daniel E. Fox

Southern and south-central Texas is and has been an interrelationship of physical and cultural elements. As a human region, it is built upon a heritage of many different cultural groups.

THE ABORIGINES

At the beginning of historic times, the area of what has become known as south Texas was inhabited by hunting and gathering peoples known as Tonkawas, Coahuiltecans, and Karankawas. During the 16th century, Tonkawa groups lived in the Edwards Plateau region, in parts of the coastal plain to the south, and in the Brazos River drainage to the east. Not much is known about the Tonkawa before they became organized into a tribal group during the 17th and 18th centuries. Although categorized as a Plains Indian culture, they were dependent upon many of the same natural resources and may have spoken dialects of the same linguistic stock as their neighbors to the south (Sjoberg 1953a; Hasskarl 1962; Jones 1969; Berlandier 1969).

Groups of Coahuiltecan-speaking Indians were in inland areas, with Karankawas along the coastal lowlands and littoral (Ruecking 1955; Gatschet 1891). Culturally similar, both peoples led a seasonal hunting and gathering subsistence adapted to their semi-arid environment. Karankawa groups exploited the varied resources of offshore islands, mainland shores and prickly pear fields. Coahuiltecan bands also were dependent upon a variety of plant resources, particularly prickly pear, agave, pecans and mesquite, and animal life, including bison, deer, fish, birds and other small fauna of the Rio Grande Plain (Newcomb 1960:3-5; Campbell 1975).

For the purposes of this overview, the Karankawas can be considered along with the Coahuiltecans as members of the Western Gulf culture area (Newcomb 1956). An ethnographic sketch of the Coahuiltecans will serve to give an impression of both peoples.

It should be noted at the outset that the term "Coahuiltecan," while in common use, is considered by many modern-day ethnohistorians to be an almost useless term. Many of the autonomous groups in southern Texas, south-central Texas, and northeastern Mexico were Coahuilteco-speakers; others spoke different languages. More importantly, these hunter and gatherer groups were largely autonomous and their lifeways were often considerably varied. The "Coahuiltecan" generalization has been discussed by Campbell (1975:1, 1977:2) and Nunley (1971). Only recently have detailed studies been done of specific Coahuilteco-speaking groups (cf. Campbell 1975, 1977).

The material culture of these peoples was relatively simple, durable and transportable. Small huts were used for shelter. Bows and arrows, rabbit sticks, nets, baskets, mats and stone tools such as knives, scrapers and

hammers were their basic implements (Newcomb 1961:43-44). They often wore little clothing, although they adorned their bodies in various ways, including painting and tattooing, ear, nose, and lip piercing, and the use of jewelry fashioned from bone, stone, shell, and other materials (Schuetz 1969:78-80).

These populations existed much of the year in small family groups (the basic socio-economic unit), and assembled during the various plant harvest seasons into bands composed of patrilineally-related groups. Each band usually had a headman, and occasionally chiefs gained limited authority over a number of bands. Headmen and shamans, the only individuals who were set off from their fellows, often had several wives, perhaps as part of the prestige sphere of Coahuiltecan economy (Newcomb 1961:44-45).

Newcomb (1961:45) emphasizes the interdependence of this egalitarian society:

> . . . personal gain or gain at the expense of the group was unknown. All the people a person lived with and worked with were his kin. Coahuiltecan society, then, . . . was distinguished by (1) fraternity - all were kin; (2) equality - there were no full-time occupational specialists, much less various social classes; and (3) freedom - the resources of nature were free for the taking.

Relations between groups or bands were much less cooperative. Territorial in nature, Coahuilteco-speakers competed for natural resources, often to the point of intermittent feuding and small-scale warfare between neighboring bands (Schuetz 1969:81). Emissaries often mediated such clashes (Newcomb 1961:46-48), and it is possible that *mitotes*, ceremonial feasting and dancing, may have served to ameliorate conflict between groups.

Coahuiltecan supernaturalism probably was not a coherent mass of beliefs and practices. Specific magical and religious ways of dealing with the unknown may have differed between individuals as well as socio-economic groups. Shamans, usually the older members of either sex, combined magic, religion, and science into the treatment of the sick and ailing. Peyote and the laurel bean were drugs used in religious ceremonies or *mitotes* (Newcomb 1961:51-55; Schuetz 1969:87).

With the intrusion of European culture during the 16th century, Coahuiltecans faced new environmental pressures. The advent of new cultural elements such as horses and metal tools resulted in changes of subsistence, technology and social organization. European diseases spread rapidly, decimating much of the native population. Plains-adapted Tonkawa, Lipan Apache, and Comanche peoples pushed southward (Sjoberg 1953a, b; Tunnell and Newcomb 1969; Berlandier 1969; Fehrenbach 1974; Campbell 1972:3).

As Campbell (1975:2) summarizes:

> By the end of the 17th century the Indians of southern Texas were already beginning to face what most hunting and gathering peoples of the world have had to face: population decline, territorial displacement, segregation and ideological pressure, loss of ethnic identity, and absorption by invading populations.

In the end, the aborigines of south Texas became an important resource for exploitation by the northern expansion of the Spanish Colonial empire.

SPANISH TEXAS

During the late 17th century, Texas became the remote northeastern frontier of the Spanish Colonial empire in the Americas. The area of settlement encompassed the country between the Red and Nueces Rivers, and by the mid-18th century the sparsely populated geographical framework of Spanish Texas became anchored upon the communities of San Antonio de Bexar, La Bahia (Goliad), and Nacogdoches. After more than 100 years of colonization, this structure was comprised of 3000-4000 people (Meinig 1969:28).

Missions, presidios and *encomiendas* were the traditional colonial institutions with which the Spanish frontier had been expanded. Although the land-labor system of the *encomienda* was not as successful in Texas, a number of settlements (*poblaciones*) grew up near the missions and presidios (Leutenegger and Perry 1976:23). Canary Islanders were transported to San Antonio to establish a civil settlement, and families of Tlaxcaltecan Indians were brought from Mexico as settlers and teachers for the mission neophytes. Exemplifying the mixture of ethnic groups of Spanish Texas, races recorded in San Antonio included Indian, Negro, mulatto and Spaniard (Schuetz 1976:75-78).

The missions succeeded in Christianizing, and otherwise acculturating, a great many indigenous people into the socio-economic systems of the civil communities:

> Where the Spanish found adaptable Indians, they always worked to incorporate them into the state as third- or fourth-class citizens to form a laboring class. And while the position of all except Spaniards born in Spain was always anomalous in the empire, and blood castes were rigidly defined, if not always enforced, after the Spanish departure the soon-to-be-dominant *mestizo* groups naturally preferred never to dwell much on the notion of racial descent. It was impossible for all but a handful in New Spain to prove a racial purity that other European colonists took for granted. But class distinctions, always sharply drawn in Hispanic civilization, remained (Fehrenbach 1868:65).

MEXICAN TEXAS

During the early 19th century the strategy of the Mexican regime was to colonize the broad area between San Antonio and Nacogdoches. In the early 1830s Texas was divided into three political units--the departments of Bexar, Nacogdoches and Brazoria--reflecting new patterns in cultural geography (Meinig 1969:32).

While the departments of Nacogdoches and Brazoria became more and more overrun by Anglo-American frontier culture, the Department of Bexar remained the Hispanic region, even though it was occupied along the coast by a few Anglo and Irish colonists. As Meinig (1969:32-33) depicts it,

> Nearly two-thirds of the population was congregated in and around San Antonio, still the principal seat of Texas officials and the gateway between the Mexican nation and its distant frontier. The remainder were too few even to be spread thinly over the rest of the department, and they were loosely clustered around Goliad and Victoria, San Patricio and Refugio (an official inspection of 1834 found not a single ranch between San Antonio and Goliad). But even such tiny primitive centers were faithful if rather feeble exhibits of their common heritage. They represented a civic-centered ranching culture with all of the basic elements and character of the now long-stabilized Mexican pattern: a cohesive, hierarchical structure of Spanish, *Mestizo*, and Indian-Catholic and formal, authoritarian and conservative; a typical society of officials, soldiers and priests, ranchers and foremen, vaqueros, carters, and peons.

Maintained through a hierarchy of underlings and bound together by folkways and mores which promoted centralized authority and implicit obedience as well as intolerance to outsiders and outside things, the Hispanic scheme of socio-economic organization was not compatible with the character of Anglo-American colonists (Lowrie 1967:71-72). Following the revolt against Mexico, most of the Hispano population moved out of Bexar to take refuge along the Rio Grande and beyond (Meinig 1969:46).

In 1860 there were about 12,000 Hispano people in Texas, mostly in the south and southwest (Fehrenbach 1968:687). Along the southern edge of central Texas, especially along the Indianola-San Antonio road, Mexicans worked as carters, packers and drovers. Within this cultural border zone, the cotton plantation and the cattle enterprises of the *hacienda*, originally the two patriarchal landed institutions idealized by the contending cultures, were ruled by the Anglo. The Negro slave was necessary for one, the *Mestizo* vaquero for the other.

Further south, clusters of Mexican *rancherias*, with their jacal structures, brush-fenced yards, sheep and goats, were scattered about. Except for garrisons and a few Anglo merchants in Brownsville and Laredo, the Rio Grande Valley remained Hispano-American (Meinig 1969:55-56).

ANGLO-AMERICANS

Decisive in Texas history was the encouragement of the immigration of Anglo-Americans under the Mexican *empresario* system of colonization. Beginning with Austin's colony which embraced much of the lower Brazos and Colorado river basins, other *empresarios* recruited Anglo-Americans, Mexicans, and Irish colonists for the settlement of adjoining lands. By the end of the Mexican period the population of Texas was at least 25,000 (Meinig 1969:31; Hogan 1969:3).

Seeking economic opportunity, many planters and frontiersmen emigrated to Texas from the Trans-Appalachian South (most commonly from Louisiana, Alabama, Arkansas, Tennessee and Missouri) as part of the great westward expansion of the United States (Fehrenbach 1968:142). Between 1835 and 1846, further immigration, coupled with natural increase, more than quadrupled the population of the Republic. In 1847 the first state census showed a total of about 142,000 people, including 39,000 Negros, approximately 300 of whom were free (Hogan 1969:9-10).

Although the Texas Republic laid claim to an area much greater than the Texas of Mexico, Anglo-American settlement did not extend beyond the Nueces River until after the war of 1846 (Meinig 1969:39-40). Distance from core areas of population and the threat of Indian depredations restricted the westward extension of the young empire (Hogan 1969:14-16).

The economic basis of Anglo-American settlement was agricultural:

> . . . agricultural resources were potent forces in appealing to Americans; and the suitability of the soil and climate for the production of cotton and therefore for slave labor provided an incentive for migration from the southern slave-holding states. Political and economic conditions in the United States at the time operated toward the same end (Lowrie 1967:24).

Thus the inflow of Anglo-American planters and yeomen filled the well-watered, partially wooded bottom lands from the edge of the Hill Country to the coast.

Riverine in nature, Anglo-American settlement pattern was greatly influenced by the *empresario* system of land distribution. However, while some towns established during the Mexican period (e.g., Gonzales) were similar to planned Spanish Colonial towns, most Anglo-American communities grew up not by primary, formal, administrative creation but as secondary, speculative responses to commercial opportunity (Meinig 1969:36).

The emotional revivalism characteristic of the West during the first quarter of the 19th century appears to have been another expression of the highly individualistic Anglo-American society of Texas. "Religion rested upon the unrestrained freedom of the individual to accept or reject it" (Lowrie 1967:54). Actually, there is evidence to suggest that few ardently religious Anglo-Americans came to Mexican Texas (Lowrie 1967:58;

Hogan 1969:191-194). In fact, the legal device of marriage by local bond removed one of the most important needs for clergymen (Hogan 1969:191). As late as 1845, what religion there was in Anglo-American Texas was predominantly Protestant, and most commonly Methodist (*ibid.*:194).

EUROPEANS

Throughout the 19th century, Texas received immigrants from a number of European countries. Prompted by economic and political pressures, Irish, Germans, French, Czechs, Poles, Norwegians and others brought new cultural variety to Anglo-American Texas. The immigration of Germans probably had greater input into the rural culture of central and southwestern Texas than any other European group (Flach 1974:158).

Although there were a few German settlers in Mexican Texas, it was not until later that a great volume of literature attracted large numbers of Germans to the Republic. In the period from 1844 to 1846, the *verein zum Schutze deutscher Einwander*, a society of wealthy, titled Germans, brought 7,380 of their countrymen to the state. In 1844, 2,134 German-speakers, most of whom were Alsatians, were brought by *empresario* Henri Castro to settle in Castroville and the surrounding area. The United States Census of 1850 recorded 8,266 persons of German birth in Texas, and by 1860 the German element may well have included more than 30,000 people. Following a temporary lull during the Civil War, German immigration resumed (Jordan 1975:40-54).

Unlike other Germans who came as secondary settlers to Anglo-American Texas, the Germans brought to the Hill Country by the Verein and by Castro were pioneers on the forefront of westward expansion. Nearly all of these colonists had come from parts of Germany where houses and related farm structures were clustered together in unplanned, irregular villages. New Braunfels, Fredericksburg and Castroville, the three most important settlements, represented attempts to establish planned, nucleated farm villages. The farm village plan, however, began to fail from the start as settlers moved out of the towns and onto their farms (Jordan 1975:157-160).

The settlement pattern became one of adjacent long, narrow strips of land, like headrights, extending back from stream channels. The increasing size of farms and the continual influx of colonists pushed the perimeter of settlement outward from the towns and into the fertile stream valleys scattered throughout the Hill Country. Leaving unoccupied interfluves between, this accelerated the dispersal of settlement (Jordan 1975:160).

The German agricultural system was based on a remarkable variety of crops and livestock. Marketed commercially were significant quantities of corn, wheat, garden vegetables, hay, cotton, cattle, hogs, sheep, eggs and dairy products (Jordan 1975:156).

The first German houses in the Hill Country usually were built of horizontally laid logs or of poles driven vertically into the ground. While this frontier architecture was Anglo-American in style, the Germans usually

replaced their initial structures within five or ten years with small, sturdy stone buildings, employing some European construction techniques. Following the Civil War, many large stone houses were built. By about 1880 or 1890, German-Americans abandoned the use of stone construction and began building frame houses (Jordan 1975:165-167).

The stability of rural German settlement was based upon the stability of the family as the basic socio-economic unit. Even labor on German farms was a family affair (Jordan 1975:185).

> . . . the German-American people . . . had one great central creed. It was woven into the very fabric of their being. All other characteristics stemmed from it. It motivated everything they did. This central theme was Family (Flach 1974:6).

The original German pioneer families often had eight and perhaps ten children; the next generation had five or six. Few of these relatives moved away. Marriage was for life, and divorce seldom occurred (Flach 1974:6, 51).

AFRO-AMERICANS

A pamphlet published by the Institute of Texan Cultures (1975) presents an ethnohistorical sketch of black people in Texas. A quick review reveals that this ethnic group has been represented throughout the entire period of Spanish and Anglo-American expansion into the area. Spanish explorers and colonists brought black Moorish slaves to Texas, and by 1791 Negro slaves and free blacks numbered 24% of the population.

In Spanish Texas, blacks who had been freed were accepted socially, but were forced to remain a part of the working class. Under Mexican law, a free black had the legal and political rights of citizenship. However, with the growth of the Anglo-American empire in Texas, slavery filled the labor requirements necessary for the growth and development of the plantation economy. The proportion of slaves increased from about 21% of the immigrant population in 1835 to about 27% of the total population in 1847 (Hogan 1969:21).

As slaves, Afro-Americans contributed to the growth of agriculture and the cattle industry. Following the Civil War, they found that they were no longer accepted in the political, economic and social structure of their former masters, and were ill-prepared to compete with other ethnic groups for job opportunities. Many migrated to the North; others remained in the service of their former masters, or worked as sharecroppers. Some grouped together, forming small communities such as Board House in Blanco County.

The early black church, more than a place of worship, was a place for social interaction. It served as a vehicle for motivating a new ethnic identity and for establishing black schools. Well-established by the end of the Civil War, the black church functioned to prepare its people to assume their freedom and to begin their gradual integration into 20th century

American society. Throughout Texas history, black Americans, forced to abandon the heritage of their native Africa, have developed an indigenous culture of their own.

AMERICAN TEXANS

Following the Civil War, Texas became a part of a socio-economic system that removed state sovereignty over politics, money, and social organization. The cotton and cattle kingdoms were made tributary to the American industrialized society. In came the railroads, accompanied by two major groups of immigrants. One filled up vacant or unused lands and replaced the plantations with hordes of tenant farmers. The other settled the western counties. From 818,175 inhabitants in 1870, the population of Texas grew to 2,235,527 by 1890 (Fehrenbach 1968:603).

As Texans grew into the 20th century, they were drawn more and more tightly into the larger nation:

> Increased internal organization, compulsion, and control were inevitable; the relatively tribal frontier society would coalesce into classes and then bureaucracies, with increasing social distinctions, whatever they were called . . . Texas conducted a long, and losing, series of delaying actions and last-ditch campaigns. But as the planter economy was destroyed, so was the cattle kingdom, and finally the bedrock social institution, the family farm. As the better organized Texas society exterminated Indians and cowed Mexicans, Texas itself was made subject by greater organization and power (Fehrenbach 1968:703).

Today, one aspect of this complex socio-economic system, the U.S. Army, is supporting an investigation into the cultural heritage of the parts of south Texas it has come to occupy.

ACKNOWLEDGMENT

I wish to thank Dr. Thomas R. Hester for calling to my attention several references on the aboriginal groups of southern and south-central Texas.

PART II

HISTORICAL BACKGROUND:
POLITICAL AND MILITARY DEVELOPMENT

Anne A. Fox

II.

HISTORICAL BACKGROUND: POLITICAL AND MILITARY DEVELOPMENT

Anne A. Fox

This brief overview of the history of central and south Texas is intended to provide a perspective for the sequence of events presented in the following sections. A Historical Bibliography is included (page 367) for those who wish to pursue any particular aspect in greater detail.

From the time of Columbus's discovery of the New World and Cortez's invasion of Mexico, the Spanish were concerned with ownership and control of the lands north of the Rio Grande. Beginning in 1519 with Alvarez de Pineda, a series of expeditions explored the coastal area of Texas, spurred on by rumors of French activity and settlement.

By the late 17th century, it had become apparent that the only way to assure control of the area was to acculturate the aboriginal inhabitants and start settlements of native Spaniards in the region. After a few unsuccessful attempts, a system of missions and presidios was constructed from the Rio Grande to the Louisiana boundary. By 1770 these establishments had evolved into a small number of settlements spaced across the area, linked by tenuous roads. Travel, and indeed the existence of the settlements, was made hazardous by the constant raids of hostile Lipan Apache and Karankawa Indians from San Antonio to the south, and Comanche and other tribes from the north. As the towns began to prosper in the early 1800s, Anglo merchants and frontiersmen from the United States moved into the region, acquired land and became a part of the population.

The Mexican revolution, started by Fray Hidalgo in 1810, called worldwide attention to the region, and a number of filibustering expeditions were organized on the border with the United States, led by adventurous Americans and rebellious Spaniards. After the culmination of the revolution in Mexican independence from Spain, the Mexican government opened the door to settlement from the United States and Europe by granting a series of *empresario* contracts to men who would promise to bring settlers to populate a given area of the province. Soon towns had sprung up throughout the eastern half of the state as new settlers acquired farmland along the major river valleys. At first the Indians accepted the new arrivals, but as they perceived the growing threat to their hunting territories, the raiding began and by the mid-19th century was prevalent everywhere on the frontier.

Meanwhile, the rise of General Santa Anna to dictatorial power in Mexico sparked rebellion among the new colonists. As discontent over his abuse of power grew into a determination to resist, a series of incidents led to a punitive expedition by a large force of Mexicans led by Santa Anna. Mexican forces captured San Antonio in the battle of the Alamo in 1836, and massacred a large part of the Texan army stationed at Goliad. Marching on toward the coast to overtake the rest of the rebels, Santa Anna was defeated by General Sam Houston at San Jacinto.

With the defeat of the Mexican army, Texas declared itself a free republic and set up a government. Despite a number of later attempts by Mexico to recapture the state, the Republic endured and prospered for ten years. There was increasing sentiment, however, to join the United States, and statehood was finally acquired in 1845.

By the time Texas was admitted to the Union, the United States was at war with Mexico and General Zachary Taylor's American Army of Occupation had landed on the Texas coast and marched to the Rio Grande. One of the points of contention between the two countries was the location of the southern boundary of Texas. Mexico had long considered the land between the Nueces River and the Rio Grande to be part of Mexico, while Texas and the United States claimed that area as part of Texas. American forces won decisive battles at the Rio Grande, Monterrey, and Vera Cruz, and finally captured Mexico City. The peace treaty which followed settled the southern boundary at the Rio Grande.

Between 1848 and the start of the Civil War in 1861, two lines of U.S. Army forts were built in south Texas, one along the Rio Grande, the other roughly along the Nueces River. These posts were supplied from depots at San Antonio, Corpus Christi and Brazon Santiago. They served as a line of defense against Mexico, as a barricade against marauding Apache and Comanche Indians who regularly swept through south Texas to raid deep into Mexico, and as escorts for travelers through the country between the Nueces River and the Rio Grande, which was overrun with outlaws. Despite the vigilance of the U.S. Army and the Texas Rangers, Indian raids and banditry were commonplace throughout south Texas.

At the start of the Civil War, the state of Texas seceded and joined the Confederacy. This move was not popular in some parts of the state, particularly among the newly-arrived German settlers in the Hill Country and south Texas, most of whom wanted no part of the war. This caused serious problems in areas where the Germans were numerous, causing some to flee to Mexico and a few to return to Germany. When the majority of the able-bodied men left to fight for the South, farms were left undefended and the Indians soon took advantage of this opportunity. The frontier line of settlement retreated as families "forted up" behind palisade walls for mutual defense against the savage raiders, particularly in the area north of San Antonio.

In 1865 the end of the war brought an army of occupation, carpetbaggers and opportunists, who made life miserable for the returning Confederate soldiers and their families. In a desperate effort to recoup their losses, ranchers in south Texas began to collect large herds of the wild cattle which overran the state--a legacy from mission herds which ran wild after secularization. Hide and tallow factories were opened in coastal towns, and thousands of cattle were driven "up the trail" to railheads in Kansas and to Army posts in Texas and New Mexico.

The elimination of the buffalo brought an end to the Indian depredations on the frontier, as starving bands accepted reservation life or retreated into northern Mexico. At the same time, the discovery of oil and the blossoming

of the industrial revolution brought new life to the state, as Texas emerged into the 20th century.

Sources consulted in the preparation of this historical background are: Fehrenbach (1968), Flanagan (1974), Thompson (1974), Weddle and Thonhoff (1976), Wilkinson (1975) and Wood (1971).

PART III

THE CAMP BULLIS STUDY

SECTION A

PREHISTORIC ARCHAEOLOGY AT CAMP BULLIS

III. A.1

GOALS OF THE STUDY

Andrea Gerstle

INTRODUCTION

The purposes of this report are multiple. Basic requirements as specified by the Corps of Engineers contract include a minimum 15% area coverage of Camp Bullis to determine the nature of the prehistoric cultural resources on that military reservation, a description and interpretation of each of the sites located, limited testing in selected sites, and recommendations for mitigation. With the exception of the latter, these form the basis for a scientific study which may deal with many of the multitude of problems yet to be resolved in the reconstruction and understanding of central Texas prehistory.

The location, nature and size of the area under consideration (28,021 acres) are advantageous for focusing on particular aspects of prehistory. The following chapter (III.A.2) provides a general discussion of this area of study. Settlement distribution and subsistence pattern studies are thus possible without the biases introduced by small area surveys. This, then, is the problem orientation of the project.

RESEARCH DESIGN

Analysis of the data recovered during the Camp Bullis survey proceeded on three different levels, each providing input and feedback to the others. The three levels of analysis are: (1) the artifact and artifact assemblages, (2) site types and functions, and (3) site distribution. These are considered from synchronic and diachronic perspectives and are related to characteristic and changing lifeways of the aboriginal populations, including tool-related behavior, subsistence economy and settlement systems.

These research goals are directed primarily to site data and inter-site comparisons. This is appropriate, as the major purpose of the project is to evaluate the cultural history resources over a large area. In addition, limited testing and controlled surface collections at several sites enable a closer look at intra-site variation, including horizontal distribution of artifacts and vertical stratigraphic occupational sequences.

It is hoped that this study will provide a sound basis for evaluating the archaeology of Camp Bullis, for purposes of planning as well as comparative archaeological research.

III. A.2

ENVIRONMENT

Cristi Assad

INTRODUCTION

The focus of this section is to summarize the environment of Camp Bullis with regard to its potential effect on human habitation, both historic and prehistoric. The geology, hydrology, vegetation and wildlife have been studied in detail and are reported in the *Environmental Statement, Overall Mission, Fort Sam Houston, Texas* (Freese and Nichols, Inc. 1977).

Camp Bullis is located on the southern edge of the Edwards Plateau, in north Bexar County between Comal County to the north and Loop 1604 (Charles W. Anderson Loop) to the south. Its eastern and western boundaries are Blanco Road and Interstate Highway 10, respectively. The total area of the reservation is 28,021 acres; it is drained by two major streams, the Salado Creek and Cibolo Creek, in addition to numerous ephemeral streams and springs.

GEOLOGY

The geology of Camp Bullis is an important factor when considering the archaeology of the area. It is located at the southern edge of the Edwards Plateau with the Coastal Plain Province to the south (Carr 1967). In between these geographic areas is the Balcones Fault Zone, the eastern and southern boundary of the Edwards Plateau (Blair 1950). It is in this fault zone that the differences between the Cretaceous, Lower Glen Rose Limestone Formation and the Edwards Limestone Formation are exposed at Camp Bullis.

The Edwards Formation is found only at the southern edge of Camp Bullis and is archaeologically significant in that it is a chert-bearing formation while the Glen Rose Formation is not (C. M. Woodruff, personal communication).* The source for chert in the Cibolo Creek area, where there is a concentration of aboriginal sites, is Edwards chert which has been carried downstream from other Edwards outcrops to the north (C. M. Woodruff, personal communication).

Approximately 12 million years ago, geological activity in the Balcones Fault Zone induced changes in erosional patterns resulting in the characteristic topography seen today. What is known as the "Hill Country" was uplifted relative to the present day coastal plain. The coastal plain currently receives the erosional sediments carried out of the higher Hill Country (C. M. Woodruff, personal communication). This faulting, and the subsequent exposure of the Glen Rose Formation, define the southern boundaries of the hydraulic unit

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*Dr. Woodruff, a geomorphologist with the Bureau of Economic Geology, The University of Texas at Austin, was consulted for the present project at Camp Bullis during June 1977.

known as the Edwards Underground Reservoir or Edwards Aquifer. It extends through five counties including Bexar County (Freese and Nichols, Inc. 1977), and is characterized by limestone caves and rockshelters in layers of differentially permeable limestone.

The Edwards Aquifer has had a direct impact on all of the peoples who have inhabited the Camp Bullis area. "Streams that cross the Balcones Fault Zone lose a large part of their water to the underground reservoir" (Anonymous n.d.:1). The release of this water from springs and seeps has had a significant influence on settlement of peoples, both aboriginal and historic.

The soils at Camp Bullis are of the Tarrant-Brackett series (Freese and Nichols, Inc. 1977). They are alternating soft and hard calcareous deposits which appear as a "stepped" surface due to differential rates of erosion (C. M. Woodruff, personal communication; Taylor *et al.* 1966). Various alluvial soils from slope wash are also present and valley soils are naturally very fertile (Freese and Nichols, Inc. 1977).

CLIMATE

The climate in Bexar County is described as modified subtropical, i.e., continental in the winter and marine in the summer. During the years 1931-1960 the average temperature for December, January and February was 53.7°F and, for June, July and August, 83.2°F (Taylor *et al.* 1966). Precipitation is fairly evenly distributed with an annual average of 27.84 inches per year. Heaviest rainfall is in May and September (Scurlock *et al.* 1976).

FLORA AND FAUNA

The environmental statement written by Freese and Nichols, Inc. (1977) for the Corps of Engineers goes into extensive description of the flora and fauna presently found in Bexar and Comal Counties, particularly with regard to Fort Sam Houston, Camp Bullis and the Fort Sam Houston Recreation Area at Canyon Lake. The emphasis in this section will be on the flora and fauna which may have been used and exploited by the native and later peoples.

Flora

The vegetation of the Edwards Plateau area is different from adjacent provinces. The most characteristic combination of plants is the "scrub forest" of juniper, various oaks and other less numerous associated plant species. A mesic forest of live oaks, elms, hackberries and pecans occupies the flood plains of streams (Blair 1950).

In the Tamaulipan province, the predominant vegetation is thorny brush. This thorny brush vegetation consists of mesquite, acacia, mimosa, white brush and prickly pear, among others, and extends from the Balcones Fault Zone south into Mexico (Blair 1950).

Although the continued use of Camp Bullis since 1917 by the Army ". . . has had little direct impact (construction and road building) on the Camp Bullis area . . . (it) has been responsible for considerable indirect impact on flora and fauna" (Freese and Nichols, Inc. 1977:28). Part of this indirect impact has been changes in the native vegetation caused by extensive grazing of cattle. Bogusch notes that mesquite and other "shrubby plants" have increasingly invaded the grasslands of southern Texas ". . . within the memory of living men" (Bogusch 1952:85). It is not mesquite, however, which is invading the overgrazed lands of the Edwards Plateau--it is the juniper tree. This is due in part to the lack of extensive areas of deep soil, required by mesquite trees for their tap root system (C. M. Woodruff, personal communication). Juniper thrives on the shallow soils characteristic of the Camp Bullis area. Zone 9, the artillery impact area on Camp Bullis, is the only area which has been relatively untouched, except for construction of firing ranges. Grazing has not been allowed for over 50 years in this part of the base and it may eventually become unique in Bexar County due to its unmodified condition (Freese and Nichols, Inc. 1977).

Table 1 lists the variety of major flora to be found at Camp Bullis and Fort Sam Houston. Symbols indicate which flora were encountered in the present project (as well as species apparently utilized) and those reported by other archaeological projects and ethnohistoric documents.

Fauna

The vertebrate fauna of the Balconian province is a mixture of Austroriparian, Tamaulipan, Chihuahuan and Kansan species and, when seen as a faunal assemblage, is completely different from that of any of the other biotic provinces (Blair 1950). Although Fort Sam Houston is in Blair's Tamaulipan biotic province, the fauna of that province consists of grassland species that range into the Texan and Kansan provinces and Neotropical species which have much in common with the Chihuahuan province (*ibid.*). The fauna of the study area concerned has more in common with the Balconian province which is only miles away.

Camp Bullis once again exhibits the potential of being a haven for fauna as it appears to be for native flora (Freese and Nichols, Inc. 1977). Table 2 lists a selection of fauna present or sighted in Bexar County and primarily at Camp Bullis. Some rare and endangered species are included; these were reported in Freese and Nichols, Inc. (1977). The fauna listed represents potentially valuable food and tool sources in the present project area, and is drawn from other excavation reports and ethnohistoric citations for the local aboriginal population.

Tables 1 and 2 were compiled from the following references: Anonymous 1970; Blair 1950; Bogusch 1952; Campbell 1975; Freese and Nichols, Inc. 1977; Hester 1970b, 1971, 1975b, 1976a; Hester and Kelly 1976; Hudson *et al.* 1974; Jelks 1962; Jones *et al.* 1973; Kelly and Hester 1976; Krieger 1956; Lundelius 1967; Newcomb 1960; Schuetz 1969; Scurlock *et al.* 1976; Sjoberg 1953; and Suhm 1957.

TABLE 1. SOME PAST AND PRESENT FLORA OF BEXAR COUNTY

Juniper (*Juniperus ashei*) x
Texas oak (*Quercus texana*) ϕ
Live oak (*Quercus virginiana*) ϕ
Pecan (*Carya illinoinensis*) ϕ
Cedar elm (*Ulmus crassifolia*)*
Cottonwood (*Populus deltoides*)*
Hackberry (*Celtis reticulata*) #
Mesquite (*Prosopis sp.*) x ϕ
Texas persimmon (*Diospyros texana*)*
Red buckeye (*Aesculus pavia*)*
Mountain laurel (*Sophora secundiflora*) ϕ
Texas red bud (*Cercis texensis*)*
Whitebrush (*Aloysia ligustrina*)*
Huisache (*Acacia farmesiana*)*
Catclaw (*Acacia sp.*)*
Agarita (*Berberis trifoliolata*) ϕ
Sumac (*Rhus sp.*)*
Poison ivy (*Rhus toxicodendrum*)*
Blackberry (*Rubus trivialis*)*
Mustang grape (*Vitis mustangensis*)*
Sunflower (*Helianthus annuris*)*
Wild verbena (*Verbena bifinnatifida*)*

Twisted-leaf yucca (*Yucca rubicoia*)*
Spanish dagger (*Yucca treculeana*) ϕ
Arkansas yucca (*Yucca arkansana*)*
Sotol (*Dasylirion texensis*) ϕ
Prickly pear (*Opuntia lindheimeri*) ϕ
Tasajillo (*Opuntia leptocaulis*)*
Buffalo grass (*Buchloe dactyloides*)*
Beargrass (*Nolina texana*)*

- On Camp Bullis project sites
ϕ - Noted in ethnographic literature
x - Recent invader
* - Noted in other archaeological reports

TABLE 2. SOME PAST AND PRESENT FAUNA OF BEXAR COUNTY.

Bison (*Bison bison*) # ▽ ϕ +
White-tailed deer (*Odocoileus virginianus*) # ▽ ϕ
Pronghorn antelope (*Antilocapra americana*) # ▽ ϕ +
Axis deer (*Axis axis*) o
Ocelot (*Felis pardalis*)*
Cougar (*Felis concolor*)*
Bobcat (*Lynx rufus*)*
Coyote (*Canis latrans*) # ▽
Raccoon (*Procyon lotor*) # ▽ ϕ
Opossum (*Didelphis virginiana*) ▽
Gray fox (*Urocyon cinereoargenteus*)
Beaver (*Castor canadensis*) ▽
Badger (*Taxidea taxus*)*
Striped skunk (*Mephitis mephitis*) ▽ ϕ
California jackrabbit (*Lepus californicus*) # ϕ
Eastern cottontail jackrabbit (*Sylvilagus floridanus*) # ▽ ϕ
Nine-banded armadillo (*Dasypus novemcinctus*) ϕ x
Fox squirrel (*Sciurus niger*) # ▽
Mexican ground squirrel (*Citellus mexicanus*) # ▽
Pocket gopher (*Thomomys sp.*) # x
Plains pocket gopher (*Geomys bursarius*) # ▽
Vole (*Microtus sp.*) #
Wood rat (*Neotoma sp.*) # ▽
Cotton rat (*Sigmodon hispidus*) # ▽
White-footed mouse (*Peromyscus sp.*) #
Pocket mouse (*Perognathus sp.*) #

Turkey (*Meleagris gallopavo*) ▽ ϕ
Bob-white quail (*Colinus virginianus*) # x
Mourning dove (*Zenaidura macroura*) #
Turkey vulture (*Cathartes aura*) #
Boat-tailed grackle (*Cassidis mexicanus*) #
Caracara (*Polyborus audoboni*) #

Western diamondback rattlesnake (*Crotalus atrox*) ϕ
Coral snake (*Micrurus fulvius*)*
Copperhead (*Agkistrodon contortrix*)*
Box turtle (*Terrapene carolina*) ϕ
Frog (*Rana sp.*) #

- Found at or near Camp Bullis project sites
▽ - Found at other archaeological sites in the region
+ - No longer in area
ϕ - Noted in ethnographic literature
o - Exotic species
x - Invader species or recent introduction
* - Noted in other archaeological reports

III. A.3

PREVIOUS ARCHAEOLOGICAL RESEARCH

Thomas C. Kelly

INTRODUCTION

General summaries of archaeological research in Bexar County have been provided by Woolford (1935), Fawcett (1972) and Hester (1974b). Bibliographies of relevant literature have been published by Campbell (1960) and Hester (1975a). With the completion of the Fort Sam Houston Project, 434 archaeological and historical sites have been officially recorded in Bexar County. Only a few of these are scientifically excavated sites, and of the excavated sites only the St. Mary's Hall site (41 BX 229) has been adequately investigated.

The objective of this chapter is to summarize data on excavated sites in the Cibolo Creek (including Kendall County) and Salado Creek drainages in order to provide a basis for comparison with the Camp Bullis sites. Conclusions offered below must be accepted as tentative at this time because of the limited sampling that has taken place at most sites.

CIBOLO CREEK

The geologic information presented here was obtained from Barnes (1974) and from the project's consulting geologist, Dr. C. M. Woodruff.

Upper Cibolo Creek originates near the western edge of Kendall County 10 miles west of Boerne, in hills of Edwards Limestone. The hilltops are generally barren or thinly vegetated and are an excellent source of good quality chert, usually in large nodules. Patterson and Adams (1977) report heavily used lithic workshops and lithic resource procurement areas in this region. Downstream, four miles east of its source, the Upper Cibolo enters the Glen Rose Limestone Formation. Upper Cibolo Creek and Ranger Creek join to become Cibolo Creek west of IH10 at Boerne. The creek then enters the Recent low terrace deposit through which it continues to a point five miles northwest of Camp Bullis. Here it again enters the Glen Rose Formation.

Upper Cibolo and Ranger Creeks are spring-fed and fairly dependable sources of clear water, drying up only occasionally. However, Cibolo Creek, after entering the Glen Rose Formation near Camp Bullis, seeps into the Edwards Aquifer and is normally not flowing below Georgs Hole, two miles downstream from the western boundary of Camp Bullis. Water is impounded at Georgs Hole by a natural limestone dike and is clear and deep.

From Georgs Hole east across Camp Bullis, Cibolo Creek is normally dry except for the occasional deep stream bed holes gouged out from the combination of cavities (there are several sinkholes that enter into underground caverns) and flood transportation of huge boulders. Automobile tires have been washed into trees 20 feet above the stream bottom.

Cibolo Creek enters the Quaternary low terrace deposits south of Bulverde five miles east of Camp Bullis' eastern boundary, meanders east for another eight miles, then changes direction to south. Four miles to the south it enters the Edwards Limestone Formation at the intersection of West Fork and Clear Fork Creeks with Cibolo Creek. The Edwards Limestone is an excellent chert source and here again, in combination with what in more mesic times was probably a dependable water source, are found important archaeological resources. A mile farther downstream, Cibolo Creek again turns east to Bracken where the Edwards Limestone is replaced by fluviatile deposits of Quaternary age. Cibolo Creek turns south beyond Bracken, and further south the geologic formation changes again to low terrace Quaternary deposits. These continue to the junction of Cibolo Creek with the San Antonio River four miles north of Karnes City, approximately 84 miles from Cibolo Creek's origin.

Upper Cibolo Creek Sites

The archaeology of Cibolo Creek will be described from its origin in western Kendall County downstream to its confluence with the San Antonio River. Fig. 2 is presented to clarify locational relationships.

A series of hilltop and creek terrace sites along Upper Cibolo Creek and tributary creeks have been described by Patterson and Adams (1977) on the Weaver Adams ranch in western Kendall County. The Edwards Limestone Formation here is a rich source of chert, eroding from hilltops in large nodular form. Patter- and Adams (*ibid.*) attribute two hilltop camp/lithic resource procurement areas to the Late Paleo-Indian period and date seven lower creek terrace sites from Pre-Archaic to the Middle Archaic. Their assignment of these sites to the respective periods is based mostly on differences in size and style in chert blades and debitage and secondly on a very few projectile point fragments. They also suggest that the movement from high lookout campsites to lower riverine camps indicates a change in hunting patterns from Pleistocene megafauna to deer and smaller game animals in the Archaic period. Judge (1973) and others have made similar observations for various parts of North America.

Approximately two miles downstream, Upper Cibolo Creek makes a 180° horseshoe bend to the north around a comparatively flat flood plain atop sheer limestone banks. A survey was conducted behind proposed Floodwater Retarding Structure No. 1 for the USDA Soil Conservation Service (Bass and Hester 1975; Kelly and Hester 1976) from a point one mile upstream to the proposed structure site four miles downstream. A total of 26 archaeological sites were recorded. Two quarry-workshop areas were recognized, one at either end of the survey area. The westernmost site, 41 KE 62, was above the designed flood pool elevation of 1540 feet above mean sea level, and chert nodules eroding from the Edwards Formation were reduced here to quarry blanks and large, crude bifaces. The other, 41 KE 29, was on the proposed structure centerline in a red clay soil atop a Glen Rose Limestone bluff on the north side of the creek. The eroding chert nodules were secondary deposits from the Edwards Formation upstream (C. M. Woodruff, personal communication). The entire process of projectile point manufacture was carried out at this site. *Pedernales* projectile points (Middle Archaic period markers) were found here. The fact that no Middle or Late Archaic period indicators were found anywhere in the productive

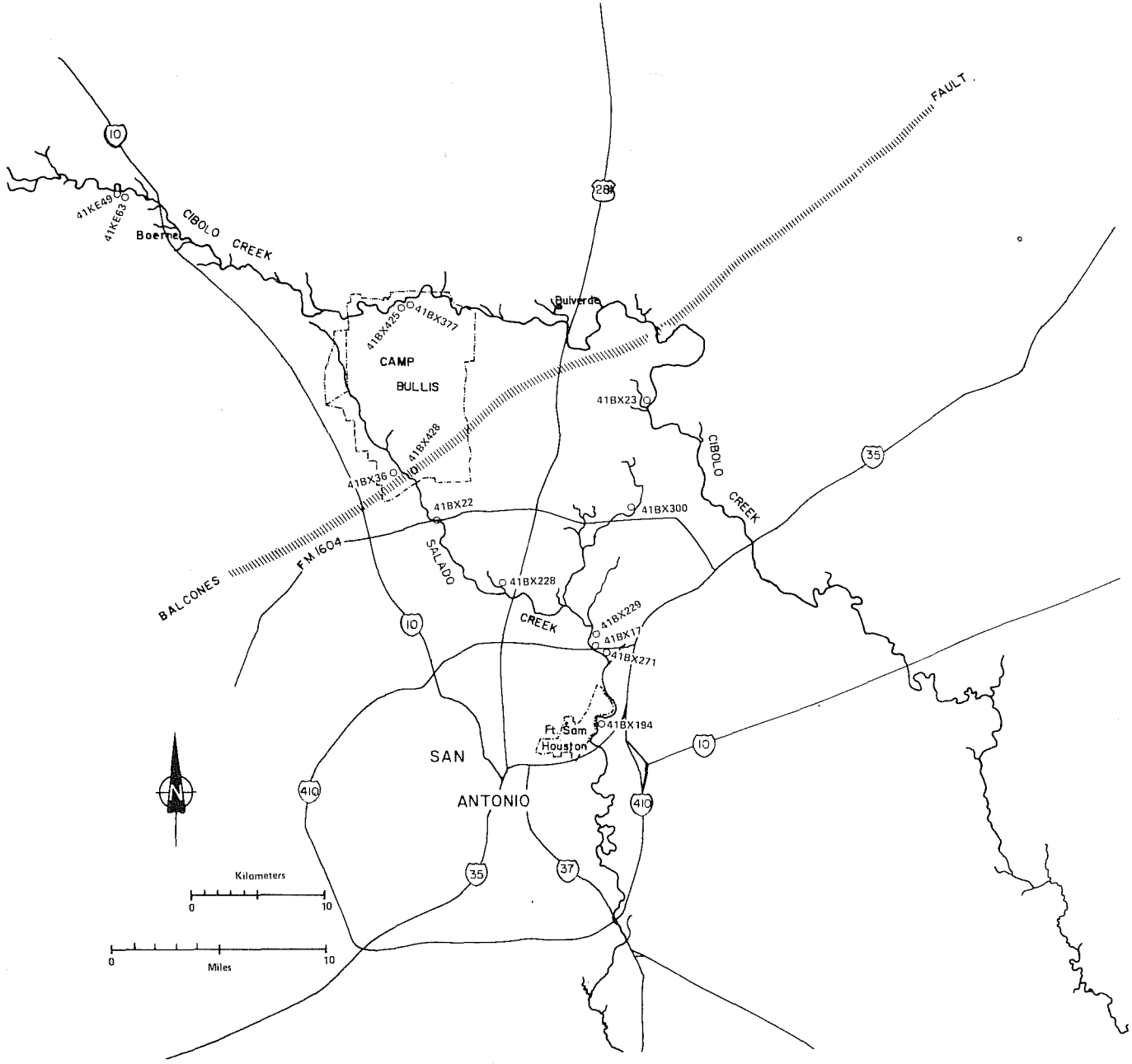

Figure 2. *Major Archaeological Sites, Northern Bexar County.* This map shows the location of major archaeological sites at which previous research had been done. Also shown are sites 41 BX 36, 41 BX 428, 41 BX 425 and 41 BX 377 at Camp Bullis. The approximate location of the Balcones Fault is indicated.

survey area below the design flood pool elevation is speculated to indicate xeric conditions in the Pre-Archaic and Early Archaic periods followed by more mesic conditions for the Middle and Late Archaic periods causing the later people to seek higher, drier campsites.

A similar relationship exists between 41 KE 49 in the oxbow and 41 KE 63, 120 m southeast and 20 feet higher on a ridge. A controlled surface collection and test excavation of 41 KE 49 yielded no diagnostic artifact that could be dated more recently than the Early Archaic. The large base camp was favored during the Pre-Archaic and Early Archaic periods and would probably have been used by later groups unless the habitat had substantially changed.

41 KE 63 was another major campsite subjected to limited testing. This site produced the only evidence of the Late Prehistoric period found anywhere in the survey area. *Perdiz* points and a few plain bone tempered pottery sherds (*Leon Plain*) were found in the top 10 cm of deposits. The two test pits also yielded Late Archaic point types, including *Frio, Ensor, Castroville, Marcos* and *Montell*. The landowner, however, had collected *Angostura, Bell, Early Side Notched, Early Corner Notched, Early Triangular, Travis, Nolan, Bulverde, Pedernales, Castroville, Montell, Marcos* and *Perdiz* points, bone tempered plain pottery and bone awls, as these materials eroded out of the cliff face over many years.

Another probable Middle Archaic feature is an oval burned rock midden (41 KE 60) also located near the western edge of the survey area. This badly damaged midden (13 x 20 m) rises 0.5 m above the surrounding terrace and has a depression two meters in diameter in the middle. It was impossible to tell whether this depression was a functional feature or whether it was a pothole. The midden contained no diagnostic artifacts or debitage and resembles Weir's (1976) Type 2 midden. The function of the burned rock middens of central Texas has not yet been resolved. Following is a partial list of discussions and theories: Kelley and Campbell (1942), Suhm (1959, 1960), Honea (1961), Kelly (1961), Johnson *et al.* (1962), Greer (1965, 1967), Sorrow, Shafer and Ross (1967) Hester (1970b, 1971, 1973) and Weir (1976).

Two small campsites were attributed to the Paleo-Indian period based on the recovery of *Plainview* dart points and associated lithic debitage. 41 KE 52 was on a high ridge above the southwest edge of the bend in the creek, and 41 KE 61 was in a cultivated field on the north side of the creek and at the west end of the area near readily available chert. A heavily patinated *Early Side Notched* point belonging to the Pre-Archaic period was also found on this site.

In general, Paleo-Indian sites were found at elevations above 1540 feet, as were quarry-workshop areas. Pre-Archaic and Early Archaic sites were the most numerous and were found all over the survey area below 1540 feet. Middle and Late Archaic period sites were very poorly represented as was the Late Prehistoric. The local settlement pattern appears to reflect two large base camps and a number of satellite special purpose sites. The two base camps are only 120 m apart and were probably not occupied simultaneously. One is higher and more sheltered than the other and their occupation may have been determined by seasonality or changing climatic conditions.

Cibolo Creek Sites

41 BX 23: The Classen Rockshelter

Archaeologically, Cibolo Creek is unknown from its origin at Upper Cibolo Creek and Ranger Creek west of Boerne to Camp Bullis, and from Camp Bullis to the Classen Rockshelter 17 miles downstream. Fox and Fox (1967) report this rockshelter on the John L. Classen Ranch in northeastern Bexar County. It is located on a stream terrace under a limestone bluff above the junction of West Fork and Clear Fork Creeks with Cibolo Creek. There is a deep hole in the stream bed that may have held water during more mesic times but is now normally dry. Chert is plentiful in nodular form, eroding from the hilltops.

Limited testing at the site produced Middle Archaic, Late Archaic and transitional Late Archaic projectile points. Point types identified were (in the order of their frequency) *Pedernales*, *Castroville*, *Montell* and *Darl*. Photographs accompanying the manuscript also show projectile points that are probably of the *Ensor* and *Frio* types. An associated circular burned rock mound had no cultural material in it. This would seem to be another example of the same kind of midden as 41 KE 60 on Upper Cibolo Creek. 41 BX 23 was noted as being 20 feet above the stream bed and this may be another indicator of mesic conditions causing Middle Archaic and later people to seek higher campsites.

SALADO CREEK AND NEARBY DRAINAGES

Salado Creek originates at the northwest corner of Camp Bullis in the Glen Rose Limestone Formation. It runs south passing east of Camp Bullis Headquarters and west of the "Known Distance Ranges." One-half mile before it exits Camp Bullis it crosses the Balcones Fault and enters the Edwards Limestone. 41 BX 36, the only previously recorded site on Camp Bullis, is on the flood plain and first terrace west of Salado Creek (see Chapter III.A.7).

Salado Creek crosses FM 1604 1.5 miles south of Camp Bullis. Downstream 1.6 miles from FM 1604 the Edwards Limestone Formation is replaced by Quaternary low terrace deposits containing redeposited Edwards cherts from upstream. The creek turns east and crosses Blanco Road one mile north of Churchill High School and enters Walker Ranch.

Panther Springs Creek (which also originates on Camp Bullis) crosses the Walker Ranch from north to south intersecting Salado Creek, just west of West Avenue, the eastern boundary of Walker Ranch. Between the two creeks is a broad flood plain which has been cultivated in the past.

Salado Creek then turns east from its confluence with Panther Springs Creek for 4.5 miles to a confluence with Mud Creek. Salado Creek continues through the terrace deposits until it joins the San Antonio River four miles south of Loop 410 after a circuitous route of 28 miles, the last four miles cut through Quaternary fluviatile deposits.

Sites on Salado Creek and Nearby Drainages

The archaeological sites will be described in order proceeding from the origin of Salado Creek in the northwest corner of Camp Bullis to its confluence with the San Antonio River 28 miles southeast. See Fig. 2 for site locations.

41 BX 36: Previous Investigations

This large midden is the only site previously recorded on Camp Bullis. Despite massive damage for years by relic collectors and more recent destruction by heavy equipment in the construction of sewage settling basins, it is still a potentially valuable archaeological deposit (see III.A.7). The site is 100 m south of Salado Creek on the flood plain and extends up a colluvial slope and shelf. Old aerial photographs indicated that the midden extended into the flood plain for another 25 to 35 m to the north before the settling basins were constructed. The author excavated a 10-foot square unit on the colluvial shelf in 1959 (material on file, CAR-UTSA).

The site was recorded by Thomas R. Hester in 1969 on information provided by Dale Patrick who reported uncontrolled digging in process. Captain Allen Leippe (USAF) donated a surface collection to UTSA in 1974 and reported the site as having been essentially destroyed by construction of the settling basins and by workmen who looted parts of the site during this period. Dr. Hester (personal communication) had only limited success in 1974 in staying the destruction, and the site was finally put off limits by a Department of the Interior Directive in 1976 according to the Camp Bullis Operations Officer. J. C. Townsend (1975) prepared a summary and recorded the artifacts known at that time. Her work has provided most of the basis for this summary of previous activities at the site.

Bison and deer bones were found; one bone had been made into a highly polished and incised fragment of an awl (Fig. 3). *Rabdotus* and other snail shells were present in great quantities. Using a total of 39 documented projectile points, Townsend assigned the midden to time periods from Late Paleo-Indian through Late Prehistoric. Heaviest use of the site was thought to have been during the Middle and Late Archaic periods. There was a single specimen each of *Angostura, Travis, Nolan* and *Bulverde* to represent the Paleo-Indian and Early Archaic periods. Three specimens each of *Montell* and *Marshall*, two *Frio*, two *Ensor-Frio*, one *Ensor* and one *Williams* indicate the presence of Late and Transitional Archaic periods. Two *Martindale* points were present; one was described as patinated and would probably be placed in the *Early Corner Notched* classification of Pre-Archaic age in the present study. The Late Prehistoric was represented by four *Edwards* and four *Perdiz* arrow points.

Bifaces, preforms, cores and flakes made up the balance of the collection studied by Townsend. No interpretations could be offered because the sample was neither collected nor excavated under controlled conditions.

41 BX 22: The Rogers Site

The site has been destroyed by the construction of FM 1604 across Salado Creek, 1.5 miles south of Camp Bullis. The site was located on an alluvial terrace

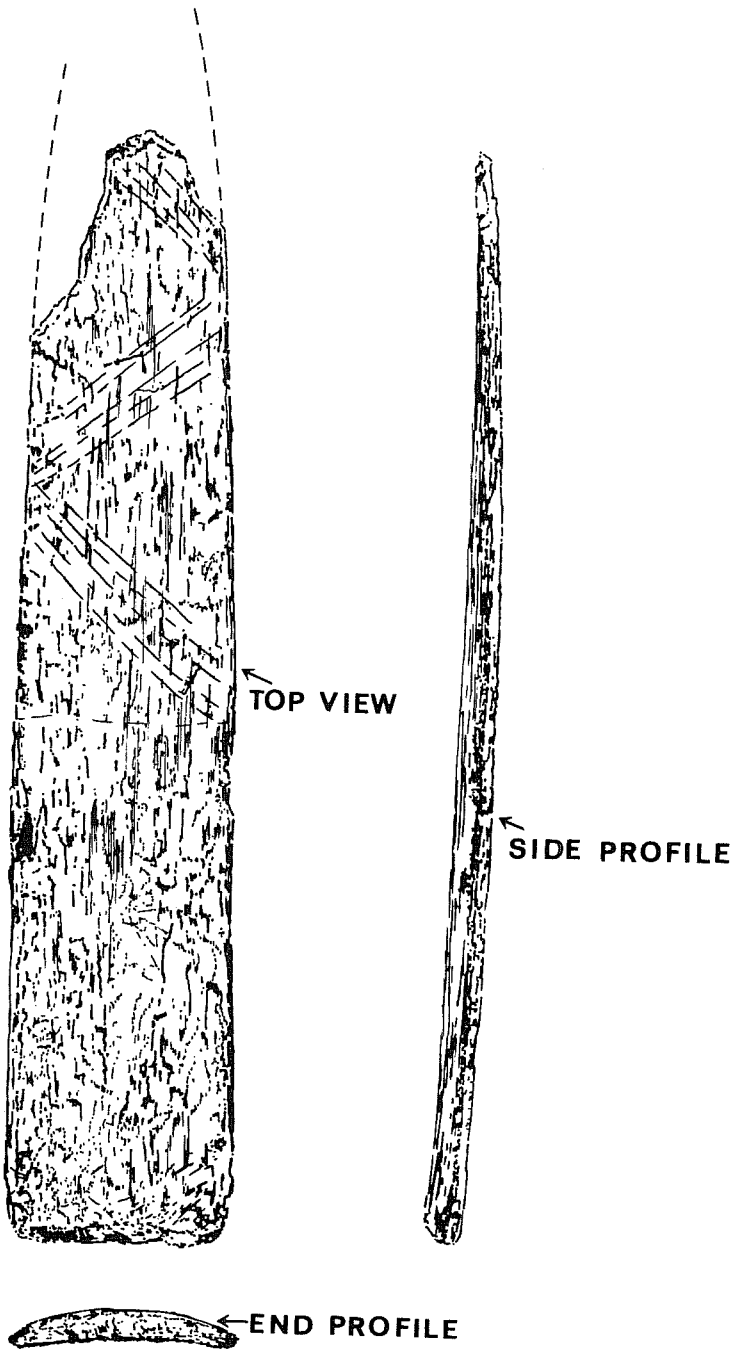

Figure 3. *Illustration of a Bone Tool.* This artifact illustration is taken from the report by Townsend (1975) on 41 BX 36.

adjacent to steep bluffs on the east bank. The locus is at the intersection of two tributary creeks with Salado Creek on the Rogers Ranch. Limited excavations were carried out by a group of young amateur archaeologists and were recorded by Daniel E. Fox (1965, manuscript on file at CAR-UTSA).

Pedernales, Castroville, Montell, Scallorn and *Edwards* projectile points were recovered, representing Middle and Late Archaic and the Late Prehistoric periods. It was noted that caves and rockshelters along the bluff were filled or partially filled with alluvium. It can be speculated that earlier occupations were buried below the levels of this campsite in the eight feet of alluvial deposit recorded in a natural vertical section. Only the upper 30 inches were tested.

Floodwater Retarding Structure No. 3

This flood control basin is located approximately 400 m upstream from 41 BX 22 in some of the most rugged terrain in the Salado Creek drainage. Five sites were located on the stream terraces (Hester *et al.* 1974). Two were small short-term campsites, and two were quarry-workshop areas. The fifth site, 3-3, was on an alluvial terrace in a sharp bend of the creek just above the proposed structure site and is the closest upstream site to the Rogers site, lying about 800 m away. It is a mound-like, oval accumulation of burned limestone rock approximately 0.5 m above the surrounding terrace and approximately 10 x 8 m in surface area. A shovel test during the 1974 survey yielded a few flakes of chert. More recent studies in this locality are reported by Valdez and McGraw (1977).

41 BX 228 and The Walker Ranch

Site 41 BX 228 is a very large site and may represent a series of repeated occupations, covering a large area on a broad flood plain on the east bank of Panther Springs Creek. It is 0.8 miles downstream from a large permanent spring-fed waterhole, and the flood plain on both sides of this waterhole was heavily utilized for aboriginal activities that are still visible despite farming in years past. A total of 36 archaeological sites were recorded on the Walker Ranch in the course of two other surveys (Hudson *et al.* 1974; Hester *et al.* 1974).

41 BX 228 is believed to be one of the most important sites in the survey area and lies within a National Register District on the Walker Ranch. Hudson *et al.* (1974) placed a 1 m^2 unit at the north end of the site, excavating to a depth of 20 cm. They reported projectile points from Archaic and Late Prehistoric periods, bison bone and lithic debris. Kelly (1974) excavated two 1.5 m^2 to a depth of 60 cm. A more recent project conducted by the Center for Archaeological Research in June-July 1977 added five 1 m^2 test pits south of the previous excavations (Jaquier *et al.* 1978). The site was extensively mapped at that time.

The soil is charcoal-stained black humus of the Lewis Silty Clay series. It contained scattered burned rock (but without discernible stratigraphy) to a depth of 45 to 60 cm. It is underlain by yellow gravelly clay followed by

bedded limestone stream gravels to the level of the creek bottom (approximately 4.5 cm below the surface). All three testing phases have indicated traces of the Early Archaic period represented by a few *Nolan* points. The heaviest occupation was during the Middle Archaic represented by *Pedernales* points. The Late Archaic is also well represented by *Castroville, Montell* and *Ensor* points (in that order of frequency). The Late Prehistoric is only sparsely represented by *Edwards, Scallorn* and *Perdiz* points. Thousands of flakes, bifaces, unifaces, cores and other lithics were found. Shells of *Rabdotus* land snails were plentiful throughout the deposits, as were quantities of burned limestone rocks. Cut and broken bone of deer, bison and other species has been subjected to analysis (Jaquier *et al.* 1978).

A large number of sites (36) were found in a comparatively small area (less than 200 acres) nearby. It is probable that there are more sites remaining undiscovered, as large portions of the area are covered with dense vegetation.

*41 BX 300: The Elm Waterhole Site**

41 BX 300 was discovered by an intensive survey behind Floodwater Retarding Structure 13A on Elm Waterhole Creek, a tributary of Salado Creek (Kelly and Hester 1976, Kelly 1976a) and the perimeters were roughly determined by using a mechanical auger. The entire flood plain on which the site lay was in the process of being removed for borrow fill for Floodwater Structure 13A, and the fact that the site still exists is a tribute to close cooperation between archaeologists, the contractor, the Soil Conservation Service and Elgin Steubing, the ranch owner. It is now an "island" surrounded by borrow pits. It has been nominated to the National Register of Historic Places.**

In 1976 the area was tested with 27 1 m^2 test pits by the Center for Archaeological Research, assisted by volunteers from the Southern Texas Archaeological Association and archaeology students from UTSA (Kelly n.d.). These tests indicated at least two distinctive contiguous areas in the site. The southern portion is an oval burned rock midden covering an area approximately 100 m north-south and 55 m east-west. The matrix consists of nearly solid fire-cracked limestone, charcoal-stained clay soil, *Rabdotus* land snails (often in clusters of hundreds), projectile points, scrapers, cores, flakes and chert debitage. The burned rock deposit is without discernible stratigraphy and extends to a depth of one meter. Below are yellow river gravels and stream-rolled cobbles continuing to an unknown depth. The bulk of the datable artifacts belong to the Early Archaic period (*Bulverde, Travis, Nolan* projectile points). A few *Pedernales* points of Middle Archaic age, and *Castroville, Marcos* and *Marshall* of the Late Archaic period were recovered.

North of this burned rock midden the land rises gradually to its highest point at the south bank of an L-shaped waterhole. Tests here indicated intensive occupation. The shallow deposits yielded Late Archaic and Late Prehistoric

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*The USGS Longhorn Quadrangle map lists the creek as Elm Waterhole Creek, but the Bexar County maps label it Long Creek.

**Mitigation of the site was accomplished by the Center for Archaeological Research in early 1978, with funding provided by Interagency Archeological Services.

artifacts (*Frio, Darl, Montell, Edwards* and *Perdiz* projectile points in that order of frequency).

The removal of the borrow fill from the flood plain revealed several other areas of intensive aboriginal activities. *Clear Fork* and *Guadalupe* tools were found 100 m south of the site, and a small burned rock midden was exposed against a steep hillside 75 m west of 41 BX 300. This midden had two *Pedernales* dart points and considerable chert debitage on the surface.

41 BX 300 was strategically located in relation to two major quarry-workshop areas. 41 BX 299 was to the east, just across the creek and above a high rocky bank; there was very little soil cover and much exposed Edwards Limestone. Chert is eroding out of the limestone, and the area was strewn with debitage, broken quarry blanks and crude bifaces. A much larger quarry-workshop, 41 BX 301, is located 250 m west-southwest. Chert nodules with diameters as large as 25 cm are found in this area eroding out of exposed limestone. Numerous individual knapping stations were found where quarry blanks were produced (Katz 1978).

41 BX 229: The St. Mary's Hall Site

Two miles downstream from the confluence of Elm Waterhole, Mud and Salado Creeks is the St. Mary's Hall site. It is located atop a steep bluff on the east bank of Salado Creek. It overlooks a wide valley with a gentle slope on the west side of the creek. It is one of the most important archaeological resources in south-central Texas.

The Paleo-Indian period is well represented in deep yellow caliche gravel deposits by *Plainview, Golondrina* and *Angostura* projectile points and their distinctive preforms. Unifacial scrapers, *Clear Fork* tools, cores and heavily patinated lithic debitage were associated. A single *Folsom* point was recovered from the site in the yellow gravels, but the evidence for a possible occupation during the Folsom period was not found.

The site was excavated by the Southern Texas Archaeological Association in 1974-1975, and was the site of the 1977 UTSA Archaeological Field Course under the direction of Dr. Thomas R. Hester (1978). Above the Paleo-Indian deposits was found a "transitional gravels" unit of Pre-Archaic age. The upper deposits, an extensive midden with scattered burned rock, dated to Late Archaic and Late Prehistoric times. These midden deposits contained burned rock, charcoal-stained soil, bone, snails, chipped stone artifacts and debitage. The Late Archaic is represented by *Montell, Ensor, Frio* and *Ensor-Frio* points. The Late Prehistoric period is best represented by *Edwards* points, although a few *Perdiz* points and *Leon Plain* potsherds were found. A significant portion of the site was completely destroyed by the building of a house and swimming pool across the fence in the southern part of the site. The Haass collection (Cantu *et al.* manuscript) was obtained as the site was destroyed. It contains *Plainview, Golondrina, Meserve* and unidentified Paleo-Indian points as well as numerous Archaic and Late Prehistoric points, cores, bifaces, unifaces, flakes and bone, and shell artifacts.

41 BX 17: The Granberg Site

The Granberg site was located one mile down Salado Creek from 41 BX 229, in the right-of-way for the IH 410 Expressway. It became the scene of something approaching a public brawl in 1962 when the press headlined rich "Indian finds" exposed in a bulldozed water main trench in the highway construction area. There were at that time no laws protecting antiquities on state property in Texas, and literally hundreds of relic collectors overran barricades and fought over "choice" areas. It was only through the most strenuous efforts of Mardith Schuetz, Harvey Kohnitz, a group of spelunkers and others, that any information was salvaged (Schuetz 1966). A "public" area was set aside to placate the pothunters, and the salvage crew was able to sink several test pits with reasonably good control in the week before the contractor finally bulldozed the whole area.

The excavations revealed three stratigraphic units: an upper black humus clay soil; a lower burned rock midden with ashy soil; and a red gravel stratum at the bottom, approximately five feet below surface. Early and Middle Archaic points were predominant in both upper levels, with *Pedernales, Castroville, Travis, Bulverde, Nolan* and *Pandora** points represented in the upper humus soil. *Nolan, Travis, Pedernales* and *Pandora* points were predominant in the burned rock midden stratum. Some Late Archaic points, *Montell* and *Castroville,* were found in both strata. The *Ensor* type point was found only in the upper humus stratum. The skeletal remains of eight individuals were found and attributed to the Late Archaic period. Grave goods included a shell gorget and a few crude bifaces.

41 BX 271: The Granberg II Site

The Granberg II site is on the east bank of Salado Creek south of the IH 410 Expressway on the first terrace above the flood plain. Several test pits were excavated with one extending to a depth of 360 cm (Hester and Kohnitz 1975); 11 strata were defined. The upper strata included a burned rock midden and a transitional stratum (zone III at 50 to 60 cm) in which typical Middle and Late Archaic points (*Pedernales* and *Montell*) were found. The strata from 60 to 360 cm were alluvial sands and gravels, sometimes in a yellow/red clay matrix. Pre-Archaic dart points were predominant in these zones with *Bell, Early Side Notched, Early Corner Notched, Early Triangular* and *Gower* represented. These Pre-Archaic projectile points were found closely associated with a number of *Clear Fork* and *Guadalupe* tools (*ibid.*:22). Four *Guadalupe* tools were found in a "cache" in zone VIII, an occupation floor at 230 cm. In the lowest stratum, zone XI, a chert core was found in large heavy stream gravel.

The Granberg II site has provided the clearest case so far for placement of the *Guadalupe* and unifacial *Clear Fork* tools in the Pre-Archaic period in central Texas (Hester 1976b).

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*In light of present-day lithic knowledge, the *Pandora* type would probably be listed as dart point preforms. They are unfinished, broken, badly step-fractured and generally too heavy for projectile points.

DISCUSSION

In this section, excavated sites along the Cibolo Creek and Salado Creek drainages have been examined to provide a basis of comparison and evaluation of the Camp Bullis survey and tested sites.

The period markers (diagnostic projectile points) are plotted by type and site (Table 3) with four partially excavated Camp Bullis sites added for ready comparison (41 BX 377 and 41 BX 425 on Cibolo Creek; 41 BX 428 and 41 BX 36 on Salado Creek). The sites are listed from left to right in order of the dominant time period, from most recent to oldest. Study of this chart indicates the greater numbers of point styles in the Late Archaic period (10 types), with *Castroville* found on seven sites, *Ensor, Ensor-Frio* and *Montell* found on six sites.

Pedernales points, the major period marker for the Middle Archaic, were found on eight sites, but a check of their total number showed surprisingly few in the area. By contrast, Weir (1976:113) indicates *Pedernales* points as being 33% of all points in the Middle Archaic sites considered in his study of the Central Texas Archaic.

The Early Archaic is best represented by the *Nolan* type, found at six sites. All of the Pre-Archaic points were found on only four sites, and the Late Paleo-Indian points were also found on four sites. There is a clustering of Late Prehistoric and Late Archaic points by site, and the same situation is seen for the Early Archaic and Pre-Archaic.

Major campsites (41 BX 36, 41 BX 300, 41 BX 17 and 41 KE 49) had the greater number of different point types, indicating preference over a long time period for the same camp facilities, probably based on dependable water, readily available limestone (for hearth construction), chert and food sources.

SUMMARY

A series of base camps and possible satellite auxiliary function sites occur in the drainages of Cibolo and Salado Creeks. The base camps were multi-purpose with the entire gamut of aboriginal functions carried out within their spatial limits. Functions identified or hypothesized for satellite sites include: reduction of cobbles to preforms and quarry blanks, projectile point production, food preparation (possibly including special cooking areas for acorns and other plants) and small auxiliary hunting or foraging camps.

Paleo-Indian camps are found on high "overlooks" and ridges and were generally small transient (hunting?) camps. The St. Mary's Hall site (41 BX 229) provides a notable exception as the only known Paleo-Indian base camp in the area. It, too, is on an overlook bluff above Salado Creek.

The Pre-Archaic sites are found at lower elevations closer to water sources and often in locales later used by Early Archaic peoples. However, within the Camp Bullis area, Pre-Archaic sites overlap topographically with Paleo-Indian sites.

TABLE 3. PROJECTILE POINT TYPES BY TIME AND SITE, CIBOLO AND SALADO CREEKS

		41 BX 377*	41 BX 425*	41 BX 22	41 BX 228	41 BX 63	41 BX 36*	41 BX 300	41 BX 428*	41 BX 17	41 BX 229	41 BX 23	41 KE 49	41 BX 271	TOTAL SITES
Late Pre-Historic	*Edwards*	X		X	X		X			X	X				6
	Perdiz		X		X	X	X	X			X				6
	Scallorn	X		X	X		X	X		X					6
Late Archaic	*Castroville*			X	X	X	X	X		X		X			7
	Darl							X				X			2
	Ensor	X			X		X			X	X	X			6
	Ensor-Frio	X			X		X	X		X		X			6
	Frio	X					X	X				X			4
	Kinney						X								1
	Lange									X			X		2
	Marcos	X	X				X	X		X			X		6
	Marshall						X	X							2
	Montell				X		X	X	X	X		X			6
Middle Archaic	*Langtry*						X			X			X		3
	Pedernales		X	X	X		X			X	X	X		X	8
Early Archaic	*Bulverde*							X		X			X	X	4
	La Jita						X						X		2
	Nolan		X		X		X	X	X	X			X		7
	Travis						X		X	X			X		4
Pre-Archaic	*Early Corner Notched*					X	X						X	X	4
	Early Side Notched												X		1
	Early Triangular					X							X	X	3
	Bell												X	X	2
	Gower												X	X	2
	Martindale	X					X								2
Paleo-Indian	*Angostura*						X				X			X	3
	Golondrina										X				1
	Plainview										X		X		2
	Folsom										X				1
Other Diagnostics	Pottery					X					X				2
	Clear Fork tools							X		X	X			X	4
	Guadalupe tools							X						X	2
TOTAL DIAGNOSTIC TYPES		7	4	4	9	5	19	13	3	14	10	7	13	9	

*Camp Bullis Sites

The Middle Archaic is poorly represented throughout the area. There are several indications of a shift to higher elevations after the Early Archaic, possibly indicating a change from xeric to mesic conditions.

The primary change that we can recognize over a long time period was in projectile point styles. The trend was from early large barbless lanceolate to smaller barbed triangular points. These differences may be related to changes in size or type of game hunted.

The Toyah phase of the Late Prehistoric is represented at the same number of sites as the earlier Austin phase, but by less numerous points and only occasional potsherds. This may indicate a decline in population in the region or sampling bias. The latter is more likely, as numerous discrete campsites of the Austin phase are common along Cibolo Creek within the Camp Bullis survey area.

III. A.4

RESEARCH METHODS

Andrea Gerstle, Cristi Assad, Augustine Frkuska and Joel D. Gunn

SURVEY METHODS

Eleven zones were defined prior to the survey; these followed the outlines of existing "military zones" and were designed to avoid conflict between the military schedule and the archaeological survey activities (Fig. 4). For the purposes of the project, these are entirely arbitrary and did not affect the outcome of the sample. These zones were bounded by roads and were partially consistent with the five major drainage basins within the reservation. In the interests of obtaining a *representative* sample of the cultural resources and at the same time most efficiently using the time and personnel available, systematically-spaced transects across all of the zones except for one were surveyed. The one exception is the artillery impact zone, to which only limited access was possible. These transects were oriented either north-south or east-west and placed approximately perpendicular to the drainage and roadway systems. Two purposes were thus served. By crossing the drainage system, the entire range of elevation and topographic variation was crossed with each transect. By walking perpendicular to the roadways, the logistical problems of crew transportation with one vehicle were minimized. The cardinal orientation of the transects allowed the surveyors to follow their compasses; thus only the ends of each transect on the roads were located and flagged prior to the survey. This was quickly accomplished in the vehicle.

The transects were 50 m wide, judged to be the maximum width that a two-member crew could intensively cover. In order to obtain the minimum sample size, the centers of each of the transects were spaced 300 m apart. Three transects, a total of 150 m in width, were surveyed for each km or 1000 m wide strip. Topographic maps showing the locations of the transects are on file at the Center.

The 15% sample of Camp Bullis covered in this manner fulfills the minimum requirements set forth by the Corps of Engineers. This sampling scheme proved to be eminently suitable for covering a large area, maintaining a statistically valid sample and minimizing the problems associated with physically locating random quadrants or other sampling units in hilly, rugged and densely vegetated terrain which is largely inaccessible by vehicle (see Judge *et al.* 1975).

Three survey teams of two persons each were involved in the survey. Two of these teams were walking the transects while the third was surveying additional areas which were not covered by the transects, but which, based on topographic map study, were deemed likely to contain archaeological sites. The 15% representative sample was thus supplemented by additional intensive survey of these selected areas. However, the statistical analysis of data pertaining to site density, frequency of different site types and locational information was restricted in this report to the systematic transect sample.

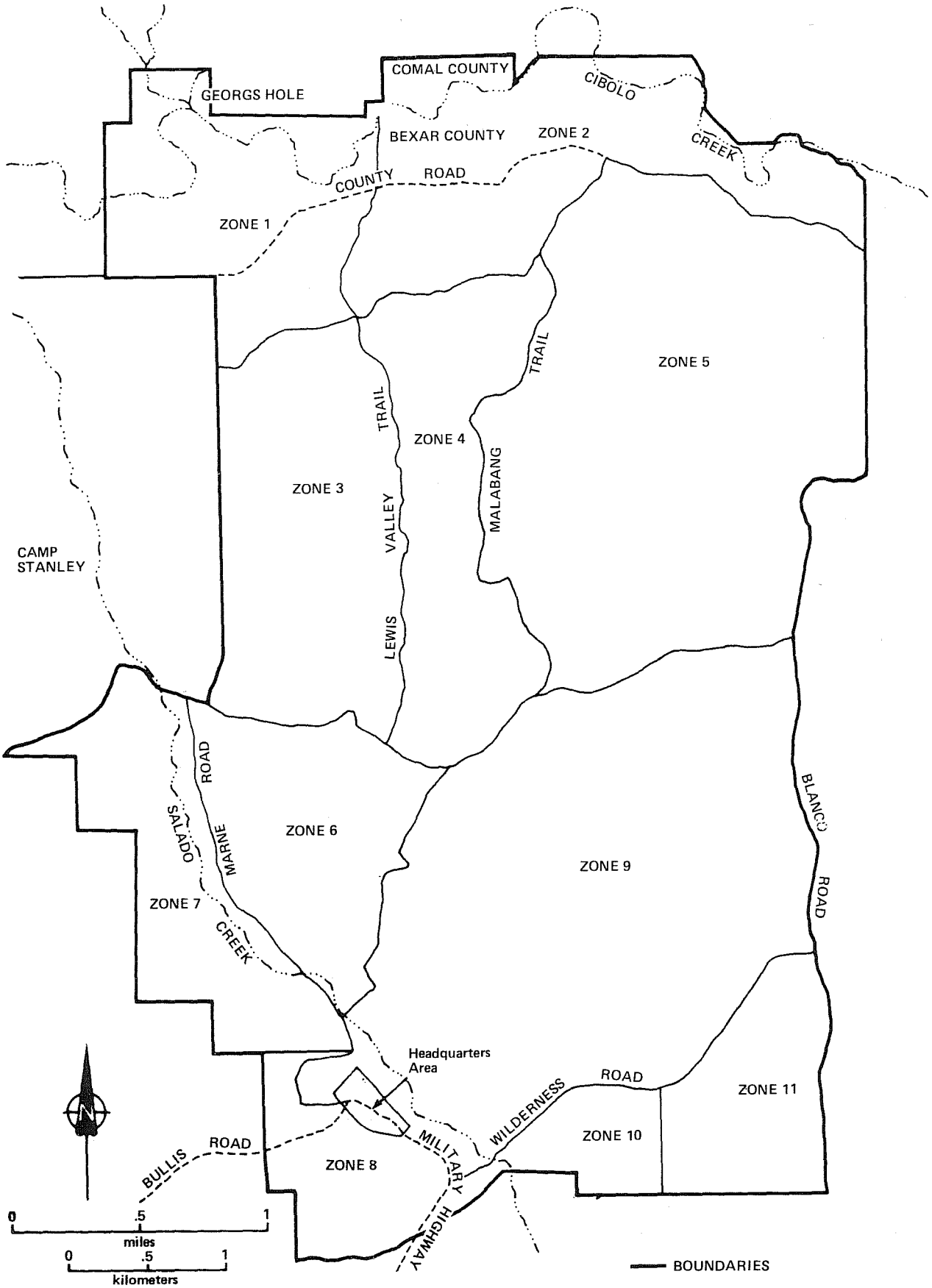


Figure 4. *Camp Bullis, Texas: Survey Zones.* The 11 zones utilized for survey activities are indicated. Also shown are major roads, streams and other landmarks at Camp Bullis.

SITE RECORDING

Two different recording forms were used to record site survey data: a computer coded form and a written form. The purpose and nature of these are described below.

The computer coded form (Fig. 5), designed by Dr. Joel Gunn of The University of Texas at San Antonio, serves to quantify and make consistent certain types of data collected on each site. This allows inter-site comparisons by computer analysis to be carried out. The data recorded on this form is oriented toward inter-site rather than intra-site analysis. Hence, the emphasis is on locational and site contextual information rather than artifact-specific data. As a field form, this is entirely justifiable. Artifact analysis is more accurately carried out in the laboratory and provides a second data set of no less importance.

The second survey form (Fig. 6) is patterned on a project-specific site survey form used by the Center for Archaeological Research and supplements the coded form with specific observations which are unique to each site and cannot be coded in standardized format. This information is used in individual site evaluations and may explain anomalies presented by the computer analysis of the data on the coded form. This uncoded form allows the surveyors to record observations on artifact distribution, configuration of features such as hearths, preliminary evaluation of site function and initial recommendations for future work.

COLLECTION METHOD

In order to minimize artifact collection, yet gain a sufficient sample for laboratory analysis and maintain a fairly consistent procedure from one site to the next, a minimum standard for procedure was established. This included determination of site boundaries and dimensions in the cardinal directions, measuring and completely collecting a 3 m^2 unit in the approximate center of the site and mapping the location of all artifacts collected outside the collection square.

Although it was not feasible in every case to collect a 3 m^2 unit, any area that was 100% collected consisted of one or more 1 m^2 units. This allowed some measure of artifact density to be calculated, a primary reason for standardizing the collection procedure. An indication of the variety of flake and tool types also resulted. The location of the collection area was plotted on a map along with those diagnostic tools found outside of the collection area. Lithic concentrations observed were also mapped and in some cases collected. Thus we have a record of artifact and feature locations within sites and a way of determining the nature of these based on the collections.

EXCAVATION METHODS

Grid Layout

All excavated units and surface collection squares were established on the basis of a grid superimposed on each site. An arbitrary datum labelled

Zero = Missing Data. Comments on Reverse Side. Fill in all blanks.

Temporary Site Designation_____

Date_____

Location

1:1-2 __ Zone No.
2:3-4 __ Transect No.
3:5-11 _____ Site No.
4:12-18 _____ East Coordinate, UTM
5:19-25 _____ North Coordinate, UTM
6:26-30 _____ Elevation (feet)

Components (Field Estimates)

7:31 _ Predominant Occupation (1=Paleo, 2=Early Archaic, 3=Middle Archaic, 4=Late Archaic 5=Neo-Amer., 6=Historic)
8:32 _ Secondary Occupation (see above)
9:33-35 ___ Individual Find (see List I)

Site Location

10:36-37 __ Physiographic Transect (1= Flood Plain, 2=Terrace, 3=Valley Slope, 4=Upland Margin, 5=Upland, 6=Upland Feature)
11:38-39 __ Land Form within 1 mile (see above)
12:40 _ Site Orientation (1=Upon, 2=N. of Feature, 3=E. of Feature, 4=S. of Feature, 5=W. of Feature)
13:41-42 __ Vegetation on site (see List II)
14:43-44 __ Water Source (1=On Site, 2=<100m, 3=<1 km, 4=>1 km)
15:45-46 __ Wildlife in area (see List III)
16:47-48 __ Lithic outcrops (see List IV)
17:49-50 __ Soil type (see List V)

Site Dimensions

18:51-53 ___ Long orientation (degrees E of N)
19:54-56 ___ Length (m)
20:57-59 ___ Width (m)

Density (Site-wide)

21:60 _ Ceramic (1=1-10, 2=10-50, 3=50-100)
22:61 _ Chipped Stone (1=1-10, 2=10-50, 3= 50-100, 4=>100)
23:62 _ Ground Stone (frequency, 9=>9)
24:63 _ Burned Rock (1=scatter, 2=concentrated, 3=midden)
25:64-65 __ # of hearths
26:66 _ Collecting (1=minimal, 2=potholed, 3=destroyed)
27:67 _ Economic activity (1=disturbed, 2= partially disturbed, 3=wholly disturbed)
28:68 _ Erosion (1=undisturbed, 2=partially eroded, 3=wholly eroded)
29:69-70 __ Surveyor

Figure 5. *Computer Coded Field Survey Form.*

Point Types, List I

30:71 _ *Perdiz*
31:72 _ *Scallorn*
32:73 _ *Cliffton*
33:74 _ *Fairland*
34:75 _ *Ensor*
35:76 _ *Marcos*
36:77 _ *Castroville*
37:78 _ *Marshall*
38:79 _ *Frio*
39:80 _ *Uvalde*
40:81 _ *Pedernales*
41:82 _ *Darl*
42:83 _ *Lange*
43:84 _ *Bulverde*
44:85 _ *Travis*
45:86 _ *Bell*
46:87 _ *Martindale*
47:88 _ *Plainview*
48:89 _ *Angostura*
49:90 _ *Golondrina*
50:91 _ Other (_____)*
51:92 _ Other (_____)*
52:93 _ Other (_____)*
53:94 _ Other (_____)*
54:95 _ Other (_____)*

Cores, Tools, Flakes, etc.

55:96 _ Hammerstone
56:97 _ Chunk
57:98 _ Core
58:99 _ Core Fragment
59:100 _ Primary Flake
60:101 _ Secondary Flake
61:102 _ Interior Flake
62:103 _ Final Trimming Flake
63:104 _ Retouched Flake
64:105 _ Heat Spall
65:106 _ Blade
66:107 _ Retouched Blade
67:108 _ Quarry Blank
68:109 _ Chopper
69:110 _ Biface
70:111 _ Side Scraper
71:112 _ End Scraper
72:113 _ Other Scraper
73:114 _ Uniface
74:115 _ Perforator
75:116 _ Graver
76:117 _ Burin
77:118 _ Burin Spall
78:119 _ Denticulate
79:120 _ *Clear Fork* tool
80:121 _ *Guadalupe* tool
81:122 _ Metate
82:123 _ Mano
83:124 _ Ceramics
84:125 _ Glass, Worked
85:126 _ Mussel Shell
86:127 _ Snail Shell
87:128 _ Non-human Bone
88:129 _ Charcoal
89:130 _ Other (_____)
90:131 _ Other (_____)
91:132 _ Other (_____)
92:133 _ Other (_____)
93:134 _ Other (_____)
94:135 _ Other (_____)
95:136 _ Other (_____)

* *Additional Point Types*

91 = *Langtry*
92 = *Edwards*
93 = *Side Notched*
94 = *Gower*
95 = *Early Side Notched*

Figure 5. (continued)

Vegetation, List II

1 - open, grassy fields with clumps of live oak, cedar
2 - above, plus prickly pear and/or yucca/sotol
3 - woods of live oak, hackberry, huisache, cedar, elm
4 - dense cedar, thorny brush, mesquite
5 - cultivated field
6 - cedar and grassland
7 - (2) and (3) combined
8 - (7) plus beargrass and grama
9 -

Wildlife, List III

1 - deer, armadillo, turkey, snakes, rabbit, birds
2 - (1) plus fish (aquatic resources)

Lithic Outcrops - List IV

1 - river cobbles, very fine chert, translucent (Class I)
2 - river cobbles, medium fine chert (Class II)
3 - river cobbles, limey chert/cherty lime (Class III)
4 - slope or hilltop source, Class I, nodular
5 - slope or hilltop source, Class II, nodular
6 - slope or hilltop source, Class III, nodular
7 - slope or hilltop source, Class I, bedded
8 - slope or hilltop source, Class II, bedded
9 - slope or hilltop source, Class III, bedded
10 - sandstone
11 - other (_____)

Soils - List V

1 - predominant limestone bedrock with very thin soil
2 - blackish loamy soil with some depth
3 - reddish clayey soil with some depth, possible chert gravel
4 - yellow caliche gravel; no real soil

Figure 5. (continued)

Date_____

Zone_____Map Name_____Map Coordinates_____

Temporary Site Designation_____Site No._____

LOCATIONAL DETAILS: Distinctive nearby features, including nature of nearest water source.

SITE CHARACTERISTICS: Associations of artifacts with features, distribution of artifact types through site, no. and type of artifact concentrations and content (describe each).

CONDITION OF SITE: Type and extent of disturbance plus notes on how site content and artifact distribution may have been affected.

PRELIMINARY FIELD EVALUATION: Ideas regarding site function, occupation, character of deposits, etc.

RECOMMENDATIONS:

ACTIVITIES OF RECORDER: What was done and how.

PHOTOGRAPHIC RECORDS (roll, exposure #'s)

B&W: Color:

Collection Bags_____ Recorder_____

Figure 6. *Field Survey Form.*

East 1000, North 1000, was established on or to one side of the site. The grid was then measured from the datum and oriented in the cardinal directions. Stakes were placed at one meter intervals in the section of the site to be investigated. The southwest corner served as the datum for the individual 1 m^2(s) in the grid. Their location relative to the site datum was recorded by adding or subtracting the distance north and east to the square from 1000. The choice of the coordinate values E1000 and N1000 rather than East Zero and North Zero ensured that no negative coordinate values would be encountered. This greatly facilitated computer analysis.

Excavation Units

All excavation units were 1 m^2. Excavation levels followed the contour of the present ground surface. Some small "shovel tests" were excavated at many of the sites in order to determine site boundaries and depth of cultural deposits. The soil from these tests was generally not screened.

On some sites (41 BX 36, for example), 2 m^2 blocks were excavated. The purpose of these areas was to extract information from larger horizontal areas. The southwesternmost 1 m^2 of these 2 m^2 blocks served as an excavation "control" unit. These were excavated in 5 cm levels and screened through 1/8-inch mesh screens. The other three units in the block were excavated in 10 cm levels and screened through 1/4-inch mesh screens.

Constant volume soil samples were taken from the southwest corner of each unit (there were a few exceptions when the constant volume samples were taken from another corner due to the occurrence of a feature or abundant rocks). The size of the constant volume samples approximates 20 x 20 x 5 cm for a 5 cm level or 20 x 20 x 10 cm for a 10 cm level.

Excavation Forms

Two types of excavation level forms were used: a computer form developed by Dr. Joel Gunn, Center for Archaeological Research, for computer analysis of excavation units (Fig. 7), and a standard CAR *Unit Level Record* with a gridded continuation sheet for mapping (Fig. 8).

The computer form requests basic information about provenience, depth of level, strata, soil color (from Munsell Chart) and general quantitative information for charcoal, chipped stone (total count), snails and bone. The quantity and volume of all rock (burned and unburned, not including chert or ground stone) were also recorded. The *Unit Level Record* form allowed for more detailed descriptions and the individual recorder's comments.

Photographs were taken of each level, feature and unit profile, and recorded on a photographic log sheet.

Fill all blanks, Zero = Missing data

1_ _ _ _ _ _ _ _ Card-Site #
_ _ _ _ _ _ _ _ Field Number of Substratum Unit

Excavators_____
_____
_____
_____

meters centimeters
_ _ _ _ . _ _ East
_ _ _ _ . _ _ North
_ _ _ . _ _ Depth to Top
_ _ . _ _ Datum
_ _ Thickness

Photo #'s_____
Section #'s_____

_ _ . _ _ Substratum

before excavation
color
_ _ . _ Hue
_ (Y=1, YR=2, R=3)
_ . _ / _ Value and Chroma
_ Constant Volume

_ _ _ _ # Rocks
_ _ _ _ Vol. Rocks

after excavation

_ Consolidation (1= soft, 2= hard)
_ Grain Size (1=silt, 2=sand)
_ Charcoal (1=flecks, 2=C14)
_ Shell (9=>9)
_ _ Chipped Stone
_ Bone (9=>9)
_ Extent of Excavation (0=no, 1=N, 2=E, 3=S, 4=W)
_ Inspected
_ Tagged
_ Mapped
_ _ Day
_ _ Month
_ _ Year

Comments:

Figure 7. *Computer Coded Excavation Level Form.*

Site_____

Project_____

Unit_____Level_____Date_____

Excavators:_____Screen size_____

Description of level/midden (color, composition, contents, etc.)_____

_____

_____

_____

Materials recovered: (a) chipped stone_____

_____

(b) animal bone_____

(c) shell (mussel, land snails)_____

(d) ceramics, metal, glass, etc._____

Artifacts (briefly describe and draw; use reverse if necessary):

Features_____(use separate form for recording features)

Disturbances_____

Photographs_____No. of bags_____

Recorded by_____Field Director's Approval_____

Figure 8. *Standard Unit Level Record.*

LABORATORY PROCEDURE

The laboratory work for this project proceeded concurrently with the field work. As artifacts were brought in, each bag was logged in and the contents washed. Before being catalogued, all lithics, bone, snails and any other items were sorted and counted. All of the artifacts collected were sorted into chipped stone and ground stone categories. The chipped stone was then divided into the following groups: cores, projectile points, scrapers, bifaces (quarry blanks, preforms and finished bifaces), retouched flakes and debitage. The latter group was further subdivided into primary, secondary, interior and "lipped" or biface thinning flakes. Finer subdivisions of tool type were based on the form of the specimens. Each category of artifact was labelled by site number or transect and provenience if from the survey, and by site number, unit and level if from the excavations. The type and quantity of each item was catalogued on standard Center for Archaeological Research *Specimen Inventory Forms* and a computer form (Fig. 9). The information on the computer form was then keypunched onto computer cards in preparation for numerical analysis.

Special analyses were performed on a selected sample of complete and fragmentary lithic artifacts, all identifiable animal bone and on a limited number of constant volume samples which were collected during excavation. Analysis of pollen, soil and snail samples was done in conjunction with the constant volume samples (see III.A.10 and III.A.11).

For the lithic analysis, a special computer form was developed (Fig. 10). The artifacts analyzed included points, bifaces, unifaces, cores and retouched flakes. Information on location, cultural type and time period, color, texture and measurements on length, width, thickness and weight were recorded only for complete specimens of other types. The cultural type list used with this form is presented as Fig. 11. Time did not permit analysis of tool use wear.

The faunal material was sorted into five categories: burned and unburned identifiable bone, burned and unburned unidentifiable bone and worked bone. The identifiable faunal material was sent to Jerry Henderson, Texas Archeological Survey, Balcones Research Center, The University of Texas at Austin, for analysis.

Constant Volume Sample Analysis

Twenty-four constant volume samples were processed for three of the sites excavated (41 BX 36, 41 BX 377 and 41 BX 428). The flotation procedure was as follows (see also Jaquier 1976):

1) A sample measuring 6.5 x 11.5 x 15.5 cm was selected for each 5 cm excavation level (two for each 10 cm level). This was mixed with water in a bucket by gentle agitation.

1-4 - - - - Sequence Number

Point Types

5 - *Angostura*
6 - *Golondrina*
7 - *Plainview*
8 - *Meserve*
9 - *Early Corner Notched*
10 - *Bell*
11 - *Uvalde*
12 - *Martindale*
13 - *Gower*
14 - *Tortugas*
15 - *Nolan*
16 - *Travis*
17 - *Wells*
18 - *Bulverde*
19 - *Langtry*
20 - *Pedernales*
21 - *Marshall*
22 - *Castroville*
23 - *Lange*
24 - *Montell*
25 - *Marcos*
26 - *Williams*
27 - *Darl*
28 - *Fairland*
29 - *Ensor*
30 - *Frio*
31 - *Kinney*
32 - Unidentified/Unfinished Dart Point
33 - *Edwards*
34 - *Perdiz*
35 - *Scallorn*
36 - Unidentified/Unfinished Arrow Point
37 - *Edgewood*
38 - Other

Tools, Cores, Flakes, Miscellaneous

39 - Distal Fragments
40 - Medial Fragments
41 - Miscellaneous Bifacial Fragments
42 - Biface
43 - Uniface
44 - Preform
45 - Quarry Blank
46 - Chopper
47 - Side Scraper

Figure 9. *Computer Coded Laboratory Form.*

48 - End Scraper
49 - Double Side Scraper
50 - Double End Scraper
51 - Ovate Scraper
52 - Circular Scraper
53 - Concave Scraper
54 - End/Side Scraper
55 - Perforator
56 - Graver
57 - Burin
58 - Burin Spall
59 - *Clear Fork* Tool
60 - *Guadalupe* Tool
61 - Hammerstone
62 - Core
63 - Core Fragment
64-65 - - Primary Flakes
66-67 - - Secondary Flakes
68-70 - - - Interior Flakes
71-72 - - Lipped Flakes
73 - Retouched Flake
74 - Blade
75 - Retouched Blade
76-77 - - Chunks
78 - Heat Spall
79 - Metate
80 - Mano

1-4 - - - - Sequence Number
5 - Ceramics
6 - Glass
7 - Glass, worked
8 - Mussel Shells
9-11 - - - Snail Shells
12-14 - - - Non-human Bones
15-16 - - Burned Bone
17-18 - - Metal Items
19 - Charcoal Sample

Figure 9. (continued)

_ _ _ _ _ Sequence No. (1-5)
_ _ Zone No. (6-7)
_ _ Survey Unit/Transect No. (8-9)
_ _ _ _ _ _ _ Site No. (10-16)
_ _ _ _ _ _ _ East UTM (17-23)
_ _ _ _ _ _ _ North UTM (24-30)
_ Survey=1, Excavated=2 (31)
_ _ _ _._ _ East (unit) (32-37)
_ _ _ _._ _ North (unit) (38-43)
_ _ _ Depth (44-46)
_ _ _ Cultural Type (see list) (47-49)
_ Opaqueness (1=translucent, 2=edge translucent, 3=opaque) (50)
_ Color (1=neutral, 2=red, 3=brown, 4=yellow, 5=green, 6=blue, 7=purple (51)
_ Grain (1=very fine, 2=fine, 3=medium, 4=coarse, 5=very coarse) (52)
_ Fired (1=none, 2=crazed, 3=potlidded, 4=fire reddened) (53)
_ _ _ Length (mm) (54-56)
_ _ _ Width (mm) (57-59)
_ _ _ Thickness (mm) (60-62)
_ _ _ _ _ _ Weight (grams) (63-68)
_ Cortex (0=none, 1=<50%, 2=>50%) (69)
_ Time period (70)
_ Flake size (1=>80mm, 2=40-80mm, 3=20-40mm, 4=10-20mm, 5=0-10mm) (71)

Figure 10. *Computer Coded Lithic Analysis Form.*

Point Types

1 - Abasolo
2 - Almagre
3 - Angostura
4 - Bell
5 - Bulverde
6 - Carrizo
7 - Carrollton
8 - Castroville
9 - Catan
10 - Clovis
11 - Darl
12 - Desmuke
13 - Edgewood
14 - Elam
15 - Ellis
16 - Ensor
17 - Ensor-Frio
18 - Fairland
19 - Folsom
20 - Frio
21 - Gary
22 - Golondrina
23 - Gower
24 - Kent
25 - Kinney
26 - La Jita
27 - Lange
28 - Langtry
29 - Lerma
30 - Marcos
31 - Marshall
32 - Martindale
33 - Matamoros
34 - Meserve
35 - Montell
36 - Morhiss
37 - Morrill
38 - Nolan
39 - Paisano
40 - Palmillas
41 - Pandale
42 - Pandora
43 - Pedernales
44 - Plainview
45 - Refugio
46 - San Patrice
47 - Scottsbluff
48 - Shumla
49 - Tortugas
50 - Travis
51 - Trinity
52 - Uvalde
53 - Wells
54 - Williams
55 - Yarbrough
56 - Early Corner Notched
57 - Alba
58 - Bassett
59 - Bonham
60 - Clifftton
61 - Cuney
62 - Edwards
63 - Fresno
64 - Harrell
65 - Hayes
66 - Livermore
67 - Maud
68 - Perdiz
69 - Scallorn
70 - Starr
71 - Talco
72 - Toyah
73 - Turney
74 - Young
75 - Val Verde
76 - Granbury
77 - Early Side Notched
78 -
79 - Unfinished
80 - Unknown

Bifaces

86 - Complete
87 - Distal-Proximal fragment
88 - Medial fragment
89 - Beaked (complete)
90 - Beaked fragment

Figure 11. *Cultural Type List.*

Unifaces

100 - Convex Unilaterally trimmed
101 - Concave Unilaterally trimmed
102 - Bilaterally trimmed (both sides convex)
103 - Bilaterally trimmed (both sides concave)
104 - Bilaterally trimmed (convex and concave)
105 - Unilaterally and End trimmed
106 - Bilaterally and End trimmed
107 - End trimmed
108 - Circular trimmed
109 - Miscellaneous or irregular
110 - Beaked

Blades

120 - Blade
121 - Flake-Blade
122 - Notched Blade
123 - Notched Flake-Blade
124 - Double Notched Blade
125 - Double Notched Flake-Blade
126 - Blade Fragment
127 - Flake-Blade Fragment

Cores

130 - Unidirectional
131 - Bidirectional
132 - Multiplatform
133 - Bifacial
134 - Blade
135 - Flake-Blade

Burins

145 -
146 -
147 -

Clear Fork/Guadalupe Tools

156 - *Clear Fork*
157 - *Guadalupe*

Flake Tools

160 - Convex Retouched Flake
161 - Concave Retouched Flake
162 - Straight Retouched Flake

Ground or Battered Stone

170 - Battered Stone
171 - Metate (complete)
172 - Metate fragment
173 - Mano (complete)
174 - Mano fragment

Bone

180 - Incised
181 - Retouched
182 - Awl

Shell

195 -
196 -
197 -

Miscellaneous

210 - Worked Glass

Figure 11. (continued)

2) A nylon stocking was used as a strainer to skim the light fraction (floating material) and a 1/16-inch mesh screen was used to collect the heavy fraction (the material remaining in the bottom of the bucket).

3) After drying, both the light and the heavy fraction were sorted for lithics, bone, seeds, snails and other foreign items, e.g., glass fragments.

The information resulting from this analysis, also coded on computer forms (Fig. 12), may be used as a "control" for comparing the levels of a given excavation unit.

The constant volume samples also provided the material for a pollen analysis by Philip Dering, Department of Anthropology, Texas A & M University, College Station, Texas; and a soil analysis by the Agricultural Extension Service, Texas A & M University. The smaller snail species were identified by John Clark, Texas Historical Commission, Austin, Texas, enabling evaluation of their significance in terms of past environments (see III.A.10 and III.A.11).

MAPPING TECHNIQUES

The mapping phase of site recording was correlated with the testing phase of the project. The sites were mapped using the following equipment: the English-made Crowley Automatic Level, a stadia rod, a 30-meter tape and a Brunton compass. These were chosen because of mobility of the instruments and rapid operation time.

A temporary bench mark was chosen on the site where the Crowley level was set up. The fixed position of the level established a horizontal plane over the temporary bench mark. A distance was measured out from this point and the degrees from north were sighted back to the level with the Brunton compass. The elevation of the point was read when the horizontal piece on the stadia rod was moved vertically until it reached the horizontal plane. This allowed the stadia person to read the elevation at any point in a 360° radius around the bench mark. The points were tied onto a base map by triangulation. Whenever vegetation was too dense for direct observation, a traverse was used with the Brunton compass and a 30-meter tape.

All sketches and notes were made in the field and drafted in the laboratory. The maps provide topographic information, intra-site artifact relationships, water-site correlations and, at times, inter-site relationships between nearby sites.

1-4 ---- Sequence Number

Light Fraction

5-6 -- Seeds
7-8 -- Snails
9-10 -- Animal Bone
11-12 -- Charcoal
13-14 -- Other

Heavy Fraction

15 - Chert Artifacts
16 - Primary Flakes
17 - Secondary Flakes
18-20 --- Interior Flakes
21 - Retouched Flakes
22-23 -- Chunks
24 - Heat Spalls
25 - Other

26-27 -- Historic Items (glass, metal, etc.)
28-29 -- Burned Seeds/Frags
30-31 -- Seeds/Frags
32-33 -- Identifiable Bone
34-35 -- Identifiable Bone - Burned
36-38 --- Unidentifiable Bone
39-40 -- Unidentifiable Bone - Burned
41 - Other Bone

42-43 -- *Rabdotus sp.*
44-45 -- *Polygyra sp.*
46-47 -- *Helicina orbiculata tropica*
48-49 -- Snail #1 *Polygyridae* juv.
50 - Snail #2A *Pupoides modicus* (Gould)
51-53 --- Snail #3 *Rabdotus sp.* juv.
54 - Snail #4 *Succenia grosvenois* (Lea)
55-57 --- Burned Snail Fragments
58 - Mussel Shell Fragments
59-60 -- Charcoal Fragments
61-62 -- Other
63-64 -- Snail #2B *Vertigo oscarina* (Sterki)
65-66 -- Snail Fragments (per 5 dram vial)

SNAIL FRAGMENT MEASUREMENTS

1 = 2 full 5 dram vial or more
2 = 1 full 5 dram vial or more
3 = 3/4 full 5 dram vial or more
4 = 1/2 full 5 dram vial or more
5 = 1/4 full 5 dram vial or more
6 = less than 1/4 full 5 dram vial

Soil

1-4 ---- Sequence Number

5-6 -- pH
7 - Nitrate lb/A
8-10 --- Phosphorus
11-14 ---- Potassium
15-17 --- Organic Matter

Figure 12. *Constant Volume Samples.*

III. A.5

OBSERVATIONS ON CHRONOLOGY AND PROJECTILE POINT TYPOLOGY

Thomas C. Kelly and Andrea Gerstle

CHRONOLOGICAL BACKGROUND

Camp Bullis, located in south central Texas, is situated in the center of a region of rather intensive recent archaeological research. In spite of this, the cultural chronology of the area has not yet been clearly defined and, in fact, has been outlined in only the broadest of terms which have as yet only general temporal boundaries.

In their review of central Texas prehistory, Suhm *et al.* (1954) divided the regional cultural framework into the Paleo-American (Paleo-Indian), Archaic, Neo-American (Late Prehistoric) and Historic stages. The stages were thought of not only as changes in projectile point sequences, but were also thought to mark a series of changes in economic development, population and site characteristics (Suhm *et al.* 1954:22). The Paleo-American (Paleo-Indian) stage was represented by distinctive projectile points, particularly *Angostura*, *Plainview* and *Clovis*; age estimates were not provided, although the occurrence of *Folsom* points possibly associated with fossil bison at Kincaid Rockshelter (*ibid.*: 101-102) indicated a late Pleistocene date for at least part of this stage. The central Texas Archaic was labeled as the "Edwards Plateau Aspect"; no smaller components (i.e., foci) were defined, although the writers did review earlier concepts of the Archaic as published by J. E. Pearce, E. B. Sayles, Cyrus Ray and J. Charles Kelley (cf. Suhm *et al.* 1954:106). The time span for the Edwards Plateau Aspect was guessed to be from ca. 4000 or 5000 B.C. to A.D. 1000. The Neo-American (Late Prehistoric) stage was also not subdivided, with these late cultural manifestations lumped under the "Central Texas Aspect," ranging in age from ca. A.D. 500-800 to A.D. 1500. The Historic stage proposed by Suhm *et al.* (1954:117) includes Spanish mission sites and identified historic Indian villages.

A later review of central Texas chronology was published by Suhm (1960). Certain changes were offered in the chronological framework. The earliest occupations (Paleo-Indian) were described as beginning in late Pleistocene times and lasting until about 4000-5000 B.C. Following the Paleo-Indian period was the Edwards Plateau Aspect (Archaic), lasting until approximately A.D. 500-1000. The subsequent Central Texas Aspect was divided into two foci: Austin and Toyah (see also Jelks 1962). This period ends with the arrival of Europeans in the Historic era.

Further chronological research at Canyon Reservoir in Comal County, south central Texas, led Johnson *et al.* (1962) to propose a further refinement of the regional culture history, based largely on changes in projectile point styles. This sequence generally follows that of Suhm (1960), with Paleo-Indian, Archaic and Neo-American stages. Within the Archaic stage, Johnson *et al.* (1962; Fig. 45) defined four periods: Early, Middle, Late and Transitional. The Neo-American stage was divided into two parts: the Austin Focus and the Toyah

Focus. Absolute dating for the temporal units within this chronological framework was not available.

In addition to cultural sequences based on the above terminology, several authors have proposed new methods of dividing and identifying periods in central Texas prehistory. One such sequence comes from the Stillhouse Hollow Reservoir basin to the north of Austin (cf. Sorrow *et al.* 1967; Fig. 72). Their chronological framework consists of ten "local phases." Phases I and II are the equivalent of the Paleo-Indian period and are guess-dated at "7000 B.C. or older to 6000 B.C." "Local phases" III and IV represented cultural materials later termed the "Pre-Archaic" by Sollberger and Hester (1972); Sorrow *et al.* (1967) estimate the time span for these three phases at 6000-3500 B.C. "Local phase" V is the equivalent of the Early Archaic of Johnson *et al.* (1962), and has temporal boundaries of 3500-2000 B.C. "Local phase" VI equates with the Middle Archaic (2000-1000 B.C.), VII with the Late Archaic (1000 B.C. - A.D. 1), and VIII with the Transitional Archaic (A.D. 1-500). Finally, "local phase" IX is typical of the Austin Focus (A.D. 500-1200), and X is characteristic of the Toyah Focus (A.D. 1200-1500).

In a quantitative comparison of projectile point types from central Texas and southwest Texas, Johnson (1967) has defined five periods in the aboriginal occupational sequence. Johnson's Period I is equivalent to the Paleo-Indian period, Period II is the same as the Pre-Archaic, Periods III and IV comprise the Archaic, and Period V can be equated with the Late Prehistoric. This chronology has not gained wide acceptance, as it is not based entirely on central Texas materials. Its goal was not to determine differences within the central Texas assemblages, but to point out the distinctions between assemblages from central and southwest Texas.

More recently, Weir (1976) has redefined the Central Texas Archaic in terms of five consecutive phases, each designed to correspond to different characteristic tool assemblages resulting from cultural adaptive responses. This innovative study has generated much discussion, and may or may not prove to be a more accurate representation of the culture history of the area. The five phases are described by Weir according to their lithic assemblage components and inferred subsistence/economic patterns. The proposed sequence and phase characteristics have yet to be tested with independent data.

Drawing on all of this previous research, we have used the following chronological framework in the analysis of data from Camp Bullis sites: Paleo-Indian; Pre-Archaic; Early, Middle and Late Archaic; Transitional Archaic; and Late Prehistoric (divided into the Austin and Toyah phases). In Table 4, we have indicated the diagnostic time markers for each of these periods and have listed applicable radiocarbon dates from central and southwestern Texas. In addition, our chronological sequence is compared with those described above in Table 5.

PROJECTILE POINTS

Most of the dart and arrow point types collected during the field work at Camp Bullis have been extensively defined and exhaustively discussed in the regional literature. Thus, we have not prepared detailed artifact descriptions for

TABLE 4. CAMP BULLIS PROJECTILE POINT CHRONOLOGY

Time	Period	Phase	Point Type	Applicable C-14 Dates	Source Site for C-14‡
1600	Late Prehistoric	(Toyah Phase)	*Perdiz*	1561, 1291, 1276	Kyle
1200		(Austin Phase)	*Scallorn*	971, 801, 557	Kyle
900			*Edwards*	1040, 990, 960	La Jita
600	(Transitional)		*Darl*	650, 470	Loeve-Fox
	Late Archaic		*Edgewood* *Ensor* *Frio*	650, 380, 280, 260, 40BC, 20BC	Loeve-Fox
AD / BC			*Montell*	460, 490, 360	La Jita Arenosa*
			Marcos *Castroville* *Marshall*	360, 560, 830, 860	Bonfire*
1000	Middle Archaic		*Langtry*	1620	Oblate
			Pedernales	1100, 1360, 1620, 2130	Arenosa*
2000	Early Archaic		*Bulverde* *Travis* *Nolan* *La Jita*	2150, 2480, 2840, 2500, 2630, 2990	Arenosa*
3500	Pre-Archaic		*Gower* *Martindale* *Early Corner Notched*	3400, 3600, 4100, 4160, 5290, 6330, 6590, 6810	Eagle Cave* Hinds Cave*
5500			*Early Side Notched*	6830	Devil's Mouth*
7000	Paleo-Indian		*Angostura* *Plainview*	5400	Levi Rockshelter

AD / BC

*These are sites in the Trans-Pecos area. There are no central Texas dates available.
‡C-14 dates are included as general chronological indicators for a given time period.

TABLE 5. PROPOSED CHRONOLOGICAL SEQUENCES

Time AD/BC	Suhm *et al.* 1954	Suhm 1960	Johnson *et al.* 1962	Sorrow *et al.* 1967	Johnson 1967	Weir 1976	Camp Bullis
1500		(Toyah)	(Toyah)	Phase X			(Toyah)
1200	Central Texas Aspect	Central Texas Aspect	Neo-American		Period V	Late Prehistoric	Late Prehistoric
900		(Austin)	(Austin)	Phase IX			(Austin)
						Twin Sisters	
500			Transitional Archaic	Phase VIII	Period IV		Transitional Archaic
A.D. / B.C.							
			Late Archaic	Phase VII		San Marcos	Late Archaic
1000	Edwards Plateau Aspect	Edwards Plateau Aspect					
			Middle Archaic	Phase VI	Period III	Round Rock	Middle Archaic
2000							
			Early Archaic	Phase V		Clear Fork	Early Archaic
3500					Period II		
				Phase III & Phase IV		San Geronimo	Pre-Archaic
5500							
	Paleo-American	Paleo-American	Paleo-Indian	Phase I & Phase II	Period I	Paleo-Indian	Paleo-Indian
8000							

these types. Tables 6 and 7 contain descriptive and distributional data (see also III.A.6), and representative examples of these types are found in Figs. 13-17. These previously defined types (cf. Suhm, Krieger and Jelks 1954; Suhm and Jelks 1962; Johnson *et al.* 1962; Sorrow *et al.* 1967; Hester 1971) include: *Nolan*, *Travis*, *Bulverde*, *Wells*, *Tortugas*, *Pedernales*, *Langtry*, *Marshall*, *Marcos*, *Kinney*, *Castroville*, *Montell*, *Ensor*, *Edgewood*, *Ensor-Frio*, *Frio*, *Darl*, *Uvalde*, *Scallorn*, *Perdiz* and *Fresno*. In addition, there were several unclassifiable specimens that could not be placed in meaningful groups; these are illustrated in Fig. 17.

We have chosen to devote our descriptive efforts to several tentative or poorly-known types (e.g., *La Jita*, *Edwards*) and to points representing the Paleo-Indian and Pre-Archaic period. There is a lack of description for Paleo-Indian specimens in the regional literature, and the typological problems that exist in the present definitions of the types of points representing the Pre-Archaic period dictate that they, too, received detailed attention.

Paleo-Indian Projectile Points

Plainview (2 specimens; Fig. 18,k)

One specimen is a basal fragment 25 mm long, 20 mm wide and 6 mm thick. It has horizontal flaking scars, as well as ground edges and base; basal concavity is 4 mm deep. The base has been thinned with a large flake removed from either side and is almost fluted. This latter attribute is the only variation from the type site *Plainview* points described by Knudson (1973). The Center for Archaeological Research Computerized Classification Program (Kelly 1976b) places it securely within the *Plainview* category. The specimen has a heavy white patina and is made of fine quality chert.

This *Plainview* point, found at site 41 BX 391, is derived from an upland meadow overlooking the Muesebach Creek drainage. Erosional wash over centuries has exposed scattered points (*Bulverde* and *Ensor-Frio*), preforms, cores, bifaces of several types, scrapers and scattered flakes over a considerable area. A few of the flakes were found with the same degree of patination as the *Plainview* point.

A second small basal fragment was recovered from the surface of 41 BX 408, a camp site located on a stream terrace. Other artifacts from the site include a *Pedernales* fragment, an end scraper and preforms.

Meserve (1 specimen; Fig. 18,j)

The specimen is 79 mm long, 21 mm wide at the base, 8 mm thick and has a slight basal concavity. The blade has been reworked at some time later than its original manufacture, as a lesser patina is evident on the blade than on the base. The more recent flaking was on one face only, producing beveled edges. Beginning approximately 10 cm below the tip, both blade edges have been nibbled and polished by heavy wear for 31 mm. Some form of boring action is indicated. It has been suggested that *Meserve* points may have been reworked *Plainview*

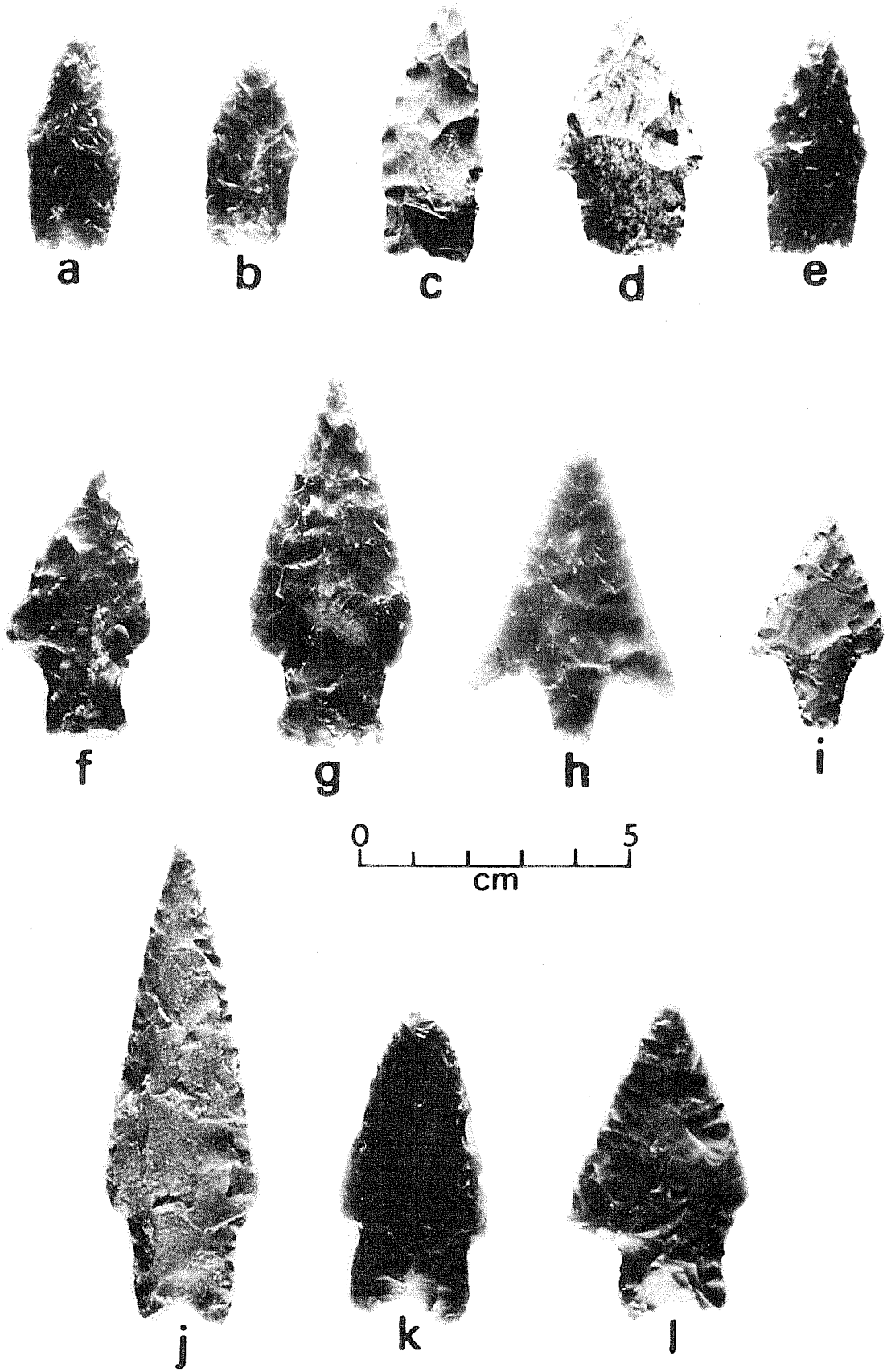


Figure 13. *Lithic Artifacts from Camp Bullis: Dart Points.* a,b, *Travis* (a, 41 BX 36; b, Zone 1); c-e, *Bulverde* (c, 41 BX 400; d, 41 BX 388; e, 41 BX 403); f,g, *Nolan* (41 BX 36); h,i, *Langtry* (h, 41 BX 36; i, 41 CM 100); j-l, *Pedernales* (41 BX 36).

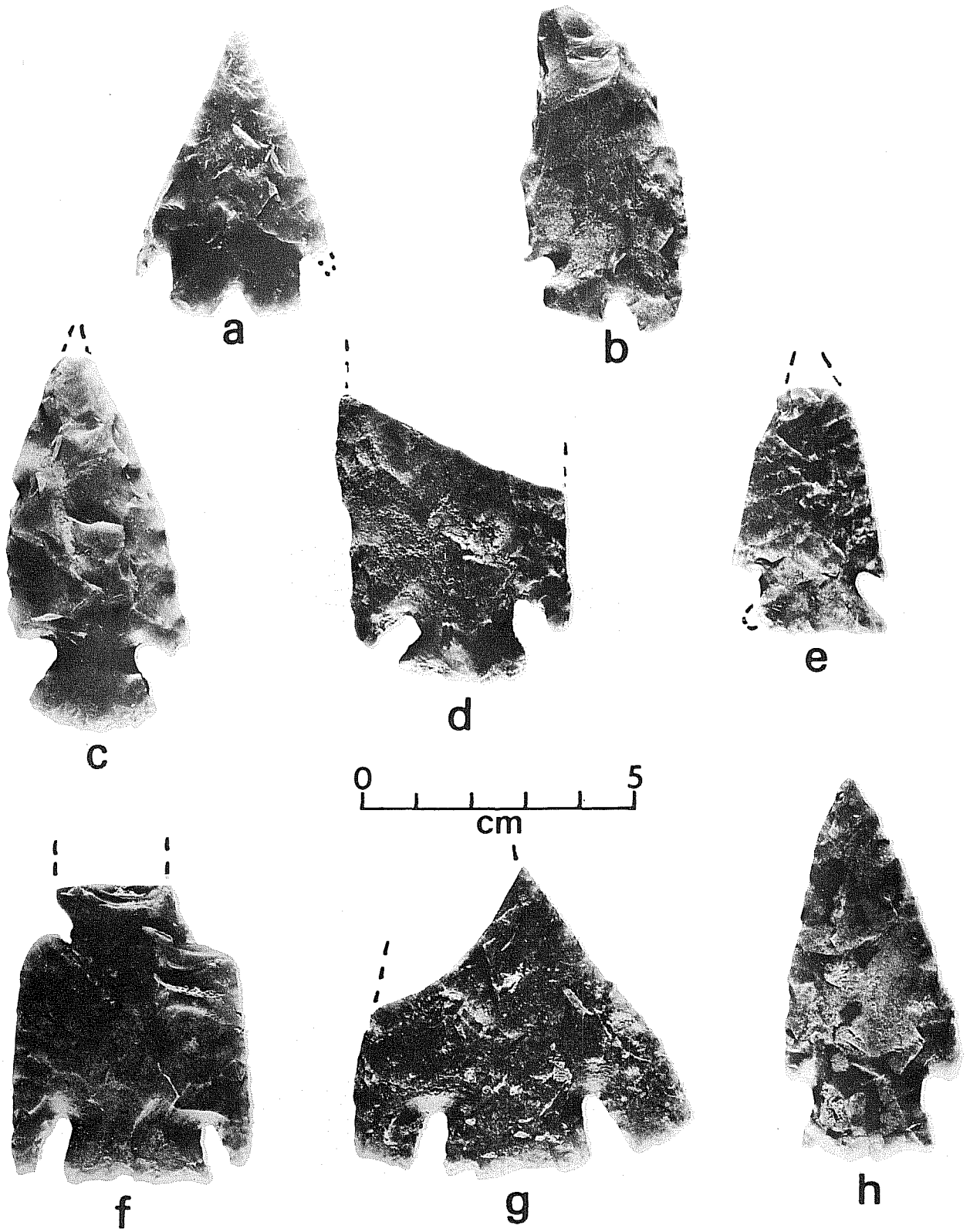


Figure 14. *Lithic Artifacts from Camp Bullis: Dart Points.* a,b, *Montell* (41 BX 36); c-e, *Marcos* (c,d, 41 BX 36; e, 41 BX 425); f-h, *Castroville* (41 BX 36).

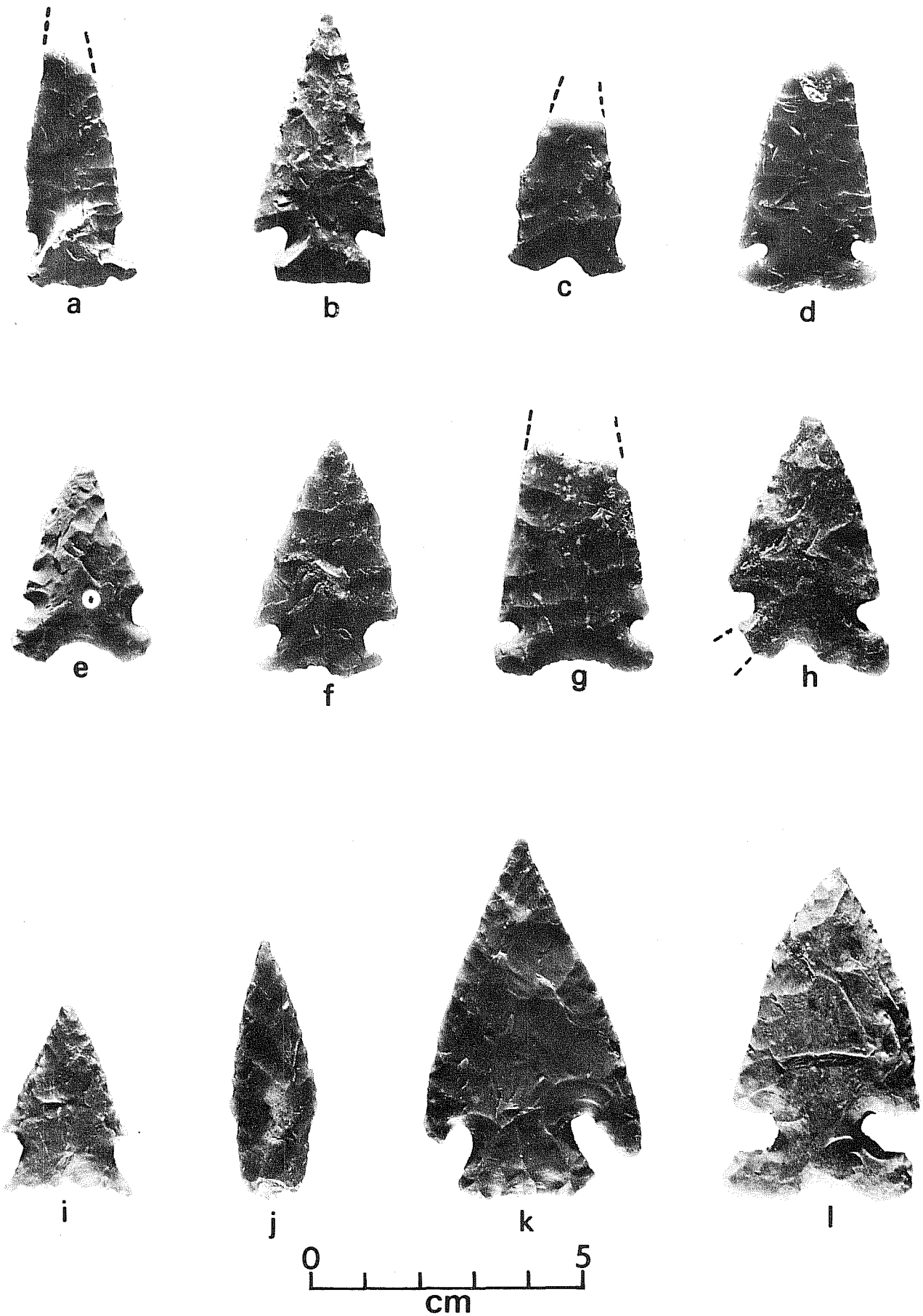


Figure 15. *Lithic Artifacts from Camp Bullis: Dart Points.* a-b, *Ensor* (a, 41 BX 36; b, 41 BX 377); c-d, *Frio* (41 BX 36); e-h, *Ensor-Frio* (e,g,h, 41 BX 377; f, 41 BX 36); i, *Edgewood* (41 CM 99); j, *Wells* (41 BX 428); k, *Marshall* (41 BX 36); l, *Big Sandy*-like (41 CM 96).

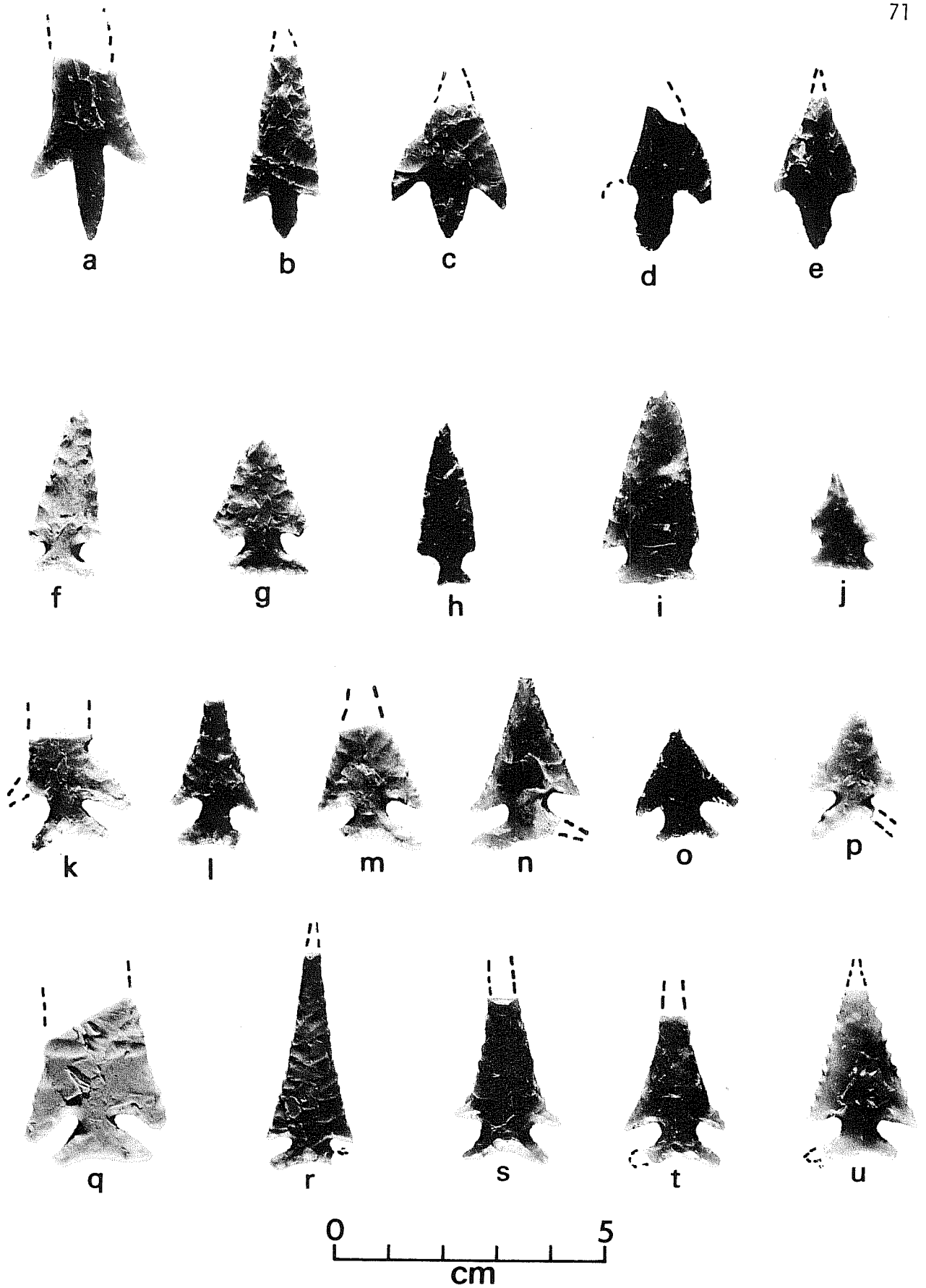
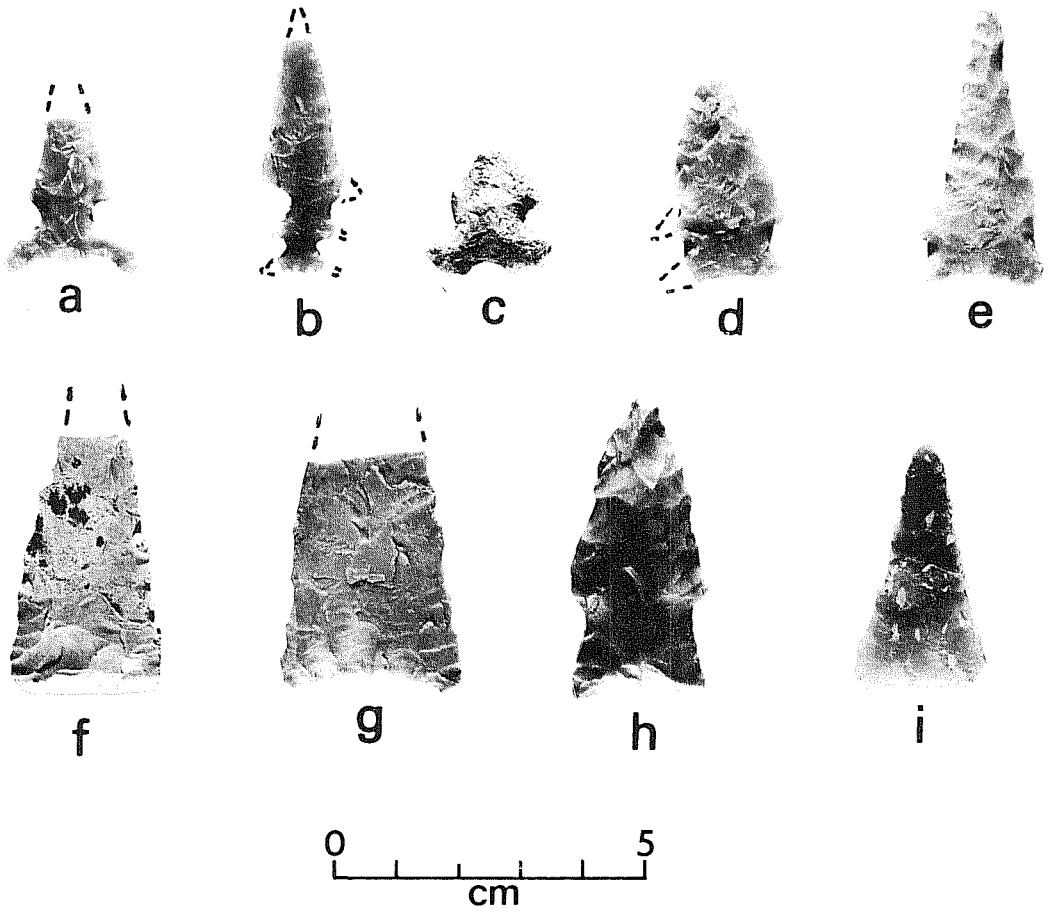


Figure 16. *Lithic Artifacts from Camp Bullis: Arrow Points.* a-e, *Perdiz* (a, 41 BX 425; b-e, 41 BX 36); f-j, *Scallorn* (f, 41 BX 400; g, 41 BX 379; h,j, 41 CM 99; i, 41 BX 36); k-u, *Edwards* (k,n,o,q,t,u, 41 BX 36; l,m, 41 BX 377; p, 41 BX 383; r, 41 BX 379; s, 41 BX 385.

Figure 17. *Lithic Artifacts from Camp Bullis: Dart and Arrow Points.* a-e, unclassified dart and arrow points (a, 41 BX 426; b, 41 BX 383; c, 41 BX 377; d, 41 BX 387; e, 41 BX 36); f, *Tortugas* (41 BX 402); g, *Kinney* (41 BX 36); h, *Darl* 41 BX 409); i, *Fresno* (41 BX 36); j-m, *Gower* (j, 41 BX 403; k, 41 BX 409; l, 41 BX 402; m, 41 BX 376); n-p, *La Jita* (all from 41 BX 36).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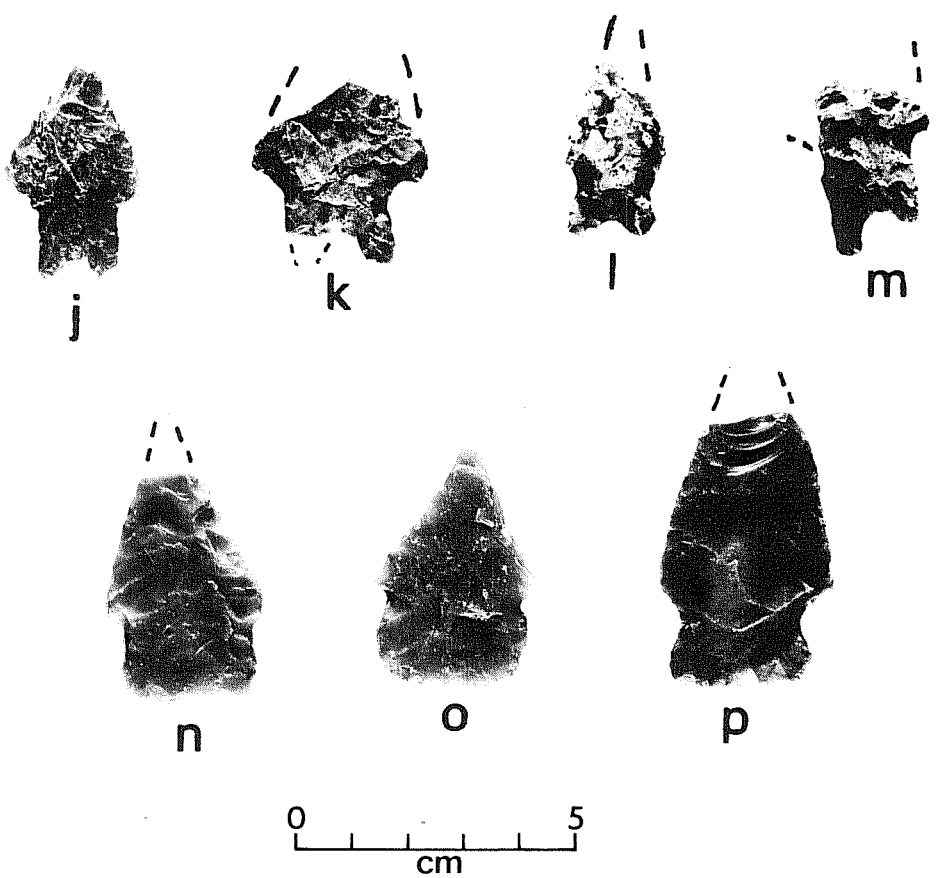
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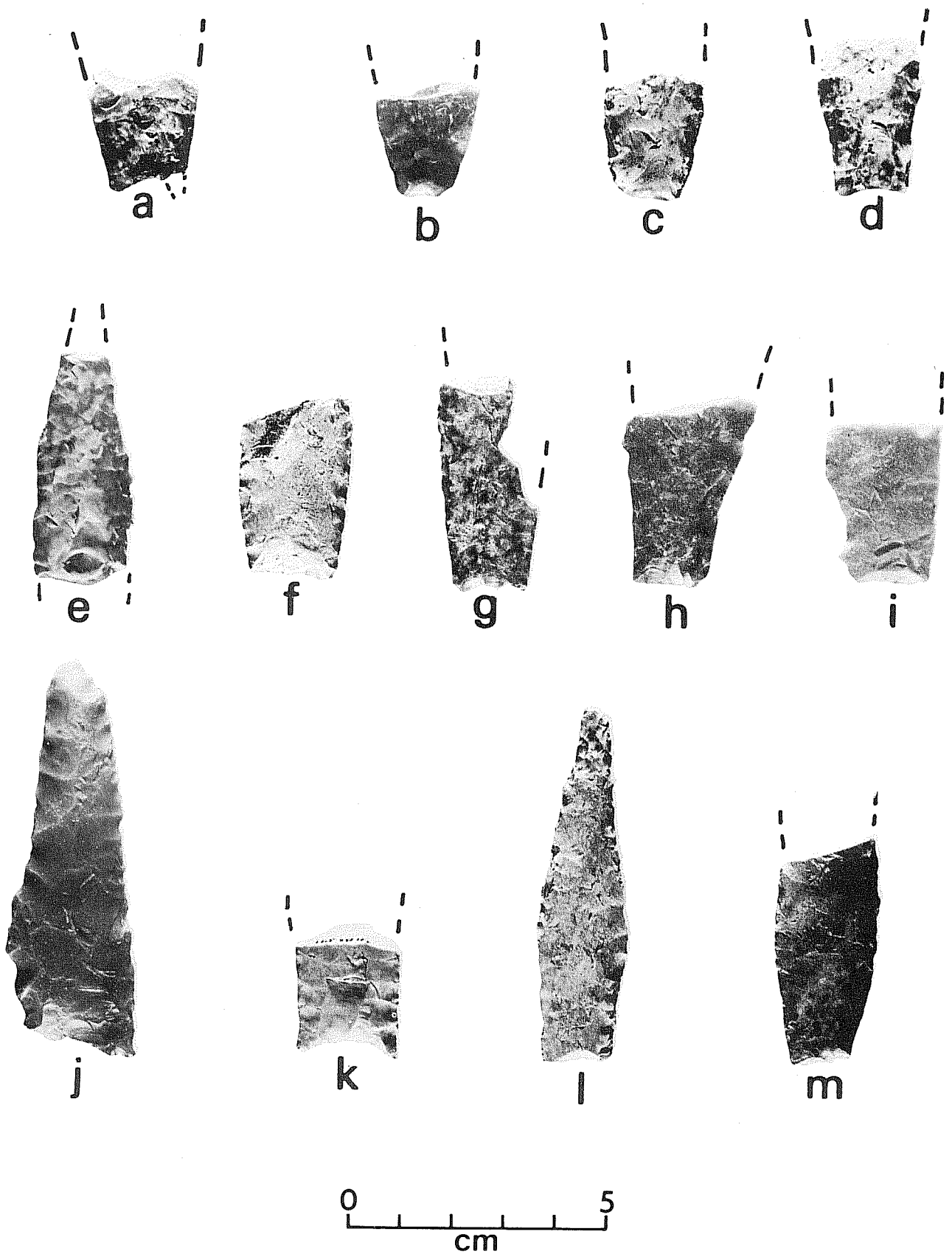

Figure 18. *Lithic Artifacts from Camp Bullis: Paleo-Indian Dart Points.* a-i,l,m, *Angostura* (a, 41 BX 381; b, Zone 4; c, Zone 8; d,g,h, 41 BX 424; e, 41 BX 403; f,m, 41 BX 376; i, 41 BX 373; l, 41 BX 36); j, *Meserve* (41 BX 36); k, *Plainview* (41 BX 391).

TABLE 6. PROJECTILE POINT TYPES AND DIMENSIONS

Point Type	Abs. Freq.	Rel. Freq. (%)	Number Complete Points	Length (mm)* Avg.	Length (mm)* Stand. Dev.	Width (mm)* Avg.	Width (mm)* Stand. Dev.	Thickness (mm)* Avg.	Thickness (mm)* Stand. Dev.	Weight (gms)* Avg.	Weight (gms)* Stand. Dev.
Late Prehistoric											
Edwards	42	19.7	21	27.8	7.5	17.8	4.5	3.7	0.6	1.4	0.4
Fresno	1	0.5	0	--	--	--	--	--	--	--	--
Perdiz	20	9.4	11	29.3	6.9	16.3	4.0	2.8	0.8	1.2	0.5
Scallorn	19	8.9	12	29.8	7.4	15.7	7.7	3.8	0.5	1.6	0.4
Late Archaic											
Castroville	6	2.8	2	67.5	5.0	36.5	5.0	6.5	0.7	15.1	2.8
Darl	1	0.5	1	49.0	--	22.0	--	8.0	--	9.9	--
Edgewood	2	0.9	1	28.0	--	23.0	--	5.0	--	2.3	--
Ensor	8	3.7	5	43.8	3.9	24.8	6.7	5.8	0.8	5.6	2.1
Ensor-Frio	11	5.2	9	41.2	7.1	26.2	2.8	6.0	1.2	5.2	2.3
Frio	9	4.2	5	40.0	12.0	23.6	4.5	5.0	0.7	4.7	2.4
Kinney	1	0.5	0	--	--	--	--	--	--	--	--
Marcos	6	2.8	2	60.5	14.9	32.0	1.4	7.5	2.1	14.9	7.5
Marshall	2	0.9	1	65.0	--	40.0	--	8.0	--	14.7	--
Montell	7	3.3	5	51.2	17.6	32.6	9.7	6.0	1.2	12.1	12.3
Tortugas	1	0.5	1	57.0	--	24.0	--	8.0	--	8.3	--
Uvalde	1	0.5	1	45.0	--	27.0	--	5.0	--	6.7	--
Wells	1	0.5	1	49.0	--	6.0	--	7.0	--	5.1	--
Middle Archaic											
Langtry	2	0.9	1	40.0	--	26.0	--	5.0	--	3.6	--
Pedernales	15	7.0	7	50.4	7.6	29.9	6.3	6.7	0.5	8.3	1.9
Early Archaic											
Bulverde	5	2.3	1	45.0	--	29.0	--	7.0	--	8.8	--
La Jita	4	1.9	1	48.0	--	29.0	--	7.0	0.0	10.5	--
Nolan	9	4.2	5	52.8	5.5	25.2	3.8	6.4	2.0	9.3	2.0
Travis	7	3.3	6	45.7	8.8	20.7	3.5	8.2	1.8	6.9	1.9

TABLE 6. (continued)

Point Type	Abs. Freq.	Rel. Freq. (%)	Number Complete Points	Length (mm)* Avg.	Length (mm)* Stand. Dev.	Width (mm)* Avg.	Width (mm)* Stand. Dev.	Thickness (mm)* Avg.	Thickness (mm)* Stand. Dev.	Weight (gms)* Avg.	Weight (gms)* Stand. Dev.
Pre-Archaic											
Early Corner Notched	5	2.3	2	70.0	2.8	32.0	5.7	7.0	0.0	6.5	9.1
Early Side Notched	1	0.5	0	--	--	--	--	--	--	--	--
Gower	5	2.3	3	35.7	4.0	22.3	3.8	6.3	0.6	4.8	1.1
Martindale	7	3.3	4	58.0	12.8	32.0	3.5	7.3	1.1	10.7	3.2
Late Paleo-Indian											
Angostura	11	5.2	1	71.0	--	18.0	--	7.0	--	9.0	--
Meserve	1	0.5	1	79.0	--	26.0	--	8.0	--	16.3	--
Plainview	2	0.9	0	--	--	--	--	--	--	--	--
Unknown											
Big Sandy-like	1	0.5	1	61.0	--	35.0	--	7.0	--	16.3	--
	213		111								

*Measurements taken on complete points only

TABLE 7. MEASUREMENTS AND PROVENIENCE OF *ANGOSTURA* SPECIMENS

Length* (mm)	Maximum Width (mm)	Maximum Thickness (mm)	Weight** (gms)	Basal Width (mm)	Provenience
71	18	7	9.0	13	41 BX 36 (Unit 6, Level 4)
(32)	22	6	-	16	41 BX 373
(23)	21	6	-	12	Bullis Hill
(42)	20	7	-	12	41 BX 376
(36)	22	8	-	17	41 BX 376
(45)	20	7	-	10	41 BX 403
(22)	21	6	-	14	41 BX 381
(42)	20	n.a.	-	14	41 BX 424
(37)	26	8	-	14	41 BX 424
(31)	19	7	-	15	41 BX 424
(23)	21	6	-	12	Lewis Creek Zone 4

*Incomplete measurements enclosed in parentheses.

**Complete specimens only.

specimens (Suhm and Jelks 1962). The base of this point is not *Plainview*, but is more similar to the *Golondrina* type.

Angostura (11 specimens; Fig. 18,a-i,l and m)

Measurements and provenience for the *Angostura* specimens are presented in Table 7. Only one specimen is complete; the remainder are basal fragments. Flaking on the majority of the points is oblique collateral, with basal and stem grinding present on most specimens. The body and tip of the complete specimen have been reworked; wear pattern analysis indicates it was used as a punch and boring tool. Its thick base was probably hafted in a hollow bone or wooden foreshaft.

The bases of all but one specimen are slightly concave, with short flake scars present on both faces. Two of the points were broken in manufacture and are lacking basal grinding.

Many of the specimens are heavily patinated; about half appear to have been heat treated. The material from which one specimen is made is identical to Alibates dolomite samples from the Texas panhandle, varying in color from cream to mottled red to orange-red.

The complete specimen from 41 BX 36 was closely associated with a patinated *Early Corner Notched* point. *Nolan* points were recovered two and three levels above, but a *Marshall* point was found two levels below in the same unit. The specimen from 41 BX 403 was associated with *Travis*, *Bulverde*, *Pedernales* and *Gower* points, all surface finds. Three *Angostura* points, fragments of other unidentified projectile points and scattered debitage were recovered from 41 BX 424, a "pure" Late Paleo-Indian site. At 41 BX 376, two *Angostura* specimens were associated with *Early Side Notched*, *Early Corner Notched* and *Gower* projectile points and a *Guadalupe* tool.

Pre-Archaic Projectile Points

The Pre-Archaic dart points represent a series that is more difficult to describe because various authors include three morphologically different forms: a "*Martindale*-like" point (Fig. 19), the *Gower* type (Fig. 17) and a form that is morphologically similar to the *Uvalde* type.

Martindale (7 specimens; Fig. 19,f-l)

The bodies are triangular with straight to slightly convex edges. Prominent barbs were formed by deep corner notches, with a stem to base angle of 45° to 60°. The basal concavity is formed by chipping two convex curves that meet in the center of the base, producing a swallowtail appearance. Six of the seven Camp Bullis specimens are patinated, varying from light to heavy. All are finely made points with one (Fig. 19,i) being exceptionally well made. The specimen was found in the third level of Unit 7 at 41 BX 36, associated with a *Nolan* type point. It is the only unpatinated *Martindale* point, being of dark

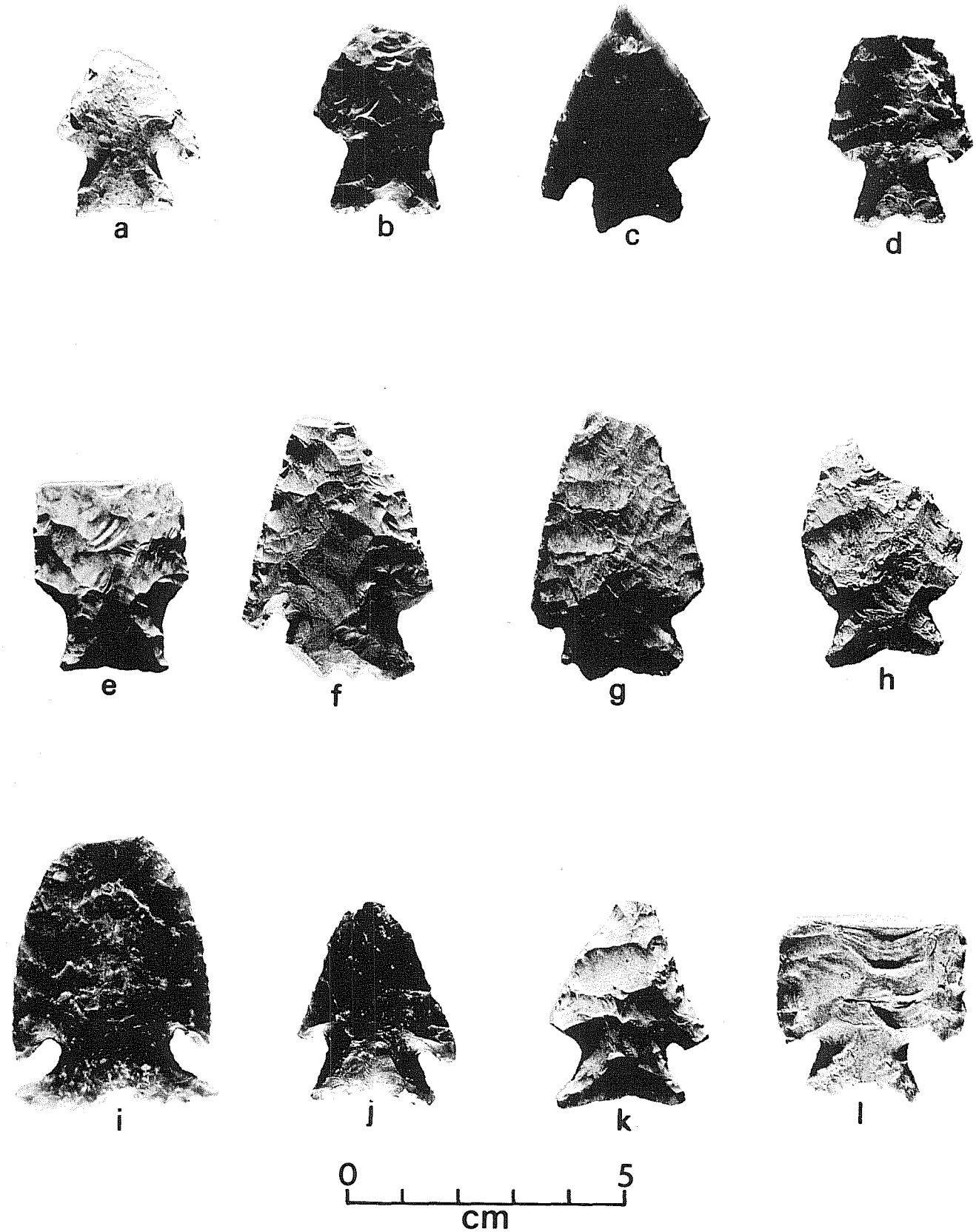

Figure 19. *Lithic Artifacts from Camp Bullis: Pre-Archaic Dart Points.* a-d, *Early Corner Notched* (a, 41 BX 371; b,d, 41 BX 376; c, 41 BX 36); e, *Early Side Notched* 41 BX 376); f-l, *Martindale* (f, 41 BX 375; g, Zone 5; h, 41 BX 371; i, 41 BX 377; j,k, 41 BX 36; l, 41 BX 407).

honey-colored translucent chert (source not found on Camp Bullis). Two Middle Archaic *Pedernales* points were found in the level below it, an unfortunate circumstance in this much disturbed site. Stratigraphy is equally mixed on the second point from 41 BX 36, which was from Unit 1, Level 4, associated with *Nolan* and *Castroville* points. Another *Castroville* point was found two levels below it. The fact that none of the other points in what is believed to be an undisturbed unit were patinated might indicate that *Martindale* points (as defined by Suhm and Jelks 1962) were manufactured in the Archaic period.

Gower (5 specimens; Fig. 17,j-m)

All have short triangular bodies with nearly straight edges. The stem is straight to slightly expanding; the base is indented deeply by removal of a large flake unifacially in three cases. Two have alternately beveled blades, one does not, and enough remains of a fourth to determine that at least one edge was beveled. Two specimens have sinuous edges. All five points have a heavy white patina which at Camp Bullis consistently is associated with Paleo-Indian and Pre-Archaic artifact types. Four points have basally ground stems and bases. None of the tips are sharply pointed nor is pressure flaking anywhere evident.

Gower points were all surface finds at Camp Bullis and came from four different sites. Three of these sites were camp sites (41 BX 376, 41 BX 402, 41 BX 403) approximately one km from water sources. The associated artifacts at 41 BX 376 were two *Angostura*, one *Early Side Notched* and two *Early Corner Notched* points. Associated artifacts at 41 BX 402 were *Tortugas*, *Ensor-Frio* and *Frio* points, with only the *Gower* points patinated. Associated artifacts at 41 BX 403 were one *Travis*, three *Bulverde* and one *Angostura* point. The *Angostura* and *Gower* are the only deeply patinated points. The fourth site, 41 BX 409, was a multi-purpose camping site/lithic resource procurement area and the associated artifacts were one unpatinated *Darl* dart point and a heavily patinated *Guadalupe* tool.

The most distinguishing characteristic of the *Gower* type at Camp Bullis is the poor quality of workmanship and the method of creating the basal concavity. This is consistent with points reported from the Youngsport site (Shafer 1963) where five *Gower* and nine *Gower* variants were found in Stratum 8 in a yellow clay matrix, well separated from Early Archaic points, *Morrill* and *Wells* in Stratum 6, and *Bulverde*, *Travis* and *Nolan* in Stratum 4. Shafer (1963:64-65) repeatedly uses the adjectives "poorly made," "crudely made" and "poor workmanship" to describe *Gower* points. Beveled blades are not mentioned, but two *Gower* Variant A have edges described as sinuous.

Crawford (1965), in describing the Granite Beach surface specimens (associated on the surface with Paleo-Indian point types *Angostura*, *Plainview*, *Golondrina* and points closely resembling *Uvalde*), also comments on the crude workmanship, except for occasional long oblique flake scars across the blade. Twelve specimens had beveled blades and four had indications of smoothing on stem edges. Sollberger and Hester (1972) report heavily patinated *Gower*-like points in an early surface context at the Strohacker site. A few had smoothed stem edges. They were associated on the surface with *Angostura*, *Plainview* and

Golondrina Paleo-Indian types and other corner notched Pre-Archaic points similar in form to *Martindale* and *Uvalde*.

Pre-Archaic points such as *Bell* and *Martindale*, etc., are generally of the same fine quality of workmanship as Paleo-Indian points they replace and Early Archaic points they precede. One must then ask: why is the *Gower* point so poorly made? Sollberger (1971) has mentioned the efficiency of beveled-edged knives, and this observation caused the writer to do a microscopic wear pattern study of the three relatively complete Camp Bullis *Gower* specimens. All revealed heavy crushing of the edges and several gouged-out flake scars parallel to the longitudinal axis of the body. The tip of one specimen has striations parallel to the longitudinal axis of the point. Heavy cutting wear is indicated, as would occur from cutting wood or bone. The sample is too small for general conclusions, but all *Gower* points should be reexamined for similar wear patterns to see if *Gower* "points" might not have been utilized as knives.

Early Corner Notched (5 specimens; Fig. 19,a-d)

These are small triangular points, with the body straight to slightly convex, and with corner notches at steep angles (60°-70°). The stem is slightly expanding, the base is concave and the workmanship is good. This point is morphologically very similar to *Uvalde* (Suhm and Jelks 1962). Weir (1976:52) illustrates very similar points classified as *Uvalde* but attributed to the San Geronimo phase corresponding to our Pre-Archaic. Hester (1971:73) has similar points classified as *Early Corner Notched Variety I*, but also includes recurved base points similar to *Martindale*. The Camp Bullis *Early Corner Notched* specimens have prominent barbs, slightly narrower bases and simple basal concavities--all of which differentiate them from *Martindale*. Two of the specimens are heavily patinated, a characteristic of Camp Bullis Pre-Archaic points, while two others are of medium to light patination.

#1. (Fig. 19,a). The point is a heavily patinated specimen, associated with a *Martindale* point, lithic debitage and cores at 41 BX 371 on an upland terrace overlooking Cibolo Creek at the west end of Camp Bullis.

#2. (Fig. 19,c). This point is only slightly patinated. It was found in a badly disturbed unit at 41 BX 36 (Unit 12, level 2), overlying an *Ensor-Frio* Late Archaic point in Level 4.

#3. (Fig. 19,b). This specimen is highly patinated, has a slender stem and the basal notch is a simple curve which distinguishes it from *Martindale*. It is from an upland site (41 BX 376) one km south of Cibolo Creek. It was associated (on the surface) with *Angostura*, *Early Side Notched* and *Gower* points and a *Guadalupe* tool. All artifacts are highly patinated.

#4. (Not illustrated). The point fragment is damaged and the base is so fragmented as to make it difficult to separate from the *Martindale* form. It is patinated and vitreous, suggesting thermal alteration. It was found at 41 BX 36 (Unit 6, Level 4) and was associated with an

Angostura point. However, a *Marshall* point was found two levels below, again indicative of subsurface disturbance at this site.

#5. (Fig. 19, d). This basal fragment of an *Early Corner Notched* point was the second specimen of this type recovered from the surface at site 41 BX 376.

Early Side Notched (1 specimen; Fig. 19,e)

The specimen is a basal fragment, 33 mm long, 27 mm wide and 7 mm thick, with large side notches resulting in weak shoulders and an expanding base. The basal edge is slightly concave and both stem edges are lightly ground. The base is thinned with a series of small flake scars. Several wide parallel flake scars are apparent on one face. The point is morphologically similar to expanding stem points from Devil's Mouth Site (Sorrow 1968:Fig. 17, K-Q) dated to 6830 B.C. It might be classified as *Lange* were it not for the patina and its surface association with a series of early points.

The specimen is a surface find at 41 BX 376, an upland margin site one km south of Cibolo Creek. It was associated with two *Angostura*, two *Gower* and two *Early Corner Notched* points, a *Guadalupe* tool, scattered burned limestone, cores, quarry blanks, broken bifaces and chert debitage. All lithic material was covered by heavy white patina.

Other Distinctive Projectile Point Forms

La Jita (4 specimens; Fig. 17,n-p)

The specimens are triangular, three with lateral edges straight to slightly convex and one wide specimen with markedly convex edges. All are weakly side-notched, three with alternate bevels. Notching forms weak shoulders with rudimentary barbs on two specimens. Three stems expand slightly and one is straight. The bases are slightly concave on one specimen and slightly convex on three. Workmanship is only fair. Secondary flaking is minimal on edges; bases are thinned on both sides by two or more broad flake scars. They appear identical to Hester's (1971) tentative *La Jita* type.

Three specimens were from 41 BX 36, Units 14 and 15, which contained the only concentration of Early Archaic points found in the site: *Bulverde* and *Nolan*. The fourth was from 41 BX 428, the small burned rock midden one mile north of 41 BX 36 on Davis Creek. It was found in the fourth level (40 cm). The only other points found in this midden were *Wells* and *Castroville*.

La Jita points at the type site were mixed in distribution and are thought to be Middle Archaic (Hester 1971), although some occurred in Early Archaic contexts. At 41 KE 49 (Kelly and Hester 1976), six *La Jita* points were found associated with *Early Side Notched*, *Early Corner Notched*, *Early Triangular*, *Travis*, *Bulverde* and *Nolan* points.

The Middle Archaic was not represented at 41 KE 49, so it would seem that the *La Jita* point type is either Pre-Archaic or Early Archaic. Based on patination, the 41 KE 49 points would fall into the Early Archaic period, as the Pre-Archaic points there had a heavy white patina, while Early Archaic points had none. None of the Camp Bullis specimens are patinated. Thus, the best estimate at present would suggest the placement of *La Jita* points in the Early Archaic period. Now that *La Jita* points have been found in three excavated sites, it is recommended that Hester's (1971) "tentative" rubric be dropped and the type accepted as an Archaic point type. Its exact time placement is not yet certain.

Big Sandy-like (1 specimen; Fig. 15,1)

This point is radically different from any other point found in the Camp Bullis survey. It is 61 mm long, 35 mm wide, 7 mm thick and weighs 16.3 gm. The body is triangular with convex, finely pressure-flaked serrated edges. It has carefully flaked wide side notches and an incurvate base. The buff patina obscures the chert so it could not be determined whether it was local.

The point is morphologically close to the *Big Sandy Side Notched* from the type site in Henry County, Tennessee (Kneberg 1956:25). Lewis and Lewis (1961:37) present a detailed discussion of the type and its temporal placement in the Archaic at ca. 3000-4000 B.C. As far as the author can determine, no similar specimens have been reported from the central and south central region.

The specimen was found in a flood plain site north of Cibolo Creek (41 CM 96), associated with a light lithic scatter and a few burned limestone rocks.

Edwards (42 specimens; Fig. 16,k-u)

This type is a Late Prehistoric arrow point with triangular blade and straight, concave, or convex edges often finely serrated. Barbs are prominent and pointed, formed by corner notches at approximately a 45° angle to the longitudinal axis. The base is deeply concave forming two long pointed barbs usually flaring and often wider than the blade. The average measurements of 21 complete points were 27.8 mm length, 17.8 mm width, 2.7 mm thickness and 1.4 gm weight. The quality of flaking is very fine.

Sollberger (1967) reported the point type in Kerr County rockshelters and in one burned rock midden. He notes the resemblance in form of these points to *Frio* and *Martindale* dart points.

At Camp Bullis, *Edwards* points are found in the upper levels of terrace sites, and in surface sites overlooking Cibolo Creek. They are closely associated with *Scallorn* points, which they resemble slightly. However, the *Scallorn* are simple triangular points, corner notched and generally with straight bases. The *Edwards* point constituted 19.7% of the Camp Bullis projectile point sample (Table 6). *Perdiz* and *Scallorn* were next in frequency with 9.4% and 8.9% respectively.

These distinctive points have been reported over the southern and western portion of central Texas (Sollberger 1967; Hester 1971; Graves and Highley 1978). Their known distribution includes Atascosa, Bexar, Comal, Hayes, Kendall, Kerr, Medina and Uvalde Counties.

III. A.6

ARTIFACT CATEGORIES AND DISTRIBUTIONAL TABULATIONS

James E. Ivey, Thomas R. Hester and Carol Graves

INTRODUCTION

In this chapter, we present a review of the artifact categories used in the analysis of materials collected at Camp Bullis. In addition, we have presented distributional and cross tabulation data for artifacts from the principal sites found there.

There is a certain degree of terminological inconsistency in artifact categories found in III.A.6 through III.A.9. We apologize to the reader for these somewhat irritating inconsistencies, but as we shall explain below, they stem from an effort to approach the goals of these four chapters from different analytical levels.

Lithic data were tabulated on four separate computer coded forms utilized in different phases of the project. These forms, designed by Joel Gunn, Andrea Gerstle and Elizabeth Frkuska, have attempted to codify established projectile point types, and the basic categories of other lithic and non-lithic tools. As anyone who has worked in central Texas will realize, attempts to categorize non-projectile point lithics in a standard fashion have not previously been successful, and we fear that we must report that we have done little better. For example, in Fig. 11 (Cultural Type List), the designers attempted to implement some standardization, by utilizing terms (particularly among the unifaces) proposed by Weir (1976) in his synthesis of the central Texas Archaic. Yet on other forms (see Figs. 5, 9, 10) the designers had to revert to more commonly used (and commonly confused) functional terminology in order to address the specific goals of certain chapters. If the Fort Sam Houston Project were to be done over, it is highly likely that different and potentially more consistent approaches would be taken in the design of these forms. However, project personnel had to work under the constraints of funding which allowed for a rather brief period for the preparation of research design, implementation of field work and submission of a full draft report (approximately 7 months). After submission of the full draft, the principal project archaeologists had to move on to other tasks and did not have the opportunity, which most archaeologists like to have, for continued analysis, re-design and re-interpretation. This is one of the major problems confronting public service archaeology in the United States, and, if the pattern continues, it is one we will have to become better equipped (both intellectually and methodologically) to handle. The design of the coding forms for this project was an effort on our part to speed the analytical process, but the vast amount of data obtained during field work required much more time for processing, keypunching, production and review of print-outs, etc., than we had anticipated.

As noted above, lithic analysis was done at several levels, with specific aims in mind. Thus, for the contents of this chapter, the Computer Coded Lithic Analysis Form (Fig. 10) and the Cultural Type List (Fig. 11) were utilized. These focus

on diagnostic artifacts and a series of general, morphologically-based lithic categories, which, it was felt, would facilitate the preparation of basic distributional data.

In III.A.7, documented sites and scattered artifacts are described. These descriptions contain lithic terminology based on the use of the Computer Coded Field Survey Form (Fig. 5). This particular coding format allowed the field workers to rapidly enter lithic (and other) data, once they had agreed on the appropriate categories during conferences in the field.

In III.A.8 and III.A.9, dealing with site types and settlement patterns, yet another level of lithic analysis was needed in order to carry out these more far-reaching studies of site relationships at Camp Bullis. For such studies, it was necessary to have a rather wide latitude in making functional interpretations for lithic categories. This facilitated, in terms of the studies (and, we hope, in terms of their utility), broad real comparisons, using literature in which these functional terms are quite commonly employed. Therefore, the Computer Coded Laboratory Form (Fig. 9) was used. This form was completed by the project analysts once artifact processing had been completed in the laboratory.

ARTIFACT CATEGORIES

The descriptions of our artifact categories are based on the coding format shown in Fig. 11; however, we have made an effort to correlate, when necessary, entries or items on that form with other coding forms used during the project (see the discussion above).

For the purposes of this assessment report, and given the short period allotted to analysis, we have avoided detailed artifact descriptions and have not included lengthy morphological descriptions or series of metric attributes. Because both the cultural diagnostics and the other artifactual materials are quite typical of the central Texas region (see below), we feel that the reader will have abundant published sources to which to refer if additional descriptive information is desired on a particular category. We have also attempted in this report to illustrate as many of the collected specimens as possible. Data for the analyzed artifacts is presented in Table 8. Non-diagnostic artifacts (i.e., bifaces, unifaces and cores) were analyzed from the excavated sites only and they are included in Table 8.

Projectile Points

In III.A.5, diagnostic projectile point types and forms were reviewed. Of the 77 potential types or forms listed in Fig. 11, all but 10 are extensively described in the original definitions by Suhm *et al.* (1954) and Suhm and Jelks (1962). And, of these 77 potential categories, the specimens collected from Camp Bullis correspond to only 23. Illustrations of most can be found in Figs. 13-19.

There are, however, 10 types or forms found on the list (Fig. 11) which were not originally defined by Suhm *et al.* (1954). Of these, four were not found on the survey; these are *Bell* (Sorrow *et al.* 1967), *Carrizo* (House and Hester 1967), *Golondrina* (Johnson 1967; Hester 1977:175ff) and *Val Verde* (Schuetz 1956).

Five of the six other types or forms that did occur (*Gower, La Jita, Early Corner Notched, Early Side Notched, Edwards*) have been described in some detail by Kelly in III.A.5. One form, called *Ensor-Frio* (item 17, Fig. 11), was not discussed. As the term implies, these are projectile points which resemble both the *Ensor* and *Frio* types. Identical specimens recovered from Oblate Rockshelter were described as *Ensor*, Variety B and Variety C; those from the Wunderlich site were described as *Ensor*, Variety 2 (Johnson *et al.* 1962). We do not conceive of this form as some sort of projectile point "hybrid." However, the specimens typically have the side-notching and size typical of *Ensor*, but in the center of the basal edge of the stem, a narrow, V-shaped notch was placed, causing the specimens to bear some resemblance to *Frio*. Whether these are typologically significant, or simply represent the vagaries of projectile point manufacture, we cannot say. Excavations in central and south central Texas in recent years have not clarified this typological quandary, although they have confirmed that the specimens are found in the Transitional Archaic.

Several projectile points were also sorted into *Unfinished* and *Unknown* categories. Specimens classified as *unfinished* (item 79, Fig. 11) have certain attributes that indicate they were never completed or utilized (see Fig. 20). These attributes include very thick proximal or distal portions with multiple hinge fractures, reflecting the inability of the stoneworker to successfully thin the specimen; these hinge fractures sometimes led to breakage. Other attributes which were considered are lack of basal thinning (i.e., the specimen has a thick base which did not appear suitable, at least to the archaeologist, for hafting) and partially formed stems (e.g., only one notch was completed). The *unknown* category (item 80, Fig. 11) constitutes finished projectile points which could not be classified according to presently defined types or forms; there were only a few of these found during the survey.

Bifaces

We recognize, of course, that most projectile points are bifaces, but here we are referring to non-projectile point artifacts, and to *fragments* of bifaces that might represent either category (see items 87, 88, Fig. 11). Of the five potential biface categories in Fig. 11, only two have been tabulated in this chapter. *Complete bifaces* (item 86) include non-projectile point forms; in general, these are discarded specimens representing "fossilized" stages in the lithic reduction process. These are generally *quarry blanks* (large, crude bifaces usually with cortex remnants on one or both faces, representing initial phases of biface reduction; Figs. 21-23,a,b) and *preforms* (percussion, and sometimes pressure, flaked bifaces further reduced in size and mass and apparently intended for manufacture into projectile points; Figs. 24-26,a-n). Other *bifaces* were simply lumped together, as the analysts were uncertain as to whether they represented preforms, knives (a function we were unwilling to assign without microwear confirmation), or even aberrant forms of projectile points.

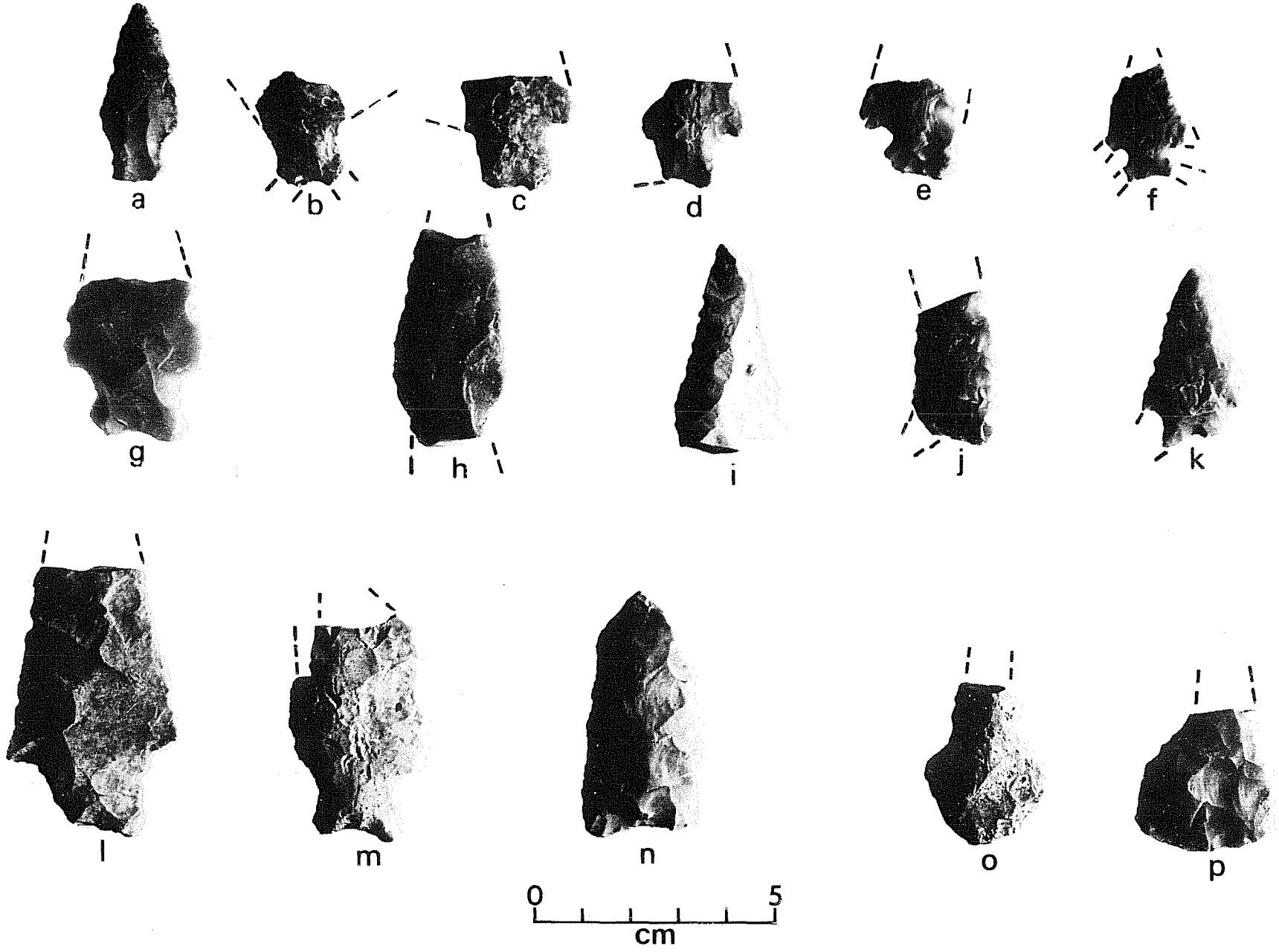

Figure 20. *Lithic Artifacts from Camp Bullis: Unfinished Specimens and Perforators.* a-n, unfinished artifacts (mostly unfinished dart points); a, 41 CM 70, b,m, 41 BX 393; c,g, 41 BX 399; d, 41 BX 378; e, 41 BX 382; f, 41 BX 380; h, 41 BX 421; i, 41 BX 382; j, 41 BX 390; k, 41 CM 99; l, 41 BX 431. o-p, perforators (beaked bifaces); i, 41 BX 424; p, 41 CM 99.

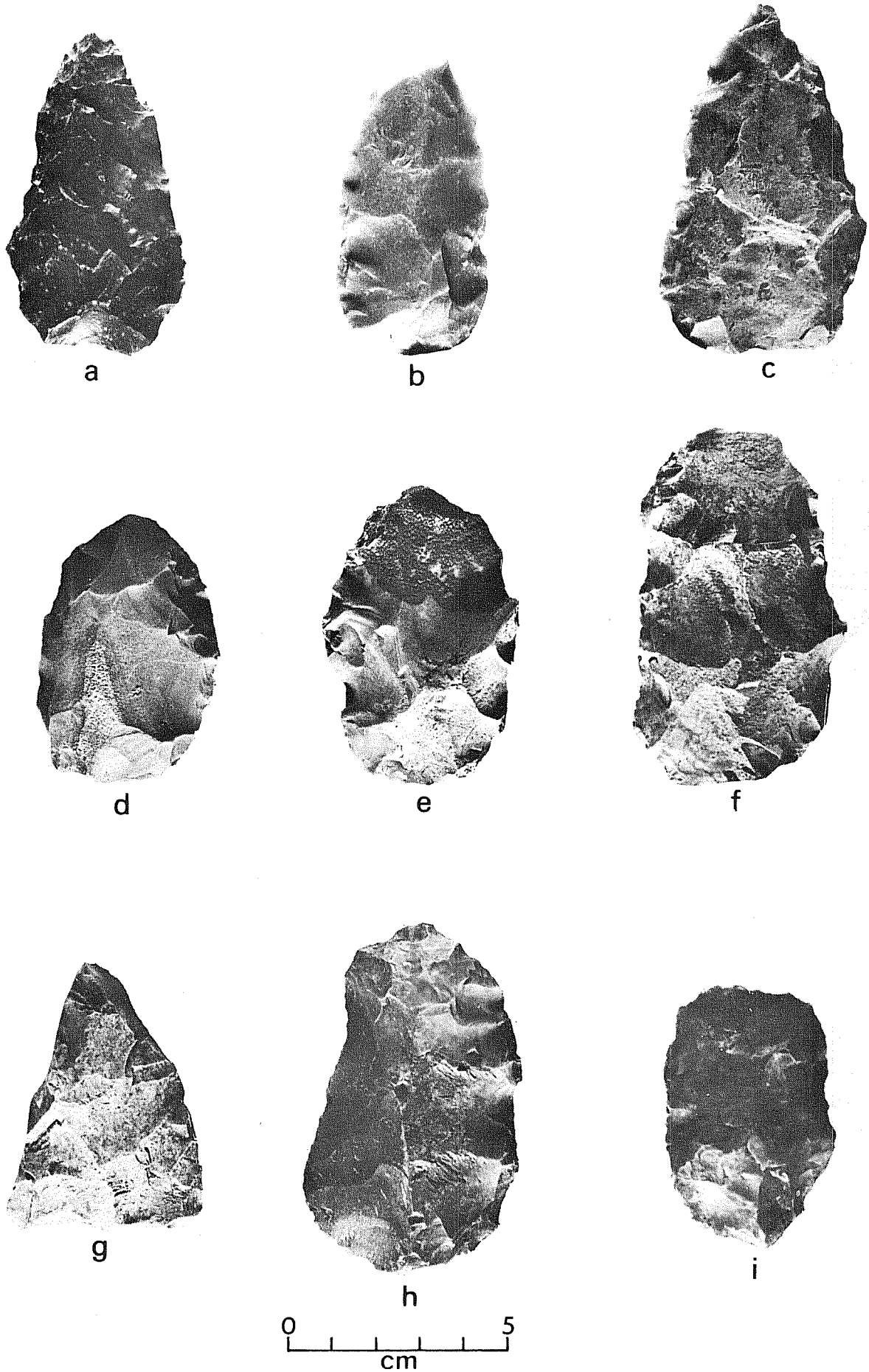

Figure 21. *Lithic Artifacts from Camp Bullis: Quarry Blanks.* a, 41 BX 409; b, 41 CM 102; c, 41 BX 397; d, near 41 BX 378-379; e, 41 BX 373; f, 41 BX 375; g, 41 BX 377; h, 41 BX 413; i, 41 BX 410.

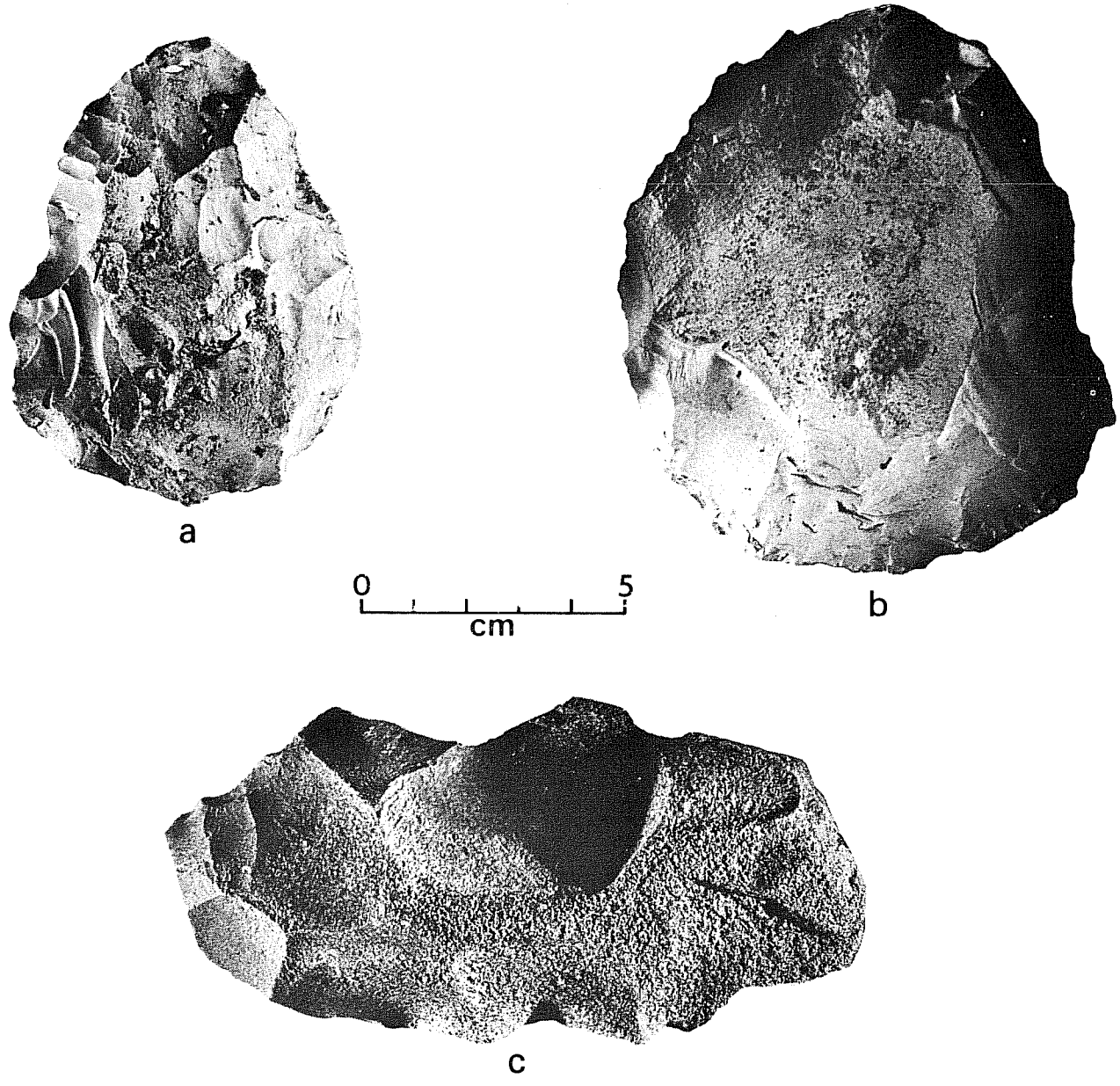

Figure 22. *Lithic Artifacts from Camp Bullis: Quarry Blanks.* a, 41 BX 374; b, 41 BX 371; c, 41 BX 407.

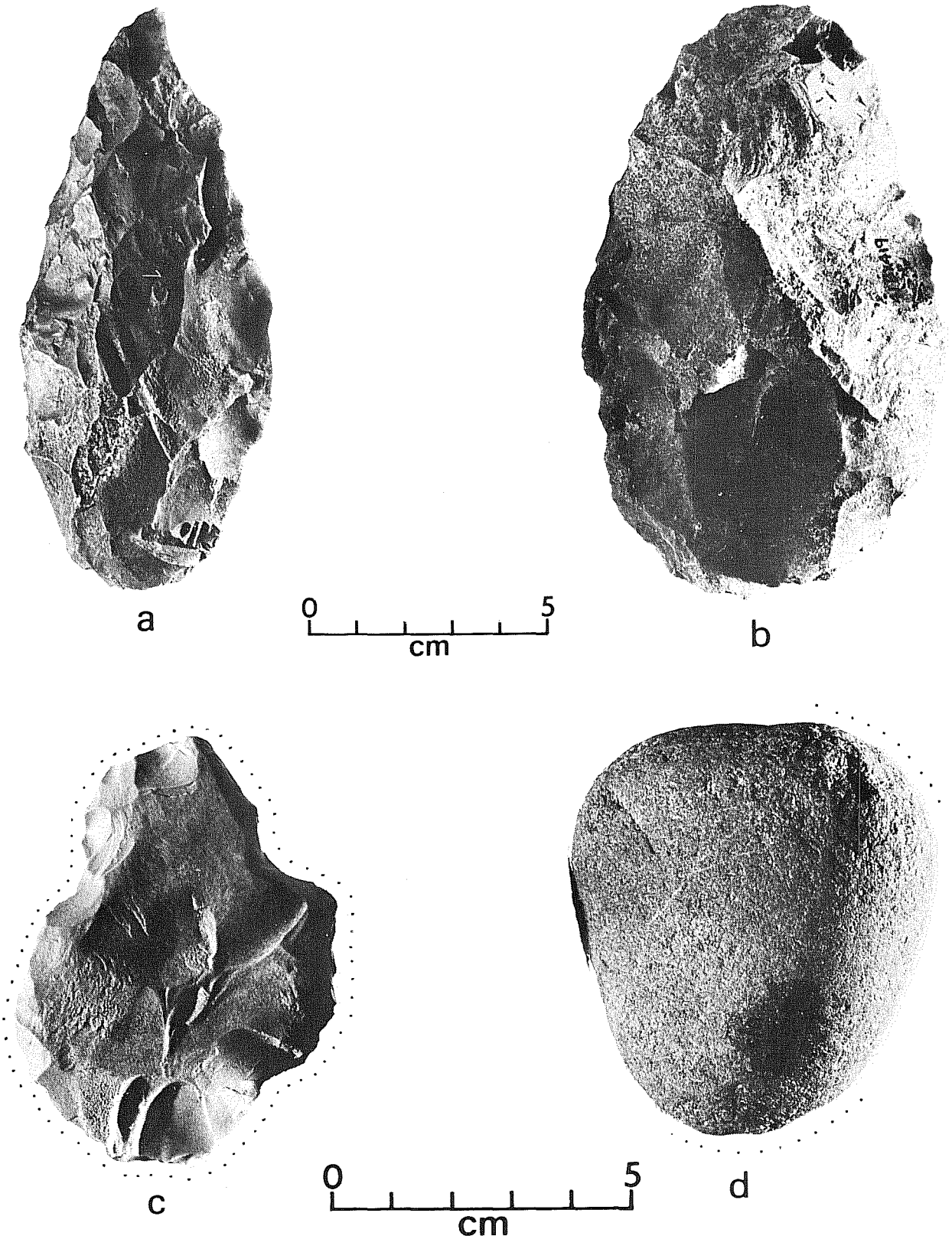

Figure 23. *Lithic Artifacts from Camp Bullis.* a-b, quarry blanks (a, 41 BX 410; b, 41 BX 419); c,d, hammerstones (c, 41 CM 102; d, 41 BX 431). Dots indicate battered edges.

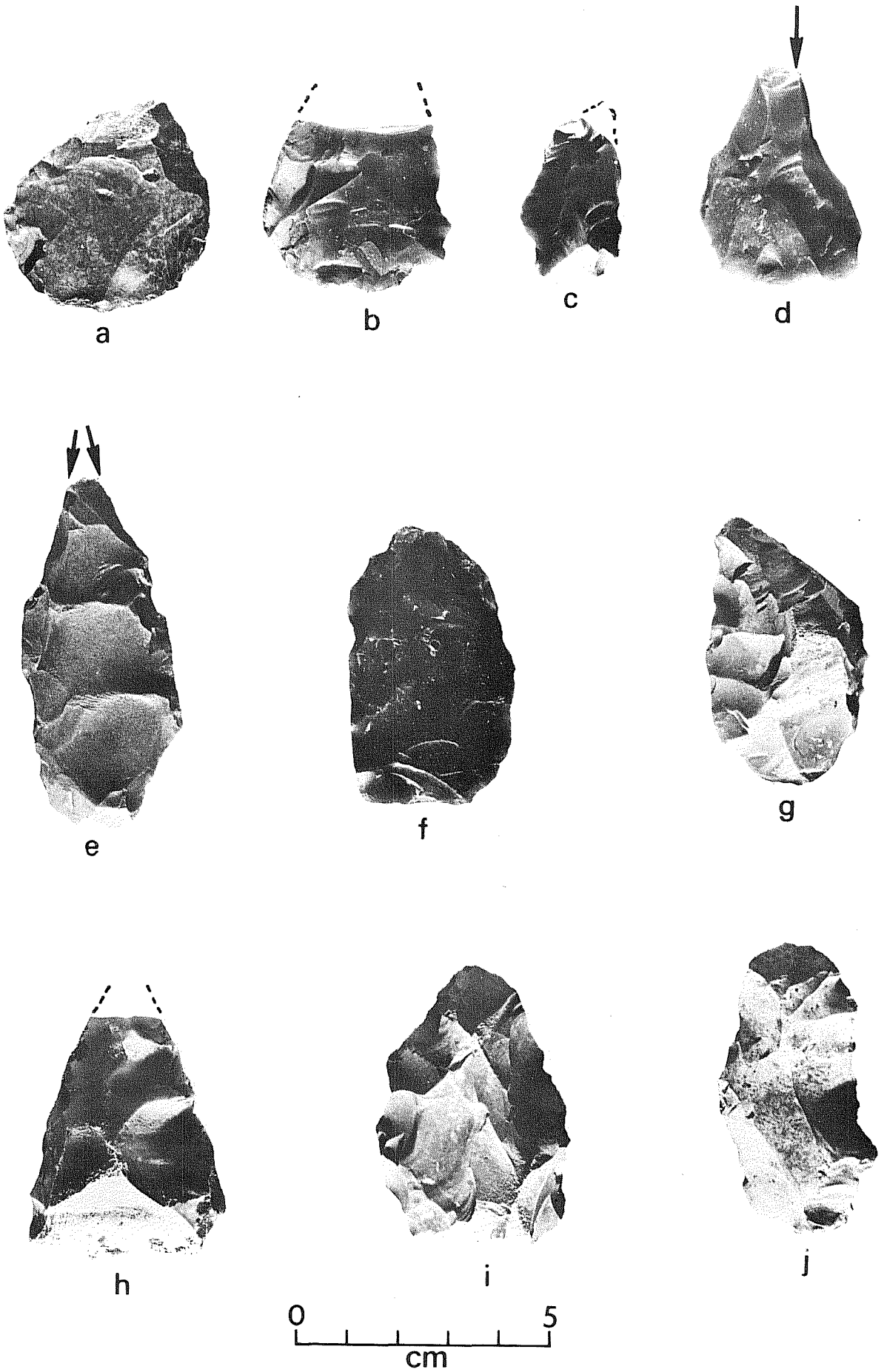

Figure 24. *Lithic Artifacts from Camp Bullis: Preforms.* a,i, 41 BX 377; b, 41 BX 423; c, 41 BX 378; d, 41 BX 379; e, 41 BX 375; f, 41 BX 409; g, 41 BX 374; h, 41 BX 426; j, 41 BX 424. Arrows denote burin-like facets.

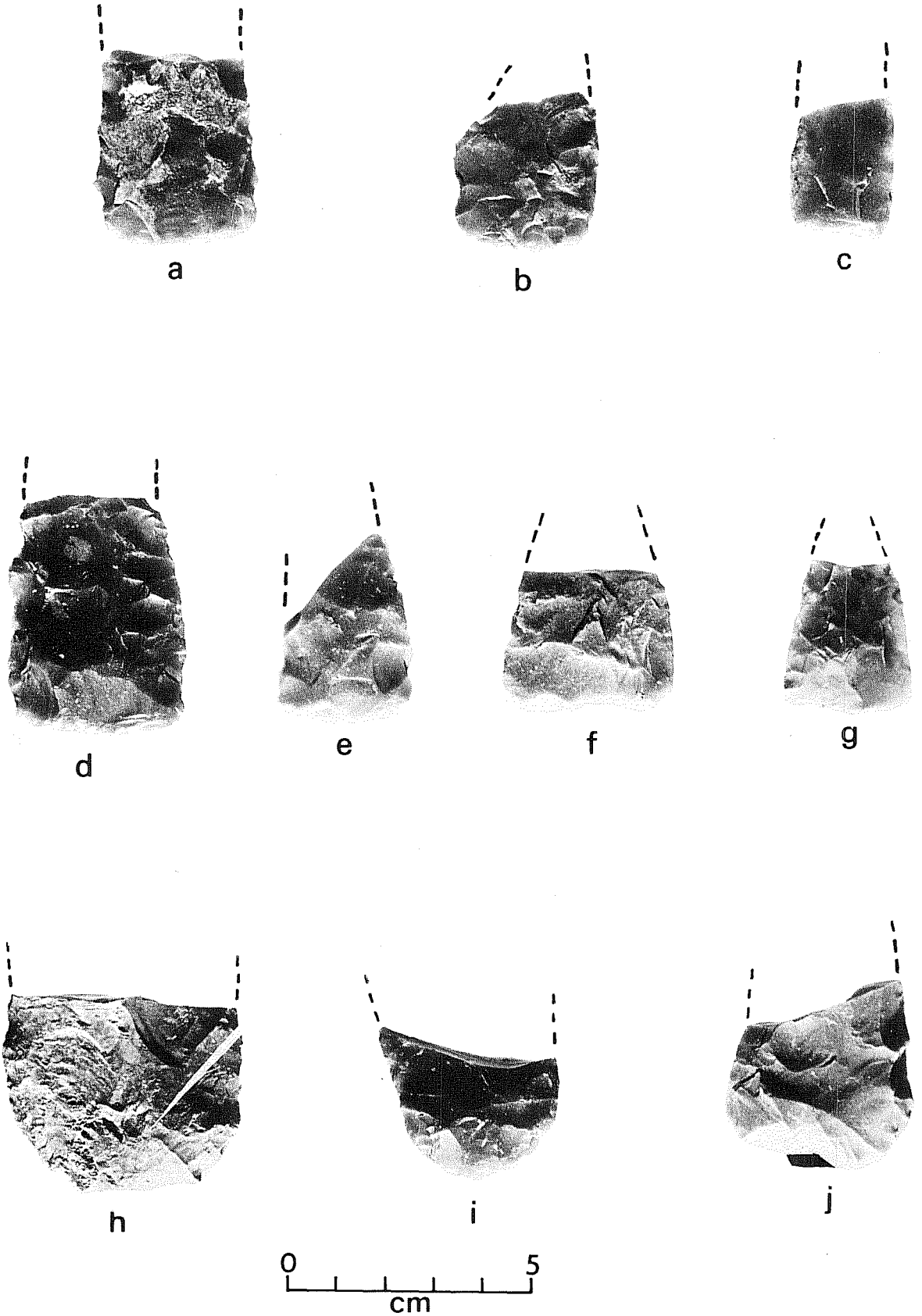

Figure 25. *Lithic Artifacts from Camp Bullis: Preform Fragments.* a,e, 41 BX 431; b, 41 CM 99; c, 41 BX 374; d, 41 BX 409; f,i, 41 BX 396S; g, 41 BX 400; h, 41 BX 390; j, 41 BX 377.

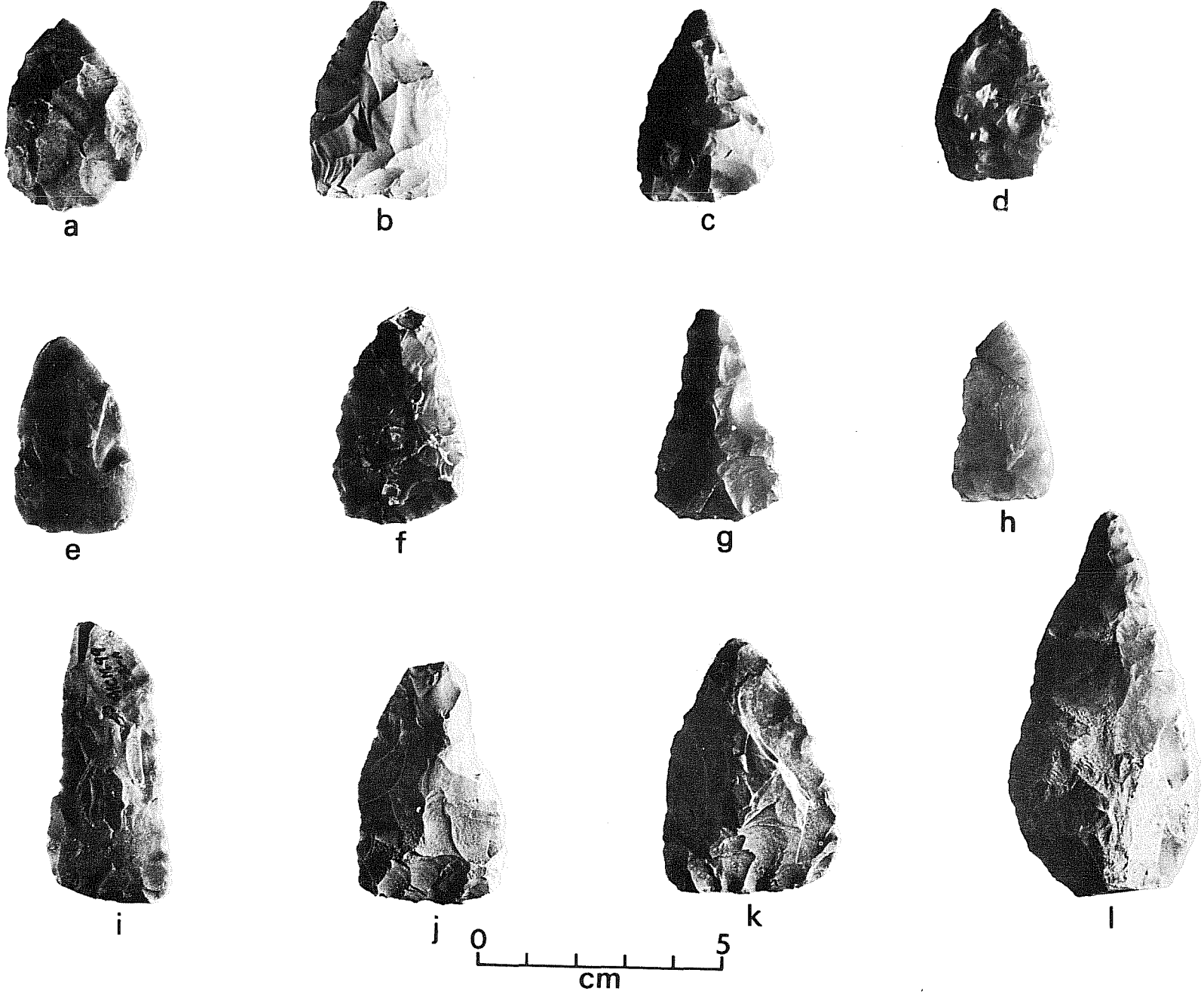

Figure 26. *Lithic Artifacts from Camp Bullis: Triangular Preforms.* a, 41 BX 381; b, 41 BX 402; c,j, 41 BX 431; d, 41 BX 396; e,f,i, 41 CM 99; g, 41 BX 396; h, 41 BX 379; k, 41 BX 377; l, 41 BX 428.

Beaked bifaces (items 89, 90; Fig. 11) have protrusions which may have functioned as awls, perforators, or gravers (Fig. 20,o,p; Fig. 27,a-e). Because of uncertainty as to exact function, this descriptive term is employed. None of the distinctive perforators with long, carefully chipped bits, often found in central Texas (cf. Weir 1976:Figs. 16,19), were recovered during the survey activities.

Unifaces

Most unifacial implements are usually thought of as scrapers, although microwear analysis of unifacially trimmed specimens has sometimes indicated their use in other functions, e.g., as cutting or slicing tools (cf. Hester and Shafer 1975). Eleven potential groups were entered for coding. The terminology (Fig. 11) generally follows that of Weir (1976). Of the uniface groups, eight were recognized and are entered in Table 8 (items 100, 101, 104, 105, 106, 107, 109, 110, Fig. 11; also Figs. 28-30). These are uniface forms which would often be referred to, at the functional level, as "side scrapers" (items 100-104; see Fig. 9, items 47, 49), "end/side scrapers" (items 105, 106; see item 54 in Fig. 9) and "gravers" (item 110; item 56 in Fig. 9; see also Weir 1976: Figs. 23,24). Item 109, "miscellaneous or irregular" unifaces, represents occasional specimens with steeply trimmed edges but which are not distinctively patterned; items 51-53 in Fig. 9 can be included within this category. Again, we should point out that our use of both descriptive and functional terms in III.A.6-9 reflects the aims of those particular chapters.

Blades

Blades are specialized types of flakes, usually resulting from an intentional lithic process designed to produce long, parallel-edged flakes. In central Texas, there is evidence of blade industries especially in Late Prehistoric times (see Green and Hester 1973), but blade-like flakes ("flake-blades") are often produced as incidental byproducts in lithic industries based on flake production. Thus, in items 120-127 in Fig. 11, eight potential categories were set forth. Of these, only two are tabulated in this chapter, *flake-blades* and *notched flake-blades*. Both categories consist of what we believe to be blade-like flakes produced in flake industries.

Cores

Fig. 11 lists six potential kinds of cores, including those used for flake production and evidencing particular kinds of platforms (items 130-133) or cores used either for blade (item 134) or flake-blade (item 135) production. This latter category is a difficult one for the lithic analyst and is essentially a grouping of those cores which show the removal of blades or blade-like flakes, but which cannot be assigned with any certainty to either a blade- or flake-oriented technology.

In Table 8, four kinds of cores are listed: *bidirectional cores*, *multiplatform cores* (see Shafer 1969), *bifacial cores* (see Hester 1975c), and *flake-blade*

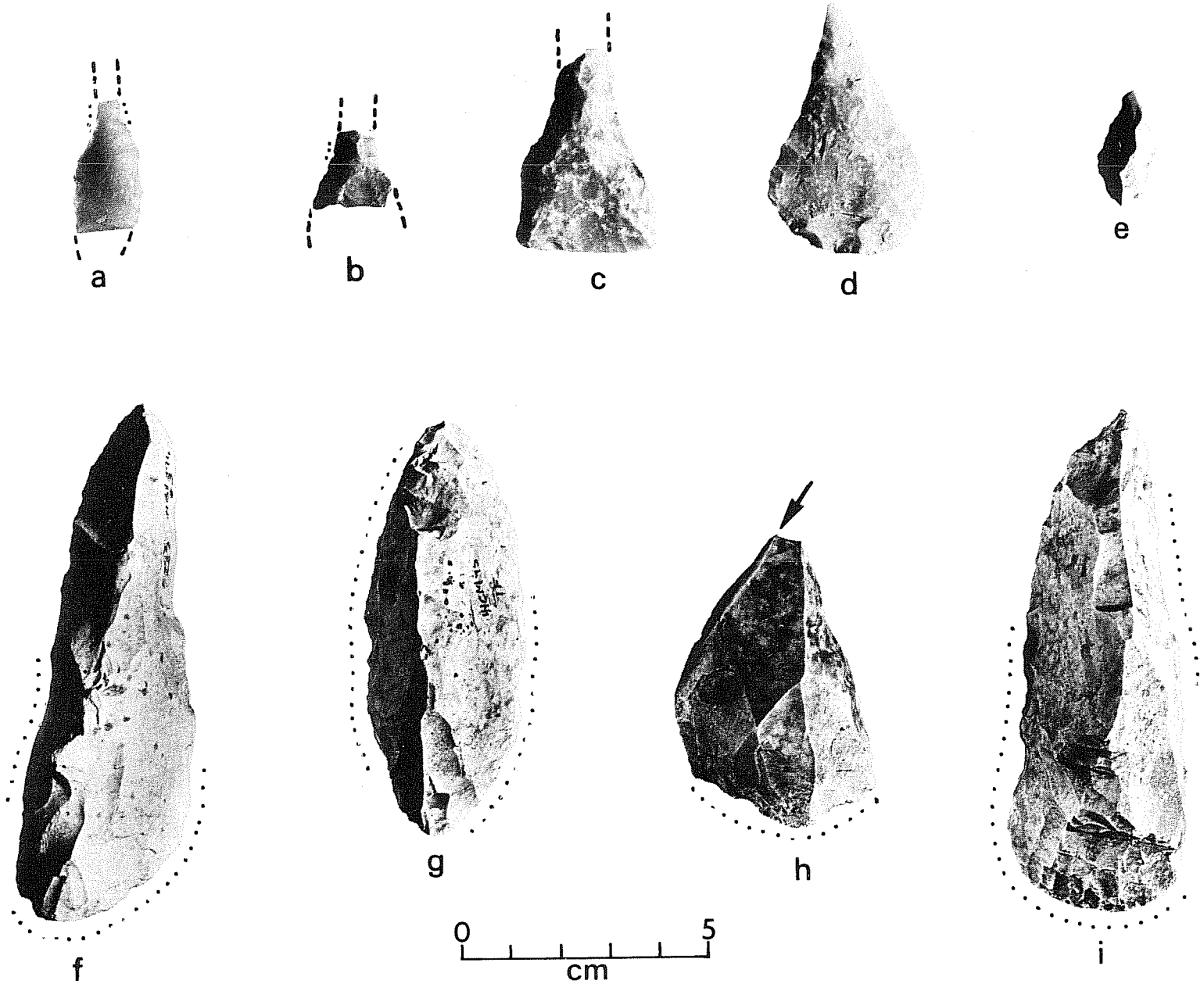

Figure 27. *Lithic Artifacts from Camp Bullis.* a-d, perforators (beaked bifaces; a,c, 41 CM 99; b, 41 CM 94; d, 41 BX 377); e, graver (beaked uniface), 41 CM 94; f-i, *Guadalupe* tools (f, 41 BX 376; g, 41 CM 95; h, 41 BX 424; i, 41 BX 409. The *Guadalupe* tools are shown with the bit down. Dots indicate utilized or worn edges.

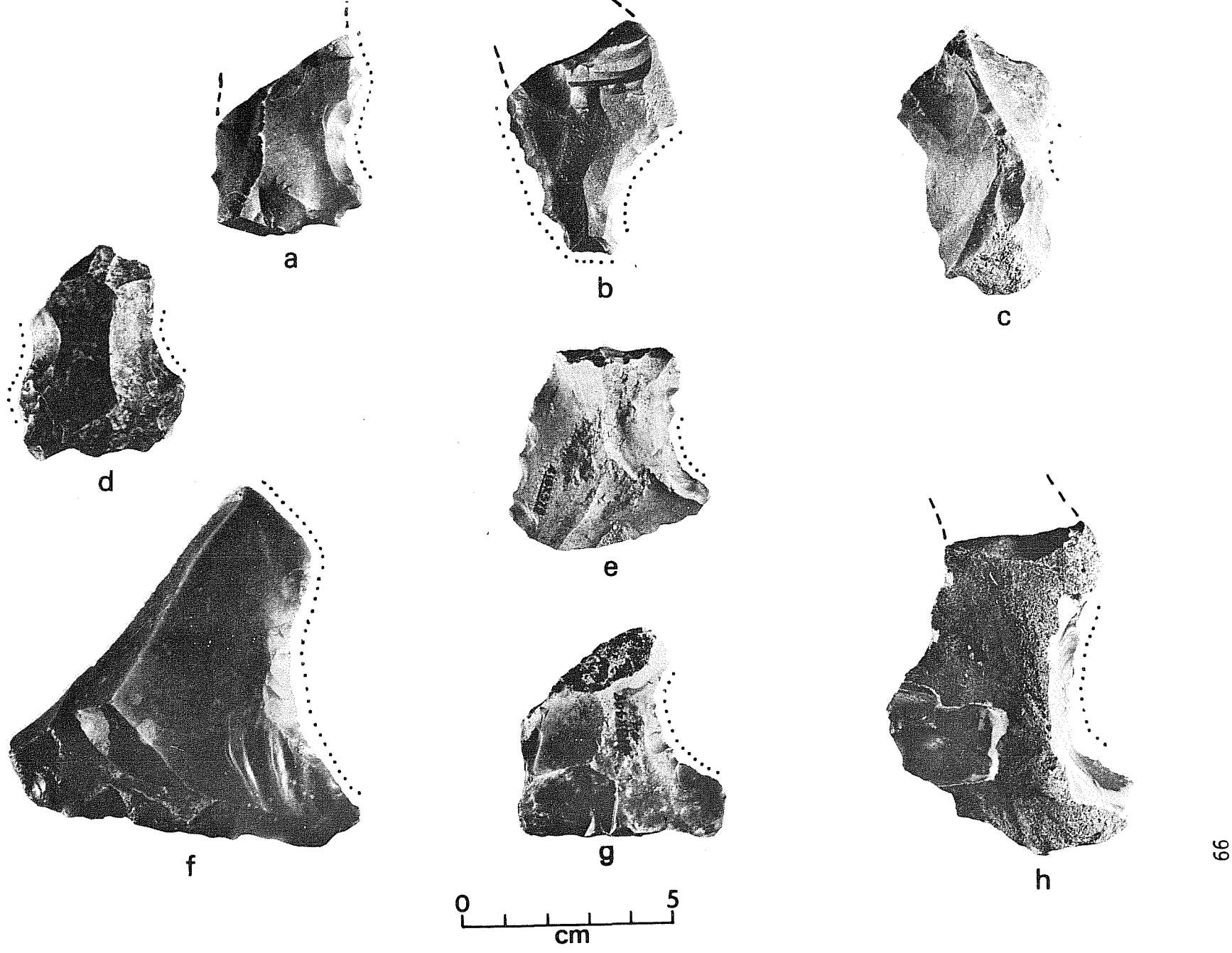

Figure 28. *Lithic Artifacts from Camp Bullis: Concave Unifaces (Scrapers).* a, 41 BX 378-379; b, 41 BX 400; c, near 41 BX 378-379; d, 41 BX 431; e, 41 BX 373; f, 41 BX 431; g, 41 BX 409; h, 41 BX 431. Dots indicate utilized or worn edges.

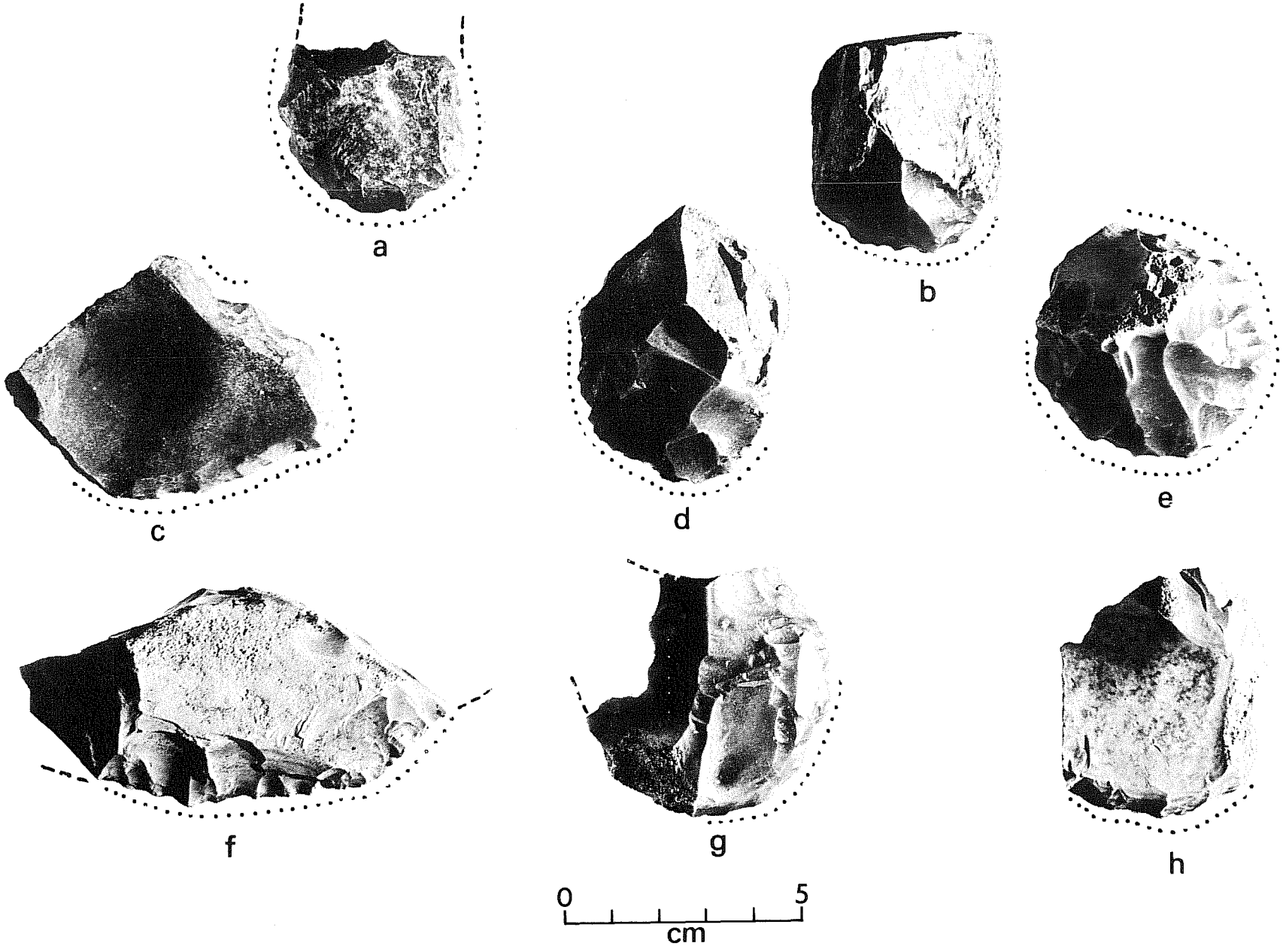

Figure 29. *Lithic Artifacts from Camp Bullis Convex Unifaces (Scrapers).* a, 41 BX 409; b, 41 BX 400; c, 41 BX 409; d, 41 BX 413; e, 41 BX 412; f, 41 BX 388; g, 41 BX 400; h, 41 BX 431. Dots indicate utilized or worn edges.

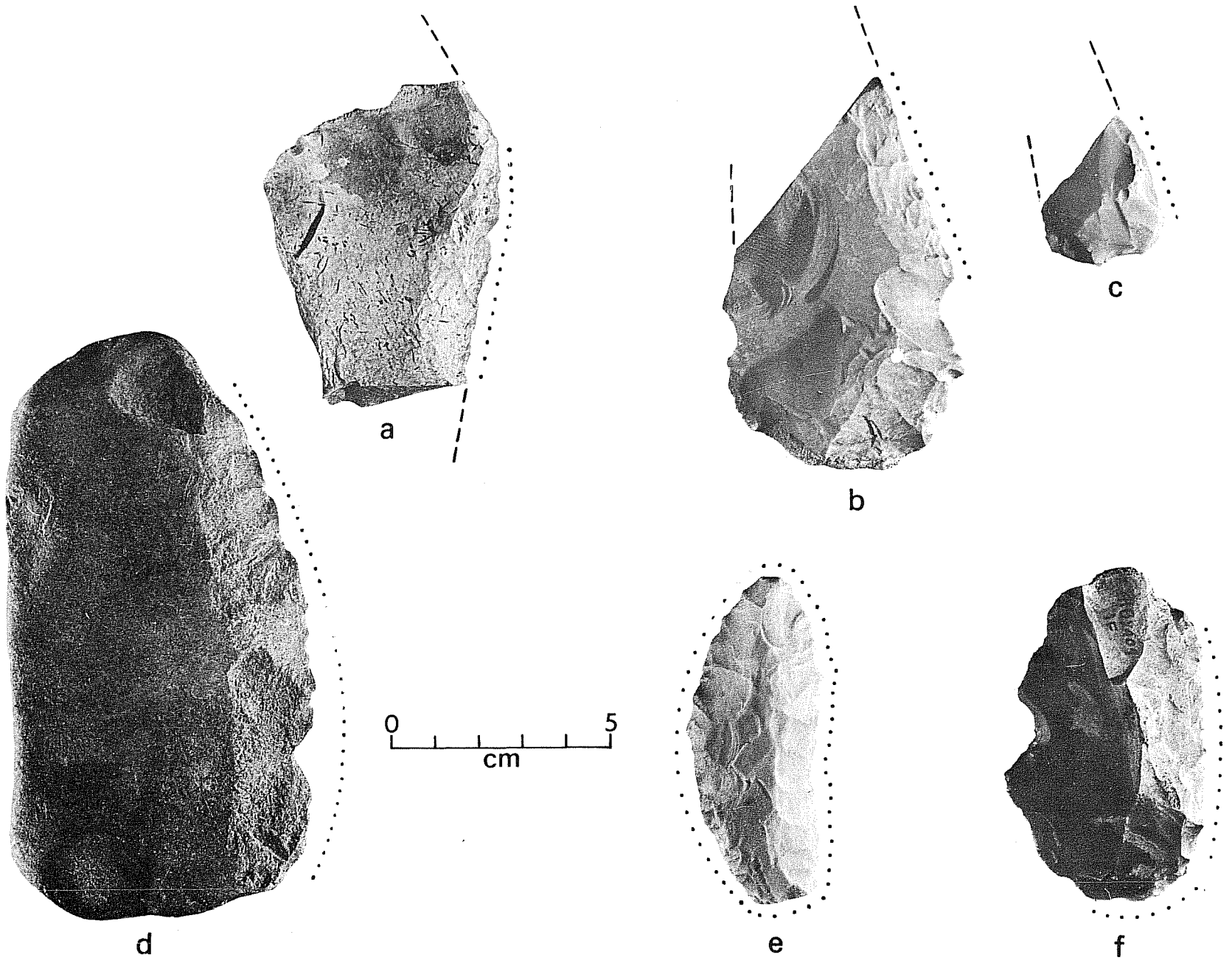

Figure 30. *Lithic Artifacts from Camp Bullis: Unifaces (Scrapers).* a, 41 BX 393; b, 41 BX 377; c, 41 BX 400; d, 41 BX 377; e, 41 BX 400; f, 41 BX 409. Dots indicate utilized or worn edges.

cores, just discussed above. The cores recovered from the sites listed in Table 8 and those found at other sites not tabulated here, all reflect a flake production technology during all cultural periods at Camp Bullis (Figs. 31; 32,a,b). Flakes were manufactured for conversion into unifaces and bifaces and were also used for casual cutting and scraping tasks (see items 160-162 in Fig. 11). Of course, many flakes ended up as byproducts, or debitage.

Other Tools

In the chipped stone analysis, three additional categories can be found listed in Fig. 11. *Burins* (none of which were recognized at Camp Bullis), *Clear Fork* and *Guadalupe Tools*, and *Flake Tools*. Only the *Guadalupe* tool form and the flake tool forms were found at Camp Bullis. The *Guadalupe* tool (or "adze" or "gouge" as it is sometimes called) is a distinctive bifacial artifact, trianguloid in cross-section, with an oblique "bit" or presumed working edge (Fig. 27,f-i). The function of these tools remains unknown, but their chronological affiliations seem to lie with the Pre-Archaic (Hester and Kohnitz 1975). Flake tools used for casual tasks were of three kinds: those with convex retouch on one or more edges, those with concave retouch on one or more edges, and specimens on which retouch formed essentially straight lateral edges.

Other Artifact Categories

In Fig. 11, there are entries for *Ground or Battered Stone* artifacts, *Bone* artifacts, *Shell* artifacts and *Miscellaneous* specimens (e.g., worked glass from potential historic Indian components). Ground stone specimens were the only category to be recognized at Camp Bullis, and, in this case, only *mano fragments* (item 174) or pecked stone were represented (Fig. 32,c and Fig. 33). There was a bone artifact found in earlier non-scientific collecting activities at site 41 BX 36 (see Fig. 3), and a few bone tools or "modified bone" were found during the excavation of 41 BX 36 (see III.A.12).

ARTIFACT DISTRIBUTIONS

Of the 63 prehistoric sites documented during the Camp Bullis survey, 33 were felt to have significant collections suitable for distributional analysis and cross tabulations. These include sites at which major testing or controlled surface collecting activities took place, while the remainder are sites for which chronological attribution could be established through the occurrence of diagnostic projectile points.

There were 368 artifacts analyzed from these 33 sites (41 BX 396N and 396S are combined), and their distributions are plotted in Table 8. The four different categories of data for each site and artifact are arranged as follows:

41 BX 36

(Artifact category)		
Castroville	4	There are 4 *Castroville* points at site 41 BX 36.
	66.7	66.7 percent of all *Castroville* points analyzed are at 41 BX 36.
	2.7	2.7 percent of all artifacts at 41 BX 36 are *Castroville* points.
	1.1	1.1 percent of all artifacts analyzed are *Castroville* points at 41 BX 36.

Table 9 has been prepared to compare the relative percentages of dart and arrow points at these sites, and to compare these with the total chipped stone assemblage (mano fragment category is excluded. The data is arranged as in Table 8.

TABLE 8. TABULATION OF ANALYZED ARTIFACTS BY CATEGORY AND DISTRIBUTION

	41BX 36	41BX 371	41BX 373	41BX 375	41BX 376	41BX 377	41BX 379	41BX 380	41BX 381	41BX 382	41BX 383	41BX 385	41BX 387	41BX 388	41BX 391	41BX 392	41BX 396	41BX 400	41BX 402	41BX 403	41BX 407	41BX 408	41BX 409	41BX 424	41BX 425	41BX 426	41BX 428	41CM 70	41CM 94	41CM 96	41CM 99	41CM 100	41CM 102	Total	%
Angostura	1.0 11.1 0.7 0.3		1.0 11.1 100.0 0.3		2.0 22.2 22.2 0.5				1.0 11.1 100.0 0.3											1.0 11.1 16.7 0.3				3.0 33.3 75.0 0.8										9	2.4
Bulverde														1.0 20.0 100.0 0.3	2.0 40.0 50.0 0.5					2.0 40.0 33.3 0.5														5	1.4
Castroville	4.0 66.7 2.7 1.1																										1.0 16.7 7.1 0.3				1.0 16.7 10.0 0.3			6	1.6
Darl																						1.0 100.0 33.3 0.3												1	0.3
Edgewood						1.0 50.0 2.9 0.3																									1.0 50.0 10.0 0.3			2	0.5
Ensor	3.0 37.5 2.0 0.8					4.0 50.0 11.8 1.1												1.0 12.5 14.3 0.3																8	2.2
Ensor-Frio	3.0 27.3 2.0 0.8			1.0 9.1 50.0 0.3		4.0 36.4 11.8 1.1					1.0 9.1 1.8 0.3				1.0 9.1 25.0 0.3				1.0 9.1 20.0 0.3															11	3.0
Frio	4.0 44.4 2.7 1.1					2.0 22.2 5.9 0.5	1.0 11.1 4.2 0.3												1.0 11.1 20.0 0.3								1.0 11.1 33.3 0.3							9	2.4
Gower					2.0 40.0 22.2 0.4														1.0 20.0 20.0 0.3	1.0 20.0 16.7 0.3			1.0 20.0 33.3 0.3												5	1.4
Kinney	1.0 100.0 0.7 0.3																																	1	0.3
La Jita	4.0 100.0 2.7 1.1																																	4	1.1
Langtry	1.0 50.0 0.7 0.3																															1.0 50.0 100.0 0.3		2	0.5

Marcos	2.0 33.3 1.3 0.5					1.0 16.7 2.9 0.3				1.0 16.7 50.0 0.3											1.0 16.7 33.3 0.3				1.0 16.7 20.0 0.3											6	1.6
Marshall	1.0 50.0 0.7 0.3																												1.0 50.0 10.0 0.3			2	0.3
Martindale	2.0 33.3 1.3 0.5	1.0 16.7 50.0 0.3		1.0 16.7 50.0 0.3		1.0 16.7 2.9 0.3															1.0 16.7 33.3 0.3														6	1.6
Meserve	1.0 100.0 0.7 0.3																															1	0.3
Montell	4.0 66.7 2.7 1.1					1.0 16.7 2.9 0.3																									1.0 16.7 100.0 0.3	6	1.6
Nolan	6.0 66.7 4.0 1.6																							1.0 11.1 20.0 0.3	1.0 11.1 33.3 0.3		1.0 11.1 33.3 0.3							9	2.4
Pedernales	7.0 50.0 4.7 1.9										1.0 7.1 1.8 0.3								1.0 7.1 16.7 0.3		1.0 7.1 33.3 0.3			1.0 7.1 20.0 0.3			1.0 7.1 33.3 0.3			2.0 14.3 20.0 0.5			14	3.8
Plainview														1.0 50.0 25.0 0.3							1.0 50.0 33.3 0.3													2	0.5
Tortugas																	1.0 100.0 20.0 0.3																	1	0.3
Travis	2.0 33.3 1.3 0.5															2.0 33.3 28.6 0.5		1.0 16.7 16.7 0.3							1.0 16.7 7.1 0.3								6	1.6
Uvalde	1.0 100.0 0.7 0.3																															1	0.3
Wells																									1.0 100.0 7.1 0.3								1	0.3
Early Corner Notched	2.0 40.0 1.3 0.5	1.0 20.0 50.0 0.3			2.0 40.0 22.2 0.4																											5	1.4
Edwards	11.0 27.5 7.4 3.0					5.0 12.5 14.7 1.4	7.0 17.5 29.2 1.9	1.0 2.5 33.3 0.3			6.0 15.0 10.9 1.6	2.0 5.0 33.3 0.5				1.0 2.5 100.0 0.3	1.0 2.5 100.0 0.3	2.0 5.0 28.6 0.5								2.0 5.0 66.7 0.5					2.0 5.0 20.0 0.5			40	10.9

Table 8. (Continued)

	41BX 36	41BX 371	41BX 373	41BX 375	41BX 376	41BX 377	41BX 379	41BX 380	41BX 381	41BX 382	41BX 383	41BX 385	41BX 387	41BX 388	41BX 391	41BX 392	41BX 396	41BX 400	41BX 402	41BX 403	41BX 407	41BX 408	41BX 409	41BX 424	41BX 425	41BX 426	41BX 428	41CM 70	41CM 94	41CM 96	41CM 99	41CM 100	41CM 102	Total	%
Fresno	1.0 100.0 0.7 0.3																																	1	0.3
Perdiz	15.0 75.0 10.1 4.1										2.0 10.0 3.6 0.5													2.0 10.0 40.0 0.5						1.0 5.0 10.0 0.3			20	5.4
Scallorn	5.0 26.3 3.4 1.4					3.0 15.8 8.8 0.8	2.0 10.5 8.3 0.5	1.0 5.3 33.3 0.3				4.0 21.1 66.7 1.1						1.0 5.3 14.3 0.3												1.0 5.3 33.3 0.3		2.0 10.5 20.0 0.5			19	5.2
Early Side Notched					1.0 100.0 11.1 0.3																														1	0.3
Unfinished	3.0 20.0 2.0 0.8					1.0 6.7 2.9 0.3	3.0 20.0 12.5 0.8				3.0 20.0 5.5 0.8		1.0 6.7 100.0 0.3					1.0 6.7 14.3 0.3	1.0 6.7 20.0 0.3			1.0 6.7 33.3 0.3							1.0 6.7 33.3 0.3					15	4.1
Unknown	4.0 28.6 2.7 1.1				1.0 7.1 11.1 0.3	2.0 14.3 5.9 0.5	1.0 7.1 4.2 0.3	1.0 7.1 33.3 0.3		1.0 7.1 50.0 0.3											1.0 7.1 33.3 0.3		1.0 7.1 25.0 0.3					1.0 7.1 33.3 0.3	1.0 7.1 100.0 0.3				14	3.8
Complete Biface	22.0 52.4 14.8 6.0					5.0 11.9 14.7 1.4	5.0 11.9 20.8 1.4				8.0 19.0 14.5 2.2																2.0 4.8 14.3 0.5							42	11.4
Beaked Biface	1.0 25.0 0.7 0.3					1.0 25.0 2.9 0.3					2.0 50.0 3.6 0.5																							4	1.1
Convex Unilaterally Trimmed Uniface						1.0 33.3 2.9 0.3					2.0 66.7 3.6 0.5																							3	0.8
Concave Unilaterally Trimmed Uniface											1.0 100.0 1.8 0.3																							1	0.3
Bilaterally Trimmed Uniface	1.0 50.0 0.7 0.3										1.0 50.0 1.8 0.3																							2	0.5
Unilaterally and End Trimmed Uniface	3.0 60.0 2.0 0.8										1.0 20.0 1.8 0.3															1.0 20.0 7.1 0.3							5	1.4
Bilaterally and End Trimmed Uniface	1.0 33.3 0.7 0.3										1.0 33.3 1.8 0.3															1.0 33.3 7.1 00.3							3	0.8

End Trimmed Uniface						1.0 20.0 2.9 0.3					2.0 40.0 3.6 0.5																2.0 40.0 14.3 0.5							5	1.4
Miscellaneous Uniface	6.0 85.7 4.0 1.6										1.0 14.3 1.8 0.3																							7	1.9
Beaked Uniface	2.0 66.7 1.3 0.5										1.0 33.3 1.8 0.3																							3	0.8
Flake-Blade	1.0 50.0 0.7 0.3										1.0 50.0 1.8 0.3																							2	0.5
Notched Flake-Blade	1.0 100.0 0.7 0.3																																	1	0.3
Bidirectional Core	1.0 100.0 0.7 0.3																																	1	0.3
Multiplatform Core	6.0 54.5 4.0 1.6					1.0 9.1 4.2 0.3	1.0 9.1 4.2 0.3				3.0 27.3 5.5 0.8																							11	3.0
Bifacial Core	3.0 60.0 2.0 0.8						1.0 20.0 4.2 0.3				1.0 20.0 1.8 0.3																							5	1.4
Flake-Blade Core											2.0 100.0 3.6 0.5																							2	0.5
Guadalupe Tool					1.0 50.0 11.1 0.3																	1.0 50.0 33.3 0.3													2	0.5
Convex Retouched Flake	1.0 4.8 0.7 0.3						3.0 14.3 12.5 0.8				13.0 61.9 23.6 3.5																4.0 19.0 28.6 1.1							21	5.7
Concave Retouched Flake	5.0 83.3 3.4 1.4										1.0 16.7 1.8 0.3																							6	1.6
Straight Retouched Flake	2.0 50.0 1.3 0.5										1.0 25.0 1.8 0.3																1.0 25.0 7.1 0.3							4	1.1
Mano Fragment	5.0 100.0 3.4 1.4																																	5	1.4
Total	149.0	2.0	1.0	2.0	9.0	34.0	24.0	3.0	1.0	2.0	55.0	6.0	1.0	1.0	4.0	1.0	1.0	7.0	5.0	6.0	3.0	3.0	3.0	4.0	5.0	3.0	14.0	3.0	3.0	1.0	10.0	1.0	1.0	368	
Percentage	40.5	0.5	0.3	0.5	2.4	9.2	6.5	0.8	0.3	0.5	14.9	1.6	0.3	0.3	1.1	0.3	0.3	1.9	1.4	1.6	0.8	0.8	0.8	1.1	1.4	0.8	3.8	0.8	0.8	0.3	2.7	0.3	0.3		100.0

TABLE 9. TABULATION OF ALL ANALYZED LITHICS

Site	Dart Points	Arrow Points	Other Lithics	TOTAL	PERCENTAGE
41 BX 36	49 39.5 34.0 13.5	32 40.0 22.2 8.8	63 39.6 43.8 17.4	144	39.6
41 BX 371	2 1.6 100.0 0.6			2	0.6
41 BX 373	1 0.8 100.0 0.3			1	0.3
41 BX 375	2 1.6 100.0 0.6			2	0.6
41 BX 376	7 5.6 77.8 1.9		2 1.3 22.2 0.6	9	2.5
41 BX 377	14 11.3 41.2 3.9	8 10.0 23.5 2.2	12 7.5 35.3 3.3	34	9.4
41 BX 379	1 0.8 4.2 0.3	9 11.3 37.5 2.5	14 8.8 58.3 3.9	24	6.6
41 BX 380		2 2.5 66.7 0.6	1 0.6 33.3 0.3	3	0.8
41 BX 381	1 0.8 100.0 0.3			1	0.3
41 BX 382	1 0.8 50.0 0.3		1 0.6 50.0 0.3	2	0.6

TABLE 9. (continued)

Site	Dart Points	Arrow Points	Other Lithics	TOTAL	PERCENTAGE
41 BX 383	2 1.6 3.6 0.6	8 10.0 14.5 2.2	45 28.3 81.8 12.4	55	15.0
41 BX 385		6 7.5 100.0 1.7		6	1.7
41 BX 387			1 0.6 100.0 0.3	1	0.3
41 BX 388	1 0.8 100.0 0.3			1	0.3
41 BX 391	4 3.2 100.0 1.1			4	1.1
41 BX 392		1 1.3 100.0 0.3		1	0.3
41 BX 396		1 1.3 100.0 0.3		1	0.3
41 BX 400	3 2.4 42.9 0.8	3 3.8 42.9 0.8	1 0.6 14.3 0.3	7	1.9
41 BX 402	4 3.2 80.0 1.1		1 0.6 20.0 0.3	5	1.4
41 BX 403	6 4.8 100.0 1.7			6	1.7

TABLE 9. (continued)

Site	Dart Points	Arrow Points	Other Lithics	TOTAL	PERCENTAGE
41 BX 407	2 1.6 66.7 0.6		1 0.6 33.3 0.3	3	0.8
41 BX 408	2 1.6 66.7 0.6		1 0.6 33.3 0.3	3	0.8
41 BX 409	2 1.6 66.7 0.6		1 0.6 33.3 0.3	3	0.8
41 BX 424	3 2.4 75.0 0.8		1 0.6 25.0 0.3	4	1.1
41 BX 425	3 2.4 60.0 0.8	2 2.5 40.0 0.6		5	1.4
41 BX 426	1 0.8 33.3 0.3	2 2.5 66.7 0.6		3	0.8
41 BX 428	3 2.4 21.4 0.8		11 6.9 78.6 3.0	14	3.8
41 CM 70	3 2.4 100.0 0.8			3	0.8
41 CM 94		1 1.3 33.3 0.3	2 1.3 66.7 0.6	3	0.8
41 CM 96			1 0.6 100.0 0.3	1	0.3

TABLE 9. (continued)

Site	Dart Points	Arrow Points	Other Lithics	TOTAL	PERCENTAGE
41 CM 99	5 4.0 50.0 1.4	5 6.3 50.0 1.4		10	2.7
41 CM 100	1 0.8 100.0 0.3			1	0.3
41 CM 102	1 0.8 100.0 0.3			1	0.3
TOTAL	124	80	159	363	
PERCENTAGE	34.2	22.0	43.8		100.0

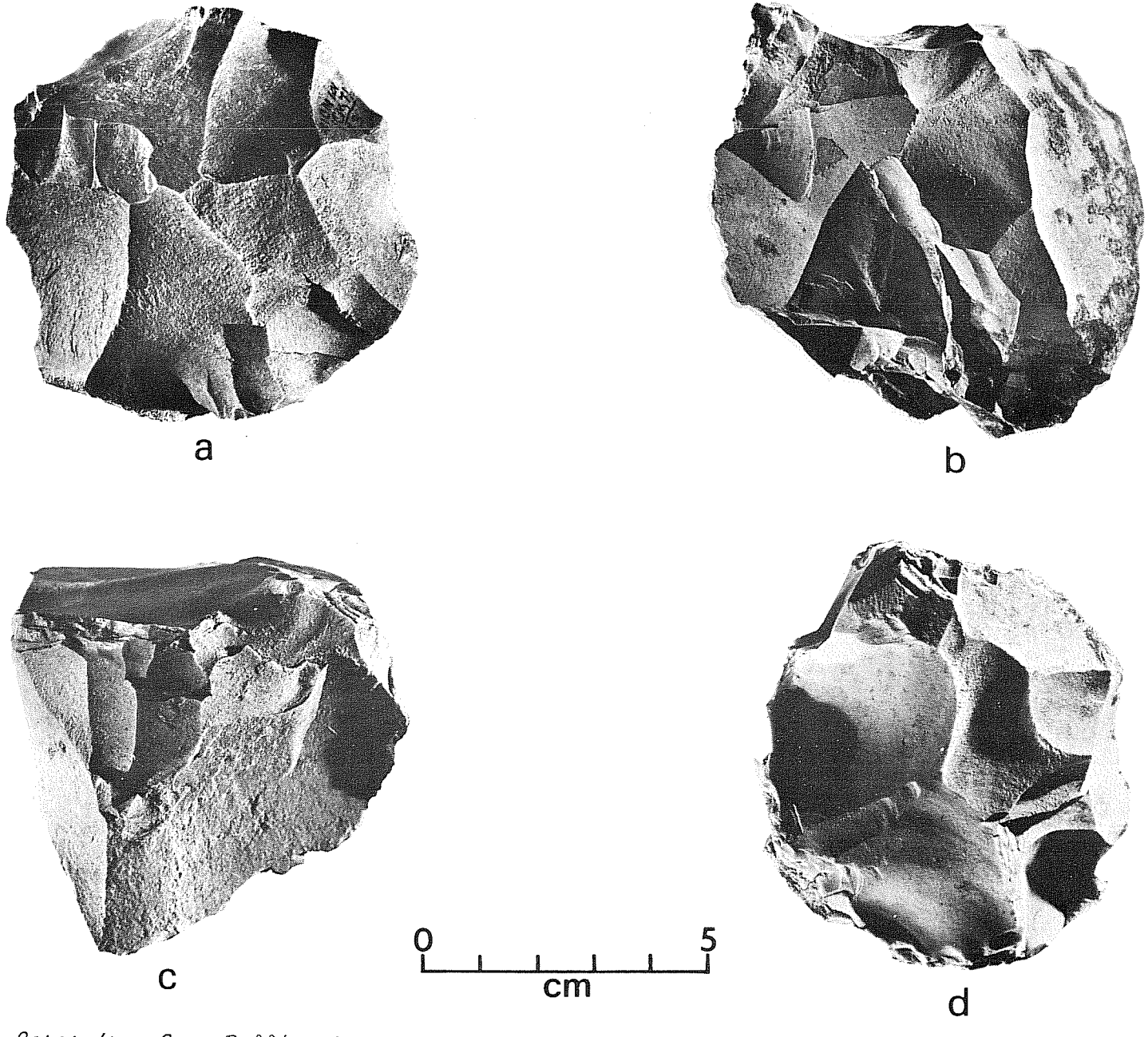

Figure 31. *Cores from Camp Bullis Sites.* a, 41 CM 101; b, 41 BX 375; c, 41 BX 407; d, near 41 BX 378-379.

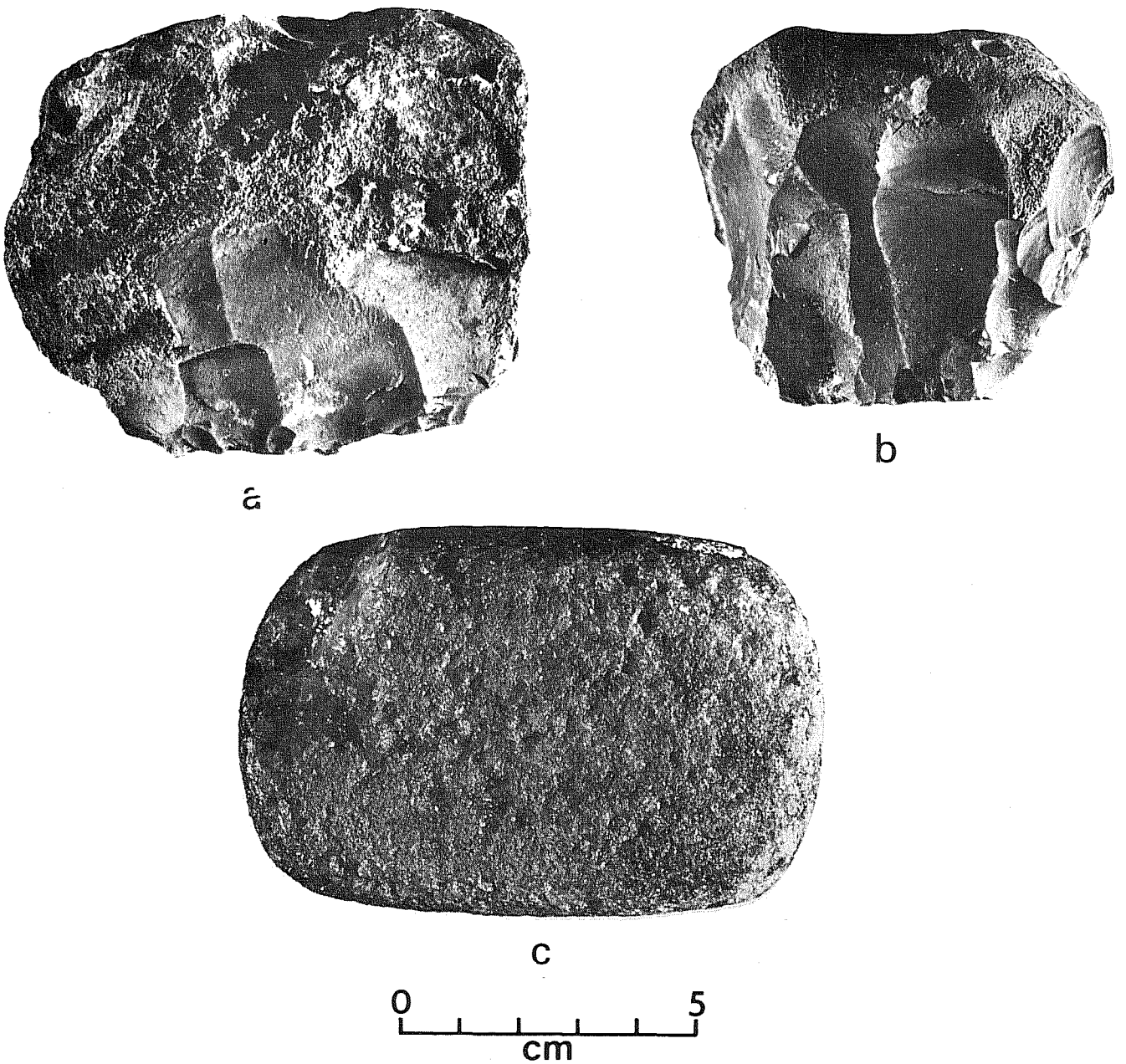

Figure 32. *Lithic Artifacts from Camp Bullis.* a,b, cores (a, 41 BX 379; b, 41 BX 374); c, ground stone artifact (41 BX 402).

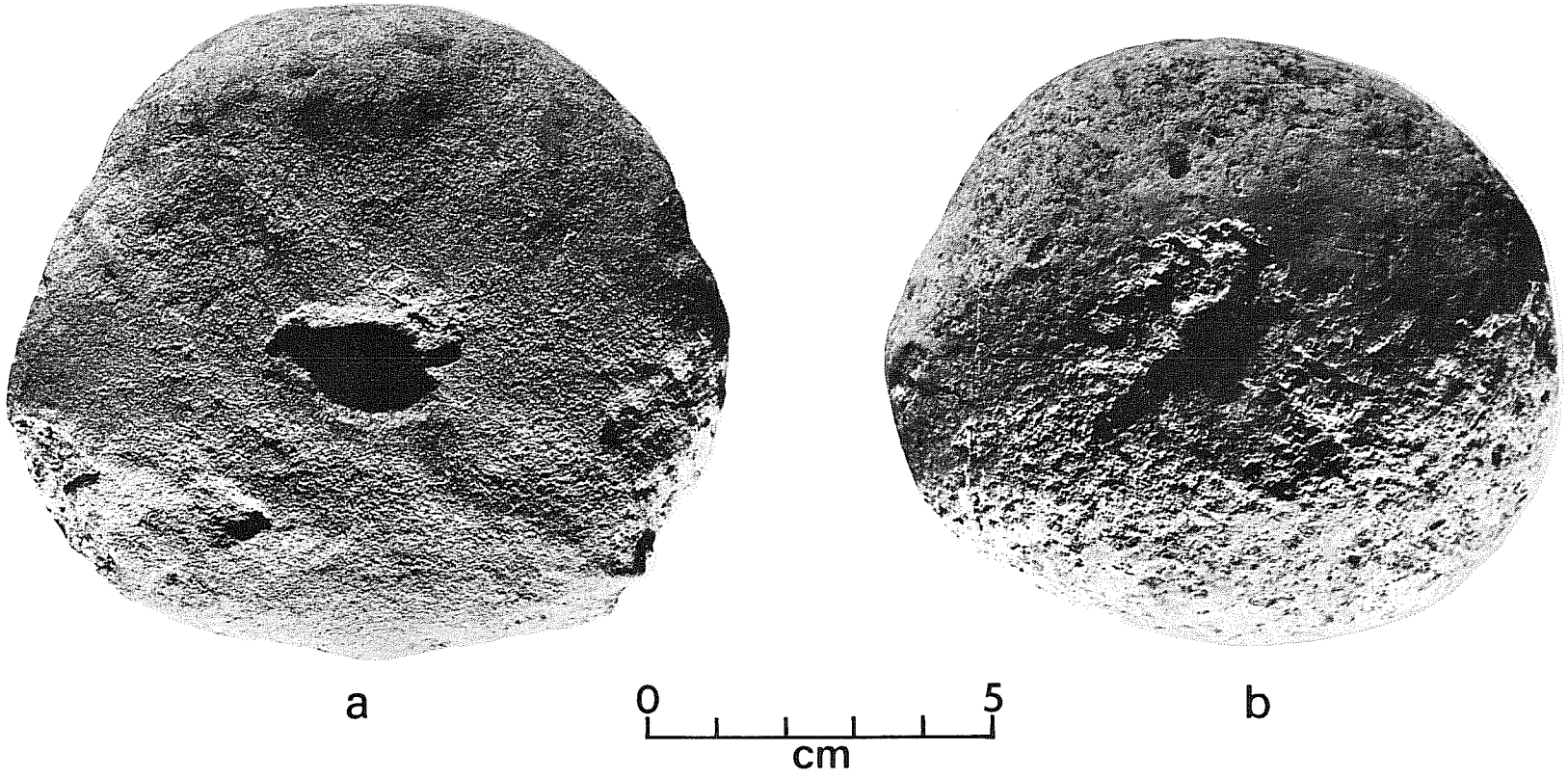

Figure 33. *Lithic Artifacts from Camp Bullis.* a,b, pecked stone artifacts; both are from site 41 BX 377.